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UNITED STATES
NUCLEAR REGULATORY COMMISSION

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In the Matter of:

)
336th ACRS MEETING)
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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

In the Matter of:)
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336th ACRS MEETING)
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Thursday,
April 7, 1988

Room 1046
1717 H Street N.W.
Washington, D.C. 20555

The above-entitled matter came on for hearing, pursuant to notice, at 1:30 p.m.

BEFORE: DR. WILLIAM KERR
Chairman
Professor of Nuclear Engineering
Director, Office of Energy Research
University of Michigan
Ann Arbor, Michigan

ACRS MEMBERS PRESENT:

DR. FORREST J. REMICK
Vice Chairman
Associate Vice-President for Research
Professor of Nuclear Engineering
The Pennsylvania State University
University Park, Pennsylvania

DR. HAROLD W. LEWIS
Professor of Physics
Department of Physics
University of California
Santa Barbara, california

ACRS MEMBERS PRESENT (CONTINUED:)

MR. CARLYLE MICHELSON
Retired Principal Nuclear Engineer
Tennessee Valley Authority
Knoxville, Tennessee, and
Retired Director, Office for Analysis & Evaluation of Operational Data
U.S. Nuclear Regulatory Commission
Washington, D.C.

DR. DADE MOELLER
Professor of Engineering in Environmental Health
Associate Dean for Continuing Education
School of Public Health
Harvard University
Boston, Massachusetts

DR. PAUL G. SHEWMON
Professor, Metallurgical Engineering Department
Ohio State University
Columbus, Ohio

DR. CHESTER P. SIESS
Professor Emeritus of Civil Engineering
University of Illinois
Urbana, Illinois

DR. MARTIN J. STEINDLER
Director, Chemical Technology Division
Argonne National Laboratory
Argonne, Illinois

MR. DAVID A. WARD
Research Manager on Special Assignment
E.I. du Pont de Nemours & Company
Savannah River Laboratory
Aiken, South Carolina

MR. CHARLES J. WYLIE
Retired Chief Engineer
Electrical Division
Duke Power Company
Charlotte, North Carolina

ACRS COGNIZANT STAFF MEMBER:

Raymond Fraley

NRS STAFF PRESENTERS:

Grian Grimes
Loren Bush

AFTERNOON SESSION

(1:30 p.m.)

DR. KERR: The first item on the agenda for the afternoon is a meeting with the Director of NRR. We are delighted to have Mr. Murley and some of his cohorts with us this afternoon.

Tom, we will turn things over to you.

MR. MURLEY: Okay. Thank you, Mr. Chairman. I wanted to respond to your questions and also bring my senior staff down to introduce them and kind of take a minute and explain how we do business, and also go over with the committee very briefly a number of items so that you can see where we are heading. And if you would like more details later on, we will be glad to do that on any individual topic.

So we do have a number of topics. I think I sent a note down, so with that we will just get into it.

First, on my left is Jim Sniezek, whom I am sure you know. He was the Deputy EDO, Deputy Director of INE for a period, and he is now Deputy of NRR, and he and I are more or less interchangeable in terms of the workings. He handles a lot of the issues that come up that either don't need my time or I don't have time to get to.

Frank Miroglia on his left is associate director of the projects. I am sure you know him as well. He handles all of the project management functions in the office. Particular

things that are, I guess, take a lot of his time right now are the near-term operating licenses and particularly the restart of the problem plant. We have got Pilgrim and Peach Bottom, and we will talk more about those in a minute. Steve Varga and Denny Crutchfield are division directors.

To my right, whom you may or may not know, is associate director for inspection and technical assessment. Tim comes from Region I. He has been up here from time to time. He was on CRGR until just recently. He's responsible for the technical review aspects of everything we do. He's got engineering, human factors, inspections, operating events, emergency planning and that sort of thing.

Mr. Shau, Mr. Rossi, Mr. Cardinal, Mr. Condo and Mr. Rohm are the division directors that report to Tim.

And, finally, Frank Gillespie whom you probably know from years past. He used to be in research and other places. He is the director of the program management, policy development and analysis. In addition to the administrative work under Frank in policy development areas, I look to Frank and his crew to perform. I'll give an example of what that might mean.

We might on occasion get a request for information on what is our view on whether a state can use a reactor site for low-level waste storage site. There I would turn to Frank and have his people develop a policy for that. So we try to

anticipate as much as we can issues that may come up and develop policies on those.

He is also the interface with research and the big areas there are severe accident, engineering safety issues. He will talk about that.

Also, the program development for inspection we had placed under Frank to keep it separate from the actual inspection division, the group that goes out and does it.

Now I will talk a bit about operational safety and the emphasis placed on it. The last time I was here, I believe last summer, I talked with the committee about that. It's the same emphasis.

If we are to ask how safe are these plants that we are regulating and how do we make them safer, there is really two questions that have to be asked. One is how safe is the basic design of the plant. The second question is how well are the plants being operated; distinctly different questions.

PRA can help us in our traditional safety analysis, can help us on the first question, but we don't up until recently have a good solid way of addressing how well plants are being operated.

In my judgment, the best way that we can ensure safety or improve it is to improve the quality and the professionalism in the way these plants are operated today. And so I made that top priority at NRR.

This means that we have to reduce our attention somewhat on relatively minor issues, because we only have a limited amount of resources. We can't deal with some of the minor issues that, although they have to be dealt with, they shouldn't take a lot of our time. I am talking things like snubbers, splices and chlorine monitors and stuff like that. These minor issues I think not only distract us, but they distract the licensee from what is most important, and that is operating his plant safely.

But to some extent I have to acknowledge that we are fighting human nature when we are doing this, and it's an easy path for engineers to focus on equipment, chlorine monitors and that sort of thing. It's not so easy to focus on management problems, personnel problems, personnel practices, the sorts of thing that are important to keep a plant from getting into trouble.

And so in that sense I am I guess changing the emphasis of the staff, changing not so much direction, but I guess our focus. And that leads me to my point on this topic, and that is I could use some help from the committee; that is, assuming you agree. Comments on whether we have got our priority right, advice on where we might have overlooked something in this area.

As I recall, it's been a few years now, probably four or five, the committee wrote a letter on Waterford, and they

were -- the last year or two before startup -- commenting they didn't think that the depth of staffing and the quality of staffing was as good as it should be at that stage. And I think that had an important impact in helping the staff and helping the licensee realize that they had to improve their experience for their operating staff.

So that is the sort of things that I think we could use some help on. And the specific question that Bill Kerr asked me to focus on was whether and to what degree the committee should be involved in restart of plants that have been shut down for an extended period. For example, Rancho Seco, Pilgrim, Peach Bottom and TVA plants. And I think the committee should be involved in that; certainly should be briefed. And clearly it's up to the committee to what -- how deep and what involvement you ought to have.

But for something that I regard to be as important to safety as it is, I think that the committee needs to be aware of that. And so we will be glad to -- in fact, we will schedule briefings well in advance of any restart decision. That might mean that next month, for example, we will come down and talk to you on Pilgram, and Frank Miroglia has some more to say about that.

Now to move on to severe accidents. I guess I have a chart.

MR. REMICK: Tom while you are getting ready, on the

matter of coming down and talking to ACRS, that sounds good, but the thought going through my mind, would that involve necessarily licensee representatives? Sometimes those meeting could be more helpful when there are people that are much more familiar with their specific, let's say staffing or something like that. Sometimes the staff, you know, the people they bring down aren't able to answer those specific questions.

I am not asking you to -- I guess I'm asking what are you thinking of there? Just staff coming down and briefing us?

MR. MURLEY: Well, primarily the staff. And we would get the regional staff down because they are the ones that are frequently much more deeply involved in the issues. And I think from time to time we would like to talk to you about some fairly sensitive personnel type issues that we would just want to be just the staff and the committee.

But I have no objection to bringing the licensee. And in fact I can see some cases where it would be beneficial to do that.

MR. REMICK: I don't know how ahead of time you define it. I wouldn't want it necessarily one way or the other, but I think it's something you have to keep in mind. Sometimes it's good to hear the other side of the story if there is a controversy, a difference let's say.

MR. MURLEY: Yes.

MR. MICHELSON: Just another comment. You struck a

cord when you said chlorine monitors, and let me offer a little bit of -- a few words of comment on that. It's not that I disagree with you at all.

But what, three or four years ago the NRC announced with fanfare that the LER system was being changed, and in fact it resulted in a factor of two reduction in the number of LERs being reported. And the goal was to assure yourselves that we did not have events being reported as LERs that really didn't tell us anything, or were not beneficial. So we reduced them by a factor of two.

Well, then when we examined the LERs being reported under this new system, we found just -- and don't hold me to the numbers, but we found a very high percentage of these LERs, and certainly the preponderant event that was causing control room HVAC systems to go in the emergency mode was a "failure" of chlorine monitoring.

And what we suggested was that these were cluttering up the LER system. They were not giving us any data that is useful as a performance indicator of how well the plant was operating. And in fact in many respects it wasn't a failure at all. It was a failure of the chlorine monitor, but in almost every event or circumstance, the control room went on the emergency mode, which is what it was supposed to do, so it was a wonderful test of the system. And that was our message.

MR. MURLEY: I think I am agreeing with you that

although there is a good reason to have chlorine monitors, that it ought not to be a thing that distracts the operator's attention from really important things, and it ought not to distract the staff.

DR. KERR: So we are going to quit having LERs submitted when chlorine monitors go on the fritz? Is that the conclusion?

MR. MURLEY: Jim, do you know the answer to that?

MR. SNIEZEK: Well, what we would be doing is taking the chlorine monitors out of the tech specs and therefore if they would malfunction, it would not be reported. That would essentially accomplish that.

MR. MICHELSON: Thank you. I did not realize that. I'm pleased to hear it.

MR. MURLEY: The last time I was down I talked to the committee using I think the same chart. And it is a kind of schematic of pulling together various pieces of the severe accident program.

Research of course is working on an overall plan now, and I would guess that that should be finished probably within a month or so. And I am sure the committee will get copies when it is.

I have shown three major parts of three lines I guess. One is the individual plant examinations which is to look at each plant in the country. That has now been sent to

CRGR. It's scheduled for review on April 18th, and I understand that the committee has some information on that. And you know the goal of that is to identify vulnerabilities and so forth.

Another line is what I just got done talking about, my top priority, which is improve plant operation. There is some general ongoing activities, SALP, management views, diagnostic inspections that are going to go on forever. But there are also some discrete products from that.

One is the improved tech spec program. I believe Tim is going to talk in a minute about that, but that is a very high priority for me, and that is to get a lot of the clutter out of the tech specs so that some of these newer plants sometimes are operating under five, six, seven LCO action statements, and that has to be distracting for operators.

And so we are in fact moving on the improved tech specs. We are meeting with the NUMARC people all the time how.

DR. KERR: What is the number of pages the tech specs can have?

MR. MURLEY: Number of pages?

DR. KERR: Yes.

MR. MURLEY: I don't recall.

DR. KERR: Or thickness in centimeters, or however --

MR. MURLEY: I can give you a figure that is probably more useful than that. And that is the new tech specs, new

standard tech specs should reduce the number of LCO action statements by half, or less than half.

DR. KERR: What about adopting a standard that said it shouldn't be thicker than 1 centimeter?

MR. MURLEY: Well.

DR. KERR: This thick and this type set.

MR. MURLEY: I simply don't know volumes. A volume is coming down but I don't know what it is.

We will be sending down also in another month a program on the BWR Mark I containments. This interim report should be due -- well, we are working on it this month, but it will probably be May before it gets down to the Commission. I am sure the committee -- will send a copy to the committee, and then come down and talk to you if you would like as well.

Briefly, the approach for the Mark Is is the following. Because the reactor system and the containment system are so tightly coupled for this plant, we don't believe that one can easily break out prevention of accidents from mitigation of severe accidents.

So we are going to propose what we call a balanced approach to all of this which includes some measures to prevent severe accidents, some measures to mitigate severe accidents and then another category in the middle which is accident management. And this is, although it's been around for some time, we are putting a good deal of emphasis on the whole area

of accident management.

And that's going to lead us into a product which I hope the goal will be severe accident procedures. By that I mean we intend to push our analysis and our PRA techniques and everything out into the beyond design basis accidents into the case where the plant is actually in trouble, the fuel is damaged, out into the recovery area in other words.

DR. SIESS: Tom, what is accomplished by containment performance research?

MR. MURLEY: Well, this is the work -- a lot of work that is being done in these recommendations is being done in research. So it includes not only experiments, for example, the Sandia tests, things like that, some hydrogen tests, but it also includes a lot of analysis.

DR. SIESS: Is it how containments will perform given an accident?

MR. MURLEY: Generally, yes.

DR. SIESS: That's the only research item you have got feeding into the severe accident picture. Am I missing something?

MR. MURLEY: Well, no, research will help us -- in fact everywhere. It is going to help us in the IPEs. It's going to help us -- I mean the office of research as well as their specific programs is going to help us in the accident management area as well.

DR. SIESS: I find it spelled out as a parallel path with in put, and it just sort of struck me as odd.

MR. MURLEY: No, this is just kind of a shorthand notation. But we are working very closely with research in this whole area.

MR. SHEWMON: I would like to have you come back to the severe accident procedures and say when you think you are going to have what preliminary product, or what product out on it because I would like to hear more about it.

MR. MURLEY: Yes, I don't have that today. I do have my staff working on a Commission paper which I think should be done probably in a couple of months. So if you would like, we could come down and brief the committee, I and the staff brief the committee on everything that is going on.

Brian Sharon in research also has a big research program in accident management.

Some work the utilities are doing on their own. I will give you some examples.

In the Pilgrim plan, they have a safety enhancement program that includes several features to deal with severe accidents, even once you are into them. And that, for example, they have got a new system for cross connecting the fire water system into the RHR system. So that if you lose water supplies or pumps like that, you can get fire water into RHR and into the containment spray and even into the vessel.

Susquehana has gone through a limited IPE themselves and they have come up with a number of procedures that they think will help them in the event that they do get into an accident, and they have also brought in some new equipment.

For example, they have a gas-fired generator that will help them keep their batteries charged, so they can always keep some DC power supply.

It's those sorts of things that we want to get into to see if we can provide the operators with not only some equipment but more important, some procedures for dealing with these accidents.

(Continued on next page.)

I guess in a nutshell, I have summarized what our goals are in severe accidents. I will be glad to come down and talk to you about any one of these topics, either with research or separately.

DR. KERR: You do expect at some point to have a closure?

DR. MURLEY: Yes. Closure in the sense that we brought the ECC LOCA issue to closure. When I joined the Commission, it was still very much an open issue. We had put out a rule in the early 1970s. But that didn't close it by any means. It left a big research mortgage.

And I guess I was one of the ones that had to help pay off that research mortgage. But now, LOCA ECCS is not a big issue. It doesn't come up. We don't get any letters on it or anything like that.

So in that sense, it is closed. I don't, I'm not optimistic that this is anything in the next year or two that's going to be. I'm thinking five and ten years. But at least we have to lay out a logic program, a thought process, that will get us there conceptually. And it also, I think we need it ourselves just to order our own business, to make sure we know what I'm doing fits in with what Eric Beckjord is doing and so forth.

MR. REMICK: A related question. I heard a month or so ago that NRC staff, and I'm not sure if it involves

headquarters, but definitely regions, are out in at least one case going to utilities saying you have a PRA and you have identified dominant sequences here. What are you doing about training your people to handle those.

Do you know is that true and if it is true, is it premature, from what I understand you are saying you are working on now? Are you working on severe accident?

DR. MURLEY: Yes. Let me put it this way. I am not familiar exactly with that. That clearly is the direction we are heading. I think it might be a little premature until we think through exactly what we're doing.

Now, we have some teams out doing inspections of emergency procedures. In other words, they are taking the procedures that are in place now and we're walking them down, talking with the operators, make sure they understand them. And that sort of thing.

So it might have come up in the context of that type of inspection. But we have not, certainly not made it a requirement and I don't think we're quite ready yet to make licensees put PRA insights into their training program. I think it's a good idea and if we feel comfortable doing it, I think we surely wouldn't object.

MR. WARD: One question. You referred to the ECCS issue as being closed. And I agree. But you said we are not getting any letters anymore as evidence for its closure. Well,

I don't understand.

DR. MURLEY: Just as an indication of what is on people's minds, it is not whether ECC systems will work or not. Whereas ten years ago, 15 years ago, as you know, that was a big thing.

MR. WARD: Yes. But these letters from whom. That's what I'm interested in.

DR. MURLEY: Not from the committee. Letters from the public complaining about ECC systems, for example.

MR. WARD: Okay. I was afraid you were going to say that. Yes. For the leading technical man in the agency, I hope you've got reasons for ECCS closure other than you aren't getting any letters from the public about it.

DR. MURLEY: I do. I think we closed it by showing that ECC systems would work. And we probed the boundaries of the systems through a very well laid-out, comprehensive research program. That's what convinces me that it's resolved.

MR. WARD: Okay. I like that a lot better than the letters from the public. Fine.

DR. MURLEY: Jim Sniezek is going to talk about the other topic.

MR. SNIEZEK: What I want to talk about briefly is the relationship between the Office of Special Projects and NRR.

As you know, back in March, 1987, the EDO of the

Commission established the Office of Special Projects and had that office responsible for the licensing and inspection of the TVA facilities and the Comanche Peak facility. That was to remain in place until the staff made sufficient progress towards resolution of the issues that faced both those utilities and the NRC staff.

At that time, there was a concern also that there had to be close cooperation between the Office of Special Projects and NRR to make sure that the agency as a whole was going down the same path and wasn't diverging.

I think that our experience has shown that there has been a close cooperation. And I will just use Sequoyah as an example where we've had close cooperation. The integrated design inspection that NRC did at Sequoyah was led by NRR and quite a few team members from NRR.

The seismic qualification issue, A-46. NRR worked closely with OSP to make sure that the resolution was being done consistently on those projects as the other sites.

The silicon rubber table issue that came up regarding equipment qualification at TVA, that was resolved with NRR jointly working with OSP to make sure that we are taking the same consistent approach in the area of equipment qualification.

Diesel generator loading, the droop question and the voltage droop on diesel generators and loading which wasn't a

new question, turned up at Sequoyah. We got a lot of consultation with OSP that to make sure we had the same basic resolution.

Likewise, Appendix R, and the interpretations associated with Appendix R. Those inspections at the TVA facilities, making sure they were consistent with what we did on our other plants.

Likewise, in-service inspection programs.

In addition to those examples of close coordination, there were certain things that NRR and the regions actually conducted for the Office of Special Projects. Operator licensing is a classic example. Emergency preparedness reviews and inspections. Safeguards licensing reviews and inspections, and the area of health physics. That was all handled out of NRR from the licensing side and Region 2 and Region 4 from the inspection side. So they were not done by OSP. So we still did have those close coupling.

So overall, we had a fairly healthy relationship between the offices.

Now, the current status. Sequoyah 2, as you are aware, has now been authorized by the Commission to restart. TVA and the Office of Special Projects has reached agreement on those issues necessary to resolve for the resumption of operations of Brown's Ferry 2 and Sequoyah 1. And that is shooting for about six months for Sequoyah and about seven or

eight months for the Brown's Ferry.

Likewise, OSP has just recently issued the first SCR on Comanche Peak which is leading to a hearing which will start around the June time frame with potential licensing around the Summer of 1989.

So we are at the stage now where we are starting to think of whether it's a time to fold the Office of Special Projects intact back into NRR versus reporting directly to the EVO. So that process is starting.

That is what I wanted to mention regarding the cooperation between NRR and OSP which we think has really been pretty healthy from our viewpoint.

MR. REMICK: Jim, is it appropriate to ask you a question in the operator licensing area?

MR. SNIEZEK: I probably wouldn't have much detail in that area right now. Somebody else may have it.

MR. REMICK: You stopped the requalification exams temporarily because of industry reaction and apparently now have devised a new mode which was conducted at Robinson and I think one other plant or soon to be one other plant.

MR. SNIEZEK: Fort Calhoun.

MR. REMICK: Fort Calhoun. The feedback that I have heard, although limited, was very favorable. Comments like well, if our operators couldn't pass that we really question whether they should be licensed, people saying it really is

performance based.

But I understand it took something like 50 man weeks of NRR time and when you think you are going back to what the Commission wants you to do in the requalification area, to me it seems impossible that you are going to be able to sustain that, although in the future it would probably take less time.

It seems to me that eventually, industry has to do that and we maybe get to something called check operator, which was suggested a couple years ago.

Is there any thought of check operator? When will you start routine requalification examinations again?

MR. MURLEY: We are planning to next year pick up the pace substantially -- And that is fiscal year, starting this Summer and this Fall -- pick up the pace on those exams. We know the first few are going to be very resource intensive. I'm not ready to throw in the towel yet on being able to do it all. We expect that we will get more -- we're going to lose people, but we expect to get more funding. So that means we are going to have to use contractors more. It's not the greatest way to do it but it can be done. So that's kind of a longwinded answer. I would like to wait until we get about six to nine months more experience under our belt before I really answer where we're going. I haven't given up on the check operator concept, but we're not on that path right now.

MR. REMICK: It's just my gut feeling that we are

heading that way and industry doesn't know it and the NRC doesn't know it. I think we are going to end up with something like that just from a practical standpoint.

DR. MURLEY: We might, but right now we're on the path of doing away with --

MR. SNIEZEK: We have had some discussions along that line and industry does definitely support the way these programs are going now.

Anything else?

(Continued on the next page.)

MR. MURLEY: Tom is next. And while he is walking up there, Mr. Chairman, I forgot part of my punch line. Which is you had asked the question on thoughts on keeping the molten core in the reactor vessel. The genesis for that comment that I made last time was this notion of accident management, and that is what I really had in mind. Not so much additional hardware, although I do not rule that out. What I have in mind is better procedures, and possibly some additional hardware, and additional power supplies, and additional water supplies, something like that. So that even once an accident starts, you do not automatically throw in the towel and assume.

DR. KERN: Well, I interpreted your comments as a response to that.

MR. MURLEY: Okay.

MR. MIRAGLIA: Good afternoon, gentlemen. Frank Miraglia of NRR. You have expressed an interest in two categories of plants, and there are quite a few to discuss. I will make a few comments on each, and entertain any questions that you gentlemen may have.

(Slides shown.)

There are currently seven plants in the shutdown status, long-term shutdown, shutdown for various reasons. And what I have done here is indicated the Applicant's estimated restart date for those specifically.

Peach Bottom 2 and 3, as you recall, was shut down a

little over a year ago by order of the NRC. They have undergone a major reorganization at corporate level as well as plant staff level. They have developed a plan for addressing concerns that were raised, predominantly in the management area as well as upgrading maintenance programs, training programs, and the like.

The projected dates for each of the facilities would be Unit 2 in November of this year, and Unit 3 in December. I believe that the committee had a briefing perhaps in the fall of last year.

DR. KERN: We did. Mr. Miraglia, we did. I would like to repeat a question that I asked at that time.

And that is on what basis do you decide when those plants are ready to operate again? I did not get an answer to that question in the earlier briefing.

MR. MIRAGLIA: I think that one has to look for each of these plants some of the factors that resulted in a shutdown.

DR. KERN: I am talking about Peach Bottom 2 and 3.

MR. MIRAGLIA: At Peach Bottom, the concern was, as you recall, the order was as a result of allegations about inattentiveness.

DR. KERN: I think that I understand why it was shut down.

MR. MIRAGLIA: And the concerns that were raised in

that thing were management issues and concerns.

DR. KERN: My question is how do you decide when things are at a point at which you can reauthorize restart, what criteria do you use?

MR. MIRAGLIA: I think that when we feel that they have demonstrated that they have addressed the issues that led to the shutdown, and that they can comply with the Commission's regulations, and they are safe to operate.

MR. MURLEY: When you get into this management area, as you know, it gets very difficult. What we are looking for at Peach Bottom is a stable management organization of capable of people. Since the shutdown order, as you know probably, everyone from the shift supervisors up through the chairman of the board has been removed or retired.

So there are new people in the management chain and at the plant. We would like to see how they are going to operate things. So far, the signs are good. And we would like to observe them in performance even while the plants are shut down. That is number one.

Two is we have to come to some judgment on the operators themselves, the ones whose performance caused us to take the action that we did. So we are interviewing the operators one by one, and they are going through a retraining program of their own. And we are going to assess each operator one by one as to whether we believe they have the right safety

attitudes, and the right training, and that sort of the thing.

I guess that those would be the two key areas. In addition, the licensee himself has not yet said that they are ready to operate. They know our concerns. And the last information that I had was that it would probably be toward the fall before they would even tell us themselves.

MR. SHEWMON: Has INPO scheduled another review of Peach Bottom?

MR. MURLEY: They are continuing.

DR. KERN: What I seem to be hearing is that you really do not have any objective criteria. But when they reach that point, that you will sort know that the management attitude and the operator attitude is what you want it to be. And at that point, you will reauthorize restart.

Is that a fair assessment?

MR. MURLEY: Yes. We have to be satisfied overall that the plant itself is ready to operate. As you know, they are changing the piping out on one of the units. But it is mostly the management and the operators.

DR. KERN: The reason that I asked the question is because it seems to me that it is an important issue not only for this plant, but for many of the other plants that are in operation. I was told during that briefing that these operators would have passed any of the licensing or requal examinations that they were taking.

And also apparently, the problem was not identified initially, or at least it was not identified forcefully, by the NRC staff, but rather by external observers. And this leads me to sort of ask the question how do you know that the same thing is not happening at forty other plants. And if it is or is not, how do you know that the situation has been corrected.

And what I have heard so far is well, it is sort of a gut feeling that we have, and that is the way that we will decide.

MR. MURLEY: Let me take it first, Frank, because I was right up there at the scene with Peach Bottom.

DR. KERN: Please do not misunderstand me. I think that I understand why the plant was shut down. That is not an issue.

MR. MURLEY: But you characterized it in a way that I think that I have to alter a little bit. We knew that there were performance problems at the plant. We were seeing signs of it at several places. They had a case where they bypassed some of their lock sequences and things that like, which we gave a civil penalty for.

We knew that their attitude was not good. We did not exactly know why. That it a difficult question. And we did not know that when were not there that their performance was really unprofessional. That is what we learned through outside sources. But we were not completely taken by surprise. That

was simply the straw that broke the camel's back, so to speak.

Now having known that poor attitude, we know I think how to look for signs when it is changed. Now you are raising another question. And that is how do we know that that same poor attitude does not go on at other plants. We cannot be sure. But we look for signs, poor performance, not following procedures. There are a lot of ways to look at that.

DR. KERN: But Tom, unless things have changed, you did not shut them down for the poor attitude. You knew that it was there. I do not mean you personally, but the organization apparently knew the poor attitude was there. That was not the reason for shutdown.

So I assume that you would not shut down other plants just because the operators had a poor attitude, or would you now?

MR. MURLEY: It depends. No, we are not going to go out assessing attitude. I mean that is important that they have a good safety attitude. But I think that we would look for how it affects performance. And if they are in fact not following procedures and if it is leading to observed problems, we could very well shut a plant down short of an actual event.

DR. KERN: But I thought that what I heard was that when the attitude becomes a good attitude, then you will feel like having them start up again, which says to me that you would be reluctant to have a plant to operated by a group that

has a poor attitude.

MR. MURLEY: Well, when they have got a track record like they do at Peach Bottom, that is correct.

DR. KERN: Thank you.

MR. MIRAGLIA: And I think that one of the concerns that is demonstrated here is that there was that attitude in the control room. There are indications that management may have been aware of that kind of thing going on in the control room. And the management either perhaps was not timely aware or whatever, but did not take the steps to correct it.

I think that the licensees have the responsibility for the operation of these facilities. And I think that our regulations are built on tiered structures of checks and balances. And I think that the concern here at Peach Bottom was that we wanted to assure ourselves that that attitude in the control room, that the management took the right kind of steps, and what were the reasons for that attitude existing. And somewhere in management, it was not coming up in the organization.

What changes needed to be done to assure ourselves that those check and balance systems were there. In order for them to work, there has to be information flow top to bottom. And that kind of thing indicated that there was something in the chain that was not working to get those checks and balances to work as well.

So I think that it is the operators and the management attitude. And I think that it is a combination of those kinds of things.

MR. WYLIE: Let me ask a question. There has been a lot of publicity associated with Peach Bottom regarding drug problems down there.

Did you find that to be a real problem?

MR. MIRAGLIA: My recollection is that there were concerns at both Peach Bottom and Limerick. It seemed to me that the predominant concerns were at the Limerick sites which had the large number of craft and construction workers. But Tim, I see you nodding your head.

MR. MURLEY: They had some problems.

MR. MIRAGLIA: They had some problems at Peach Bottom, but I do not believe that it involved licensed operating staff.

MR. MARTIN: Tim Martin. The investigation did determine that there were problems at both facilities, but the larger number of them were in the Limerick area.

MR. WYLIE: Did you review their drug control program to assess the effectiveness of it?

MR. MARTIN: I did not personally, but I believe they did.

MR. WYLIE: What did they find?

MR. MARTIN: I cannot answer that.

MR. WYLIE: What I am trying to get at is did the utility have an effective program?

MR. MURLEY: They did have a drug program. My recollection is that it did not involve random testing. But they did observe people. They have on occasion found problems themselves and taken corrective action. They took action at Peach Bottom on I believe contractor personnel, not their own personnel. And they have just taken steps to enhance their fitness for duty program just this week. So I am not familiar with the details of that. We can get you more information.

MR. WYLIE: I was curious as to what the previous program allowed to get by that contributed to the problem.

Would you say that it did contribute to the problem?

MR. MIRAGLIA: To the extent of the behavior of the controller operators, I do not know if we have any indications. I would expect now.

MR. MARTIN: I know of no connection between the operators' performance and the discovery of drug activities at that facility. I do not know that it has been put together. As I remember the issue, there was actually some selling of drugs on site, that contractor personnel were involved. They even found some residue of drugs in certain places. I do not remember any connection made to the performance of the operators and this drug business. That does not say that it was not made, but I do not know of a connection.

MR. WYLIE: Thank you.

MR. MIRAGLIA: The next facility is Pilgrim. Pilgrim was shut down in the spring of 1986 by a confirmatory action letter from Region 1. It had a number of equipment problems, and issues and concerns, radiation protection issues. Since the shutdown, a number of other issues have been raised in the emergency preparedness area.

Again there were a significant number of management changes at the facility, equipment upgrades, and even an enhancement program to deal with issues that go beyond design basis accidents. They have a restart plan before the staff. There is a restart panel that consists of NRR and Region 1 staff that have been following this activity.

The licensee has indicated that he feels that he would be ready to indicate to us at the end of May or early June that he would be ready for us to come in and asses his readiness to restart with a projected date for July.

As Dr. Murley had indicated, we can arrange for staff to come and brief the committee on the Pilgrim activities. And if the committee is interested in doing that, we will take steps to set that up for your May meeting, if you desire, and if there is time on the calendar.

Briefly on the TVA plants, Sequoyah 2 was just restarted. Those activities are being handled right now by the Office of Special Projects. Again I believe that the committee

has had interaction on some of these facilities. I do not know whether it is all. I know that you have been involved in the Sequoyah 2 restart.

The projected schedules that we have for the TVA plants would be September of this year for Sequoyah 1, Browns Ferry 2 at the end of this calendar year, and then followed by Browns Ferry 1 and Browns Ferry 3 in 1989 and 1990.

I have a discussion of the TVA plants that are in the OL category. OL plants. Shoreham, as you are aware, has received a low power license and completed all low power testing. The full power issues are the adequacy of the emergency preparedness issues.

There are a number of activities that are ongoing there. There are several licensing panels reviewing different aspects of the emergency preparedness reviews, one having to do with the exercise of the utility plant, and another panel that is reviewing the utility prepared emergency plan.

As you recall, New York and the local communities did not prepare a plan. New guidance has been provided as a result of the Commission's rule. The utility has resubmitted their plan to demonstrate compliance with that guidance. There is an exercise that will occur I believe in June of this year as to what the projected target is against that plan. That will be assessed by NRC and FEMA. And matters of continuing contention will be litigated in a hearing.

And we are projecting spring of 1989 for a potential full power decision. If the drill and the issues go well, that would the projected date for the Shoreham license.

(Continued on next page.)

Again, Seabrook has a fuel load license, and there are one or two technical issues that need to be resolved and are before hearing boards with respect to issuing a low power license, a 5 percent license. They deal with some questions on equipment qualifications of coaxial cable. The bigger issue has to do with getting a determination that they could meet the early alert notification.

In order to have a low-power license issued it has been the staff practice that the alert system should be in place in the local area. Certain communities in Massachusetts have removed the sirens within the EPZ and therefore the licensee cannot demonstrate that they meet the alert notification and that's a matter that's being litigated as well before a licensing board.

And then in addition, there is the larger concern. There are ongoing hearings and proceedings with respect to the adequacy of the emergency plans prepared by the State of New Hampshire. That matter is essentially complete except for one issue that I think they will go back to hearing on this Summer and the utility has developed an emergency plan for the communities in Massachusetts, since Massachusetts has not submitted emergency plans for the EPZ. Those plans have been submitted to the staff and FEMA and are being reviewed again with an exercise projected for June time frame with hearings commencing perhaps late Summer, early Fall, and again, a

projected date of Spring of 1989 for a potential full power decision on Seabrook.

DR. MURLEY: Frank, why don't we let Tim get on and leave it as an offer to come down and brief the committee on any one of these topics further, if you like.

(Slides shown)

MR. MARTIN: Very quickly, my name is Tim Martin and I am the Associate Director for Inspections and Technical Assessment. I am new to this job. Most of you have far more corporate history than I do on every one of these issues so I won't bore you with what the genesis of them are.

In the technical specifications improvement program, I want to point out, it is a voluntary and cooperative effort between industry and the NRC, that its major purpose is to enhance safety by having operators focus on those issues which are most important to safety.

The key elements here are the tech. spec. split. That split is dictated by the Commission's interim policy statement on the technical specifications. The second part is the near term line item improvements which have been ongoing for some time. And then the other miscellaneous support tasks, which include the 10 CFR 50-59 guidelines which are being developed by NUMARC, and our efforts to endorse those through a guidance document.

The second part is developing a standard review plan

for the new standard tech. specs that result and then efforts by both research and NRR in improving tech. specs further, utilizing the techniques of PRA.

Current status, the split report is about to be issued shortly. In fact, I hope to find it on my desk when I get back. The second item, the key implementation issues, we have a meeting scheduled with NUMARC on the 12th of April and we hope to be able to resolve some of their concerns with the implementation issues.

During my time, we have issued one generic letter on the removal of organization charts from the tech. specs, given the implementation of additional controls on making changes to organizations to fit particular performance criteria of the organization.

With regard to the 10 CFR 59 upgrades, the NRC is in the process now of providing their second round of comments on the industry's initiative. I should let you know that we are currently scheduled to brief the Commission on the status of the tech. spec. improvement program in late May. That's where we're headed for this one.

MR. LEWIS: I know it isn't fair to ask you this question, probably, but let me do it anyway.

The first thing on this slide says to improve safety. Presumably, that means to lower the probability of an accident. Is that what it means?

MR. MARTIN: And in fact it would do that. And we see it in the following manner.

By removing a lot of chaff in the tech. specs, you better focus the licensee and the operators on those issues which are most important to safety.

As a result it is less likely that they go unnoticed when they go awry.

MR. LEWIS: And therefore you lower the probability of an accident.

MR. MARTIN: That's right.

MR. LEWIS: So the reason for doing this is that there is a judgment that the probability of an accident is not low enough.

MR. MARTIN: The judgment is that there are a lot of distractions in that tech. spec. and a lot of white elephants that got in that don't have the same safety --

MR. LEWIS: But it says here the purpose is to improve safety, which means to lower the probability of an accident. And presumably, therefore, you are expending effort because you don't think the probability of an accident is low enough.

MR. MARTIN: It is never low enough. We would like to drive it lower.

MR. LEWIS: Aha. then why does the Commission issue safety goals?

MR. MARTIN: How's that? I didn't understand your question.

MR. LEWIS: Well, the question is, if it is never low enough, that means you are ignoring the fact that the Commission has stated what is low enough.

MR. MARTIN: All right.

MR. LEWIS: I trapped you. Now, are you going to jump in on this one?

(Laughter)

MR. LEWIS: I trapped you rather adeptly, I thought.

MR. MURLEY: We only have a few more hours.

The safety goals, I don't think we are prepared to use them as individual licensing cases. In fact, I'm sure we're not. So here's where it comes in.

If you are going to use the safety goals, you have to have the means for measuring whether your plant, how it comes up against it. The only means we have right now are PRA, really. PRA cannot tell you how well operators are operating. So you cannot get, in my judgment, an accurate measurement of the risk of a plant unless you know how well the operators are doing.

MR. LEWIS: And therefore, you are always motivated to reduce the probability of an accident.

DR. MURLEY: Yes.

MR. LEWIS: So you agreed with what he said at the

end, that you are never low enough?

DR. MURLEY: That's right. Because the PRAs, insofar as they do measure risk, they use some standards of performance that I am not totally sure we need across the board. And so we are always going to try to drive the operating performance best. And that's the end.

MR. LEWIS: So you know what I'm pushing at. The fact that the Commission has issued safety goals which purport to say what level of performance is okay and as nearly as I can tell from what both of you have said, they have no impact on the way you are going about regulating the industry.

DR. MURLEY: They do have an impact in a generic sense. That is, I think we can use the safety goals to judge generic actions and that sort of thing. We are not using them in individual licensing.

MR. LEWIS: Again, we're not talking about that. You both said that in a sense the level of safety is never sufficiently good. Talking generically. This is a generic issue.

MR. MARTIN: If we can come up with a reasonably inexpensive way to improve safety, we're going to do it.

MR. LEWIS: I don't want to rub it in, but I think that is inconsistent with the Commission's promulgation of safety goals. And at some point, not today, you're going to have to come to grips with that.

MR. SNIEZEK: Regarding the changes in the tech. specs, there are things in there that really don't impact safety much. And if we're diverting industry resources, and we're diverting our resources to make tech. spec. amendments and process them, we're not doing what's right. We should be devoting our attention to things like station blackout, get those things, really get them implemented, spend our time reviewing that, and not the garbage that's in the tech. specs now.

MR. MARTIN: Let's move on. The maintenance improvement program, which is the second area I wanted to talk about, the basic purpose here is to preserve and assure restoration, availability and performance, reliability of plant structure systems and components. The key elements here, policy statement, as marked up by the Commission, has been submitted for publication in the Federal register. We are embarking on a performance-based team inspection program to assess the effectiveness of maintenance and to identify needed improvements of individual licensees, and research is now working on a proposed rulemaking package.

Current status, the policy statement, as I say, has already been provided for publication. The inspection procedures, the temporary instruction that we will utilize focusing on plants that have some problems, will be based upon the management oversight and risk tree technology, involving

SSDS, out of Idaho, to help us develop the appropriate inspection procedures. And we are working closely with them. That should be completed here very soon.

We have already outlined the training that we intend to provide to the team leaders and the members who will perform the inspections.

The first two pilot inspections are scheduled now for June of 1988 and we have a Commission paper drafted outlining what we're going to be doing in the rule.

DR. KERR: What leads you to believe that you can with this procedure enhance safety and improve the effectiveness, assuming that that is a good goal. Let's take that as a given. What leads you to believe that a rule can do that?

MR. MARTIN: I was not involved in the genesis of why a rule was necessary and I'm not going to comment on the pros and cons of a rule.

DR. KERR: Well, surely you are not doing something that takes a great deal of effort and resources without being convinced that it may work?

MR. MARTIN: In fact, I am not actively involved in the rule development. The package, that is being done by research, and we are certainly working with them on that.

MR. SNIEZEK: When the staff went down to the Commission we did not recommend a rule; the Commission directed

the staff to come up with a rule.

DR. KERR: So you are doing it because the Commission has concluded that it will do what purpose --

MR. MICHELSON: I thought you had recommended waiting, you know, developing the rule over a two-year period or something in anticipation that it might be needed. Wasn't that the case?

DR. MURLEY: Yes. The rule will give us additional clout, so to speak, in looking at programs and in making sure that the programs are improved.

DR. KERR: Well, that is assuming that you guys have identified when a program is improved. And it also assumes that by a rule, you can improve the maintenance program of a utility that is not competent enough to have a good measurement program.

DR. MURLEY: We have found in cases past poor maintenance programs, and there's just no doubt about it.

DR. KERR: My question is who would have approved that.

DR. MURLEY: Now we are going to have a means for bringing about improvement.

DR. KERR: No, no, wait a minute. Now you are going to have a rule. But whether that rule will bring about improvement or not it seems to me -- that's what I'm asking. What is it that leads you to believe that a rule will bring

about what you hope to accomplish?

DR. MURLEY: Well, you get into -- the fundamental reason in my mind is that it enhances our enforcement capability so we now have a stick so to speak.

DR. KERR: You mean that if a utility has a lousy maintenance program, you can tell them you've got to have a good one and it'll help?

DR. MURLEY: Well, just us telling them won't do it. But if they don't we now can take enforcement action up to and including shutting the plant down.

DR. KERR: But you could do that now. You can shut that plant down anytime you think that what is going on is too much of a risk. You just did it at Peach Bottom. And you don't have to have a rule or maintenance to do that.

DR. MURLEY: You're arguing with the wrong people about the pros and cons of a rule.

DR. KERR: Wait a minute. You guys, the Commission depends on you guys to make recommendations to them. They surely must. They have told us time and again they like the staff, it is a very competent staff, and all that. And if you guys are not convinced that this is a good rule, surely you must be telling the Commission that.

MR. MARTIN: They did. They recommended a rule.

MR. SNIEZEK: I recommended at the Commission meeting representing the staff, with the EEO, we recommended they not

have a rule at this time. We didn't need a rule. We wanted to really assess how good or bad the programs were and if necessary at the end we would be prepared to develop a rule. The Commission directed the staff to develop a rule. We work for the Commission.

DR. KERR: I'm talking to the wrong people, then, and I apologize.

MR. MARTIN: And I think the other point is, it is a proposed rulemaking package that will be available in the August time frame. I can't articulate for you today what's going to be in that rule package. It is still under development. And I think we may be second guessing what's going to come out in that package. We will certainly have to take a position when that proposed package comes forward.

DR. KERR: Thank you.

MR. MARTIN: The next area I want to talk about is the operation and analysis program. I know that there are some specific questions that the ACRS asked.

Our basic purpose is to mitigate ongoing events and to prevent recurrence of those events. The elements, the key elements I see are early involvement in ongoing events of safety significance.

That means that if it rises to a certain level, the incident response center immediately gets Ernie Rossi on the phone or whoever is acting for him and he interacts in a real

time basis to monitor what the licensee is doing, to determine if he is taking appropriate action, to mitigate the consequences of the event, to get appropriate resources, NRC resources, focused on the problem and assist the licensee in bringing that particular plant to a safe, stable condition.

DR. KERR: So if you thin, that the plant operators are not doing the right thing, you tell them to do something different during the course of the accident?

MR. MARTIN: If it comes down to we believe they are going in the wrong direction, we have the obligation to recommend to them additional --

DR. KERR: I didn't say recommend. I said order.

MR. MARTIN: I did not say order. I said recommend.

DR. KERR: Oh. Okay.

MR. MARTIN: In fact, we normally reserve orders to the Commission giving those orders, that authority, even if we get a site team there who has a good feel, doesn't normally get the authority to order, except in very specific limited areas where it has to be solicited by the Commission and they have to give authority. We do carry, by the way, into the field, as part of the site team, the draft legal paper to convert it into an order.

DR. KERR: So you assign the right to order?

MR. MARTIN: That's correct.

DR. KERR: In the course of an accident, to do

something different than what he considers in his best judgment should be done.

MR. MARTIN: We contemplate it would never have to occur.

DR. KERR: You don't carry an order into the field unless you contemplate that it might occur.

MR. MARTIN: Because that may be an obligation we carry. We may have to order to ensure public health and safety.

DR. KERR: I must say that frightens me.

DR. MURLEY: We always have that obligation, on anything, to order a licensee, if he is not protecting the health and safety of the public, if we don't think he is, to order him to do something. I don't expect that we'd really have to use it. I think we're kind of overplaying this whole area because it is rare even that we advise it or recommend it.

DR. KERR: Serious accidents, thank God, are rare events so far. And hence, this is not something for which there is going to be a lot of precedent or for which there's going to be a lot of experience.

But what I'm hearing is that in the course of a severe accident of a plant in which presumably the operating people there know more about this plant and its characteristics than anybody else, the NRC contemplates that they will order the operating staff to do something different than in their

best judgment they should be doing.

DR. MURLEY: We have the capability and the authority to do that. Let me give an example, Mr. Chairman.

If knowing what I know now, about the Three Mile Island accident, if I'd been in the control room at 6:00 O'clock that Wednesday morning and the operators did not want to turn on the high pressure injection because they didn't want to overfill the pressurizer and I saw what was going on, I would not hesitate to order them to turn on the safety system. That's an example of how one might use such authority.

MR. LEWIS: You know, this is actually a deep question, because the question of the extent to which an accident is going to be managed out of Washington and the extent to which it's going to be managed by the plant is a very, very old one and a very important one.

And I remember some years ago when we were talking about the not so lamented data link that a distinguished member of the staff, when asked if he would try to manage an accident from Washington, a really severe accident, which is, as our Chairman says, a very rare event, said no, no, we wouldn't dream of intervening unless of course we thought they were doing something wrong. And I think that's roughly what you said.

Now, that gentlemen became EDO and so apparently it's a well respected position. But it is extremely important, and

it is a philosophical issue we really ought to straighten out before the accident.

MR. SNIEZEK: Actually, in the TMI, actually we did order the licensee. We ordered them to stop discharge to the Susquehanna when he thought it was the safest thing to do, the NRC did order him to do that. It has been used.

MR. LEWIS: In the case of Three Mile Island, there was a presence on the site. The issue at the time of the data link was whether it be done on the basis of information available here.

And obviously, there are degrees of intervention. So it's just not a simple question.

But I confess for myself I am very disturbed at the idea of long distance manipulation of a severe accident. I think that on balance it's a bad idea.

DR. MURLEY: Now, we hear that.

MR. LEWIS: Unless they are doing something wrong.

DR. MURLEY: No. We would have to be quite certain that they were doing something wrong. And I prefaced my example with my statement that if I were in the control room --

MR. LEWIS: Yes, you did.

DR. KERR: You also said, "and know what I know now."

DR. MURLEY: "And know what I know now."

DR. KERR: But you see, you will never be in the

control room and know what one knows two years later. So if that is the only circumstances under which you would do it, then I feel okay.

DR. MURLEY: I would have to be, speaking for myself, I would have to be very positive that I knew that the operators were doing something unsafe. And we will most often defer to the operators.

DR. KERR: We've probably made enough of that point.

MR. MARTIN: All right. The lesser events that are not ongoing, there is the next working day assessment of the operational safety and the generic implications. This assessment involves the 50-72 reports that have come into the incident response center, the daily reports which have come in from the regions and the part 21 reports that have been submitted.

There is early assignment of follow-up responsibilities for those that seem to have generic application, or if there is an operational safety problem that we believe still may exist, then that is dealt with promptly.

The end result could be an information notice, bulletin or generic letter or even opening of a generic issue.

I would like to also point out that we do evaluate studies provided by AEOD. A recent example would have been the instrument air system problems that resulted I believe in a bulletin.

The current status of that is obviously operational. You have been briefed almost monthly on what is going on there.

MR. MICHELSON: Before you leave that slide, let me ask a couple of questions.

First of all, to what extent now -- you quite clearly are doing a short term assessment of things as they happen. What do you do in terms of a longer term assessment?

MR. MARTIN: The longer term assessments are basically done by AEOD and the regions. The regions, focusing on individual plants, AEOD focusing on trends and patterns developed over a number of licenses.

We do not specifically go in and review every LER. That is done by the regions and also AEOD.

MR. MICHELSON: Do the regions review every LER?

MR. MARTIN: Yes, sir, they do.

MR. MICHELSON: From every other region?

MR. MARTIN: No, sir.

MR. MICHELSON: Just their own?

MR. MARTIN: They are focusing on their individual plants whereas the generic work is being done by AEOD.

MR. MICHELSON: I see.

Now, the other question I was wondering about was there are some very interesting deficiency reports that have arrived from time to time. These are really events before licensing in many cases, so they are treated as send in those

deficiency reports instead of LERs.

If you begin to look at a few of them on certain plants, one wonders, well, how is this being pulled together? Does the agency realize these particular deficiencies from different parts of the country are coming together and looking rather strange? Because they are common deficiencies that are being pointed out in some cases.

Do you have a means of pulling together deficiency reports? Because unless AEOD has changed their method of operation, I don't believe they systematically review deficiency reports. But correct me if I'm wrong.

MR. MARTIN: I can't say for sure. I know that the regions do it but you are right, they focus on individual plants.

MR. MICHELSON: Do you review deficiency reports from kind of a larger overview as opposed to the individual deficiencies?

MR. SNIEZEK: We were, up until recently, we have a procedure by which the region is, when they get a 5055E report are supposed to be reviewed for potential generic significance and if there is potential generic significance, they then give it to Ernie Rossi's group, to Division for Operations Events Assessment, for the generic consideration.

MR. MICHELSON: The problem is of course that the same problem may be occurring in Region 1 and Region 3 and

unless each region is looking at what the other regions are seeing, they don't realize that this is a generic problem, and it may be only one shot in their region.

MR. SNIEZEK: When you look at an event report, you can tell if there is potential generic significance.

MR. MICHELSON: These aren't event reports. These are not event reports.

MR. SNIEZEK: 5055Es.

MR. MICHELSON: These are deficiencies.

MR. SNIEZEK: Right. Exactly. 5055E reports.

MR. MICHELSON: And I wondered if there was any coordinated look at them as opposed to looking at the individual deficiency which sometimes on its own right seems only innocuous.

MR. SNIEZEK: I'm not sure if AEOD is doing that.

MR. MICHELSON: They didn't used to because of resource . I just wondered if somebody does. I see a few of them just by happenstance a I see enough of them to wonder if this is something that should be looked at in a coordinated sense. Thank you.

DR. KERR: Give me some idea of where we are on our schedule.

MR. WARD: We should have about 15 minutes left.

DR. KERR: We can't cut that down a little bit?

MR. WARD: We can cut that down.

MR. SNIEZEK: We can cut that way down because I understand that the next issue you are very knowledgeable about. Which is the auxiliary feedwater reliability program, Generic Issue 124. And there has been written communications both from you to the Chairman and from Tom Early back to the ACRS which I think quite adequately describes our position.

If there are no questions, I will be happy to terminate.

MR. MICHELSON: Is that somehow left? If we understand the issue, we are in 180 degree disagreement on it.

DR. KERR: I thought that was understood.

MR. MICHELSON: That's understood.

MR. SNIEZEK: We do have an obligation as a result of Larry Shile's meeting with a member of your staff to get back to the ACRS and brief you on the results of the program which probably won't be until the July time frame.

MR. MICHELSON: I think there is no question the staff looked at your comments and if we were starting that generic issue over we would not have done it the way we ended up doing it.

MR. SNIEZEK: In fact that's what Tom Early said in his letter.

DR. KERR: Thank you.

MR. SNIEZEK: The next individual is Frank Gillespie, about the inspection program and some of the coordination of

research on generic issues. He can do it all in about five minutes.

DR. KERR: We have heard him before.

(Slides shown)

MR. MICHELSON: Is there a handout?

MR. GILLESPIE: No, there's no handout. And our time has been cut down considerably so I'll keep it real short. I have a viewgraph, but no handout.

Our interfaces with research focus a lot now on the old group that used to be NRR, which is Themy Spess' group. And its policies, rules, generic issues, what we've done is, in the process of the last three months, to try to get some of these resolved and out the door which have been hanging around for a long time, is the interface on these on an individual level has been raised to Themy Spess and myself. And that way Themy has direct access to Eric Beckjord and I have direct access to Tom.

And we are starting to move some of these things out. A traditional one is A-3, 4 and 5, on steam generators, which I think we finally are going to move out the door rather than have it sit any longer.

A perspective on the workload, there's 50 generic issues in for prioritization. We comment on the prioritization. We are being very critical in our comments now on prioritization. We are starting to consider if we prioritize

a tie, what does that mean to us? Does that mean eventually we're going to get a piece of paper in, and is it a thick piece of paper; or does that mean we are eventually going to want to tell the licensee, do it and tell us when you're done, and we're not going to review it? We are starting to think that way up front.

In the generic issue resolution, there are 63 of those right now simultaneously being worked. Several of those are now coming out, and quite honestly, they are coming out and the staff isn't going to be reviewing the implementation.

And in some cases, the implementation, which in years past might have been causing the licensee to take some action, is now not going to cause the licensee to take action and have to report it to us. We are going to start trusting the people we found technically competent to run the plants to take the action.

An example of this is maximum allowable precipitation. This has hung around for a long time. There is about a 20 percent increase in rainfall predictions for the hundred-year rainfall. And we are finally getting that out. It will be in the form of a generic letter for information only to the licensees.

There's a number of these kind of things hanging around which we're burning immense amounts of resources just hashing them back and forth between us and research. The

intent now is that we have raised them to a level that we get a decision out to get it off the books instead of burning lots of people while it's on the books.

There's 18 rules going on. Philosophically we are trying to make sure all the rules stay where the rule lead is. And that's research.

Unfortunately, from my perspective, fitness for duty was taken on by NRR. I kind of wish it was taken on by research, but we chose to take that on early on.

The maintenance rule, although we had the policy lead, the maintenance rule is in fact being written in research and being coordinated with us.

There are 26 reg. guides, some of which have been issued as drafts since 1979 and never finalized that we are also trying to get out, get out or do away with.

We are trying to evaluate each case. Is it worth doing anything with it or should we just be writing it off as not worth further effort?

That's basically the workload for research. Spess and I sit down once a month and we go through each of these items through about four hours one by one and march the project manager through to find out where he stands and then talk to the NRR guy, technical guy who is coordinating on it to make sure it's not getting hung up. And we have a number of them now hopefully in the next three or four months that will be

coming out and we're trying to do what Vic asked, and that was clean them up within two years.

Just to give you an idea of our best estimate of the resources, we're kind of putting this on over two years. We are going to be putting about 45 FTE worth of people on this over the next two years, per year, for a total of 90, the way it's going right now, to try to get these cleared out, to focus on which ones are true safety.

If we make the two years, this is the kind of level we're going to end up putting on it.

And that's about all I have to say about our interface with research.

MR. SNIEZEK: Mr. Chairman, regarding inspection programs we would be glad to discuss that the next time we come down.

DR. KERR: I have to keep the next group of people waiting. Mr. Moeller?

DR. MOELLER: Just a couple of quick comments. The discussion of reg. guides has come up in terms of the Waste Management Subcommittee's activities, and we will be reviewing that later this afternoon. DOE has said on a number of subjects which are now being covered by technical positions, it would help their agency tremendously if they were issued as a regulatory guide.

So we know research has to do that. So we'll have to

work with them.

And at some time in the future certainly Dr. Steindler and I and the members of the Waste Management Subcommittee would like to talk to you about reactor wastes, low level wastes, the problem with solidification of resins, how that has been regulated, how you reached the point where you are today. And we are wondering a lot about the interface between NRR and say NMSS in terms of rod consolidation, dry storages, fuel decommissioning, decommissioning wastes and so forth.

MR. SNIEZEK: And we would be pleased to review those areas with you.

DR. KERR: Mr. Ward?

MR. WARD: I just want to comment that I thought that Tom Murley's opening remarks were as far as I'm concerned right on target about the need to pay attention to operational safety and particularly to the kind of softer issues of organization and management. And I think he acknowledged the difficulty that was involved in paying attention to those, whenever it's necessary. He asked for committee support in focusing on those. And I think the committee has in the past tried to be an influence in the direction of getting some focus on those issues.

One thing we haven't been successful in doing and I guess I'm bothered about the whole program is that it's not

obvious to me that recognizing that this is what you should be concentrating on, recognizing the nature of the problems, it is not obvious to me that you are really doing anything to provide yourself with the internal resources of staff that has the expertise to deal with these things.

In fact, when ECCS was King, the agency hired a lot of thermal hydraulics experts. We worried about pipe cracking, made sure that, not only that there were research programs placed out there but also that the agency had in-house people who understood materials and piping systems and so forth.

But there seems to be the attitude that the softer issues of management organization can be satisfactorily dealt with without any particular inhouse expertise, that just kind of seat of the pants judgments by ex-ECCS experts and ex-materials experts will be sufficient. And I don't think you're paying enough attention to that.

MR. SNIEZEK: I think we can beef up our efforts in that area. And as you know, it is very difficult to get people with that expertise.

Jack Rhodes division, we are trying to do more recruitment in that area.

MR. WARD: I don't know that it's difficult to get people with that expertise. You might be having difficulty doing it, but that might be because of in-house problems rather than really the general availability of that sort of resource.

DR. KERR: Mr. Remick?

MR. REMICK: Just a quick comment. I don't expect you to respond to it right now, Jim.

But we went through this morning review of the fitness for duty proposed rule prepared by NRR. But just a week or so ago hitting the street was something prepared by research on access authorization. And there is a tremendous amount of overlap in these commonalities and so forth.

My question to Tom or to you as the Deputy would be what do you do as an office director to see that from the Commission's standpoint that there is some uniformity of what is done and some coordination. You talked about coordination with research. But we see these things coming up and depending on where they are, sometimes there's just no communications across the agency.

And what, if anything, can you or are you doing to assure that? I'm just suggesting it as a topic for a future meeting, not right now.

MR. SNIEZEK: Good point.

DR. KERR: Any other comments or questions?

(No response)

DR. KERR: Well, I want to thank you people for taking the time to come down. I think this sort of discussion is quite profitable and I hope we can continue it from time to time.

MR. SNIEZEK: Thank you. We're looking forward to our next session.

DR. KERR: Okay. The next item on the agenda is Human Factors Research. Mr. Remick has the floor.

MR. REMICK: This, like fitness for duty, is a subject that I think you have heard before over the years. Not too long ago we had a tutorial on what is human factors and was it last month we had a summary of the National Academy of Science report on the needs for human factors research.

You also know that about two years ago the agency basically terminated its research program on human factors, although there are activities ongoing in human factors.

We asked the staff, in light of the fact that there is now a National Academy of Science report out and that we heard that the staff is reconstituting a human factors research program, to come down and brief us on the status of the development of that program.

Now my understanding is that the staff is also preparing a response to the National Academy of Science Report. We haven't seen that so that is not the subject today. But it is to receive a status report on what the plans are for human factors research.

So I see this primarily as an informational briefing for the Committee.

(Continued on the next page)

MR. COFFMAN: I will explain the handouts just briefly. They are copied two to a side and both sides, just to get you oriented on what you are looking at. I plan to cover these three items, the introduction, and briefly summarize the human factors research program plan, and then touch on the resources.

To revitalize the human factors regulatory research, it requires more than just adding budget money. To actually revitalize the research, we are restructuring, redirecting, and coordinating the research tasks. We are also rethinking how to package for use the research products.

So my purpose today is to very briefly describe the human factors regulatory research plan, so that you might have a good feel for the level of effort selected, a structure, and the direction being used to revitalize this program.

I will briefly describe the projects, and try to give you a feel for where they are. They are in five areas, and they are at various stages of completion. Some are nearly complete, some are recently started, and some are about to start. And some, the project plans are being developed.

The human factors regulatory research plan will be updated periodically, as projects are completed and primarily as new research needs are identified.

First, the objective of the research is to provide the technical bases to support requirements, or

recommendations, or guidance on human actions that influence safe plant operations.

The research involves hardware and humans, and their interaction in a total systems approach. And this includes the feedback to confirm the effectiveness through our performance indicator monitoring.

But the objectives of the plan are to outline the structure and the content of the human factors research, because it has been designed to meet the Commission's 1987 policy and planning guidance commitment. That is to explore methods to better understand the causes of human error and to reduce its incidence.

It also includes the identification of major areas for the research being sponsored. It addresses both near-term and long-term research. Some of these short-term efforts are focused in on the human factors generic issues.

The research results may either add to or subtract from regulatory requirements. But the new regulatory requirements must pass back-fit justification.

MR. WARD: One question. When you described the purpose of the plan. Well, when we talk about methods to better understand the causes of human error and to reduce its incidence, that short of phrase is used a lot, but I guess that I am always bothered by it. Because we talk about reducing the incidence of human error as if it is possible to eliminate

human error.

I mean human error is going to occur inevitably. We humans have some error rate that is never going to go away. And I would like to think that their search perhaps is more directed or partially directed towards accommodating systems, or to designing systems, and providing systems or something that can accommodate the inevitable human error.

And maybe this is so obvious, and the program is already doing that. But I kind of wonder is there is enough of a consciousness of that difference.

MR. COFFMAN: I think that there is a consciousness of that in the program. And hopefully, it will come forth, as I described some of these efforts that we have underway. It has got a couple of facets to it, the issue that you are bringing up.

First of all, it has to be those human errors which are important safety. It cannot just be a total across the board reducing all human errors. And the other aspect is that the human errors tend to occur. And you will see in the program plan and you will see in the research tasks that we are trying to address the research from a concept that when human capabilities and the system task requirements are out of balance, that the human error rate goes up.

Now this is all given that we are looking at the appropriate and the important tasks. So there will be tasks in

here where we are looking to enhance human capabilities, training, qualifications, and procedures. And then there will be tasks that you will see in here where we are trying to see if we cannot accommodate it by modifying the system, so that the system does not put unnecessary demands.

So I think that it is not just an across the board application of these words without some structure to it and some direction. But hopefully, it will come through as I describe some of these tasks.

We will be talking about these five research areas. This is just how we have grouped them in the plan. Although maintenance is not identified as a separate area, maintenance is addressed through several of these areas. For example, in risk base performance indicators, we are going work and rule changes are involved where there will be reporting of indicators that are measures of not only corrective maintenance but also of preventive maintenance.

Also in the programmatic performance indicator work, we are trying to address the effectiveness of maintenance programs. Then in addition to that, in the human performance and human reliability assessment area, we are working particularly or specifically with technology transfer of the MPPS code, the maintenance performance simulation code. So maintenance is throughout here, although it is not a separate topic.

And as we discuss these areas, you will recognize many similarities with the National Academy of Science's recommendations that were summarized for you by Dr. Maray on March 10th.

As the chairman of the subcommittee mentioned, Dr. Remick, we will not itemize the staff use of the NAS recommendations today, and we are documenting that response separately. And you should be seeing that within a month.

This first area is man-machine interface. Here the objective is to assure that the interface communicates clearly and compatibly as needed for safe operations. And that assurance involves both identifying the factors that garble the interface and determining improvements.

By way of the ongoing projects, the local control stations, which is human factors generic issue 5.1, have the objective to identify the need for human factors reviews of local control stations, since the detailed control room design reviews covered the central control rooms only.

We would expect to identify the potential benefits from improving control stations, and to establish some criteria and some guidance for the human factors reviews of the local control stations.

Another area is the control room design standards, which is action item 1.D.4. The objective is to determine the guidance for human factors reviews of control rooms for new

plants.

All of the operating and CP plants have these DC RDRs either planned or completed. Nureg 0700 was used for the reviews. The purpose of this task is that guidance would be established for new plants based upon experience, and considering some related research that I will describe in a minute for advanced controls.

Also I am going into some work on annunciators, human factors issue 5.2. There the objective is to identify any need for criteria or changes for control board annunciators. We would expect to determine the risk significance of errors due to the potential to confuse operators with alarms, rather than simply to provide information. So we would expect to get out of that some guidance for alarm information techniques.

Additional ongoing is the survey of advanced controls expert systems and artificial intelligence. Here the objective is to identify the safety implications associated with the introduction of advanced controls and expert systems for AI into nuclear power plants.

Examples of these are in the form of operator aids or status indicators, or more specifically a disturbance analysis system. We would expect the results to determine the extent to which advanced controls and expert systems are being introduced, and to determine what human factors guidelines should be associated with those.

As far as planned research, looking at the impact, we have a task plan to look at the impact of high technology and control room operations. Primarily first to look and see mixing of the old analog and the new digital controls adversely impacts operator performance. And we would expect the results there to determine the review criteria for mixed control rooms, and address such things as operator selection and essential training.

(Continued on next page.)

The computer classification is another area that we are in the process of establishing a research task. The purpose is to identify if there should be different classes of computers with different sets of requirements based upon their functional use and the potential impact upon safe operations.

An example is the SPDS, safety parameter display system, and it is not a Class 1-E system, yet is has a set of requirements.

So we would expect coming out of this task to be able to have a determination whether or not the present Class 1-E versus non-Class 1-E classification system is adequate.

If not, it may be necessary for guidance on the different classes, and this would include considering such things as validation and verification and operability testing.

Expert system verification and validation is another area. And there the question deals with whether or not there are review criteria for verification and validation of expert systems.

The key ingredient to the use of expert systems is that it becomes clear how the expert system came to its recommendation.

You need to be able to treat the expert system as a transparent box rather than a black box. So we would expect to determine measures to evaluate, and machine interface design, and establish some guidelines for this verification and

validation of these advanced systems.

Another area we are looking at, recommended by NRR, is to address the question of do or will the operators overly or excessively rely upon FPDS rather than the Class 1-E control board instruments that have already met the reg. guide?

And the research here is just being planned.

Halden is a program where we have a significant amount of funds committed and we expect that the Halden project and our involvement there will provide knowledge on the use of expert systems as operator aids. And in addition it will help us in some review criteria for instrumentation. It will help us on computer based procedures or procedures for computer based controls and instrumentation. And hopefully we will be getting some simulator and operator performance data out of there, too.

Yes, sir?

MR. SHEWMON: As a mild distraction, Halden is in Norway or in Sweden?

MR. COFFMAN: Norway.

MR. SHEWMON: Okay. It's close to the border. But then do the Norwegians have any commercial power plants, nuclear?

MR. BELTRACCHI: No.

MR. COFFMAN: Let me ask Leo Beltracchi.

MR. SHEWMON: I hear one no.

MR. BELTRACCHI: No. Commercial, no. They have a small reactor, but that is where they do the fuels research.

MR. SHEWMON: I've been there. I'm familiar with the place. So the answer is no. It intrigues me some that they have this fine research facility that the international community sets into but never went the rest of the way.

Go ahead.

MR. COFFMAN: Okay. But at the facility, they are not simulating their plants, they have a four-loop PWR that they've got simulated there.

The status of their program is looked at more from a research standpoint than their commercial experience.

In the earlier procedures here, the research objective on procedures is to assure the reliability of rule-based actions. That is, to minimize procedural errors. That assurance involves both identifying abuses and potential abuses in the application of procedures and determining means to overcome those, or some, in the systems sense, incoherencies in the procedures.

MR. REMICK: What do you mean by other procedures there?

MR. COFFMAN: The other procedures are those other than the emergency operating procedures.

MR. REMICK: Okay.

DR. KERR: Excuse me.

MR. COFFMAN: Sure.

DR. KERR: Perhaps you've answered this question. I'm sorry I had to be outside for a minute. But on the previous slide, one of the objectives of the research was to explore methods to better understand the causes of human error and to reduce its incidence.

Is there reason to believe on the basis of the human error rate that you see in the nuclear power business that its incidence can be reduced?

MR. COFFMAN: Let me speak out of experience I have and then possibly some of the other people from the branch may want to ad. But it seems to me like we tend to see a floor on human error rates at somewhere down around -- and don't hold me to this number precisely -- but it tends to be down around three times ten to the minus three, for a clearly specified task, a repeated task, a task where you have good data.

So there appears to be a floor. But it cannot be zero.

DR. KERR: I'm not asking you to give me statistics. I probably wouldn't understand them all. What I am asking is whether in the course of this investigation you ar going to try to determine what the error rate really is in the nuclear power industry. And then on the basis of experience with error rates which a lot of people have studied, it makes sense to try to reduce it through research.

I expect the answer is yes, but it seems to me somebody would have looked at that or will look at it before you become embarked on a program to reduce it.

Maybe you've already answered the question.

MR. COFFMAN: I think I have. I'll just go ahead and try and quickly summarize it.

We are not looking to reduce human error rates across the board, uniformly. One first has to determine which ones are important to safety.

DR. KERR: I read that the objective -- the program is designed to meet the Commission's '87 policy and planning guidance committees to explore methods to better understand the causes of human error and to reduce its incidence.

I mean, it's a laudable objective. But before you undertake it, it seems to me you would want to know whether it made sense to try to reduce it below what it now is.

MR. COFFMAN: Yes. Certainly -- let me ask Dr. Ryan to help give a new perspective on this.

DR. RYAN: Tom Ryan, Office of Research.

I think there are two aspects to this. The first is what is the rate of human error in this industry? And there is a lot of debate between the Human Factors Committee and the PRE Committee as to what the requirements are.

If you look at the human factors research, nowhere can you find studies that deal with error rates that are less

than maybe one or two out of a hundred. So there is a question about what the real error rate is.

Secondly, given reviews that have been done and procedures and some of the work we are doing in management and organization and so on, suggests to us that there are dramatic improvements that can be made.

And I am thoroughly confident that at some stage of the game the rate of improvement can be reflected in far lower error rates than we suspect are really going on.

DR. KERR: Now, if you don't know what the current error rate is, will you be able to tell when you have effected improvement?

DR. RYAN: Well, I guess I'm not really willing to concede that it would be impossible for us to get a far better assessment of what the real error rates are.

DR. KERR: Is that the first thing you are going to do, then, to try to find out what it is?

DR. RYAN: That is what we are focusing on right now.

MR. KERR: Okay. So the initial thrust of the research is to try to find out what the error rate is?

DR. RYAN: That's right. We're attempting to move in that direction.

DR. KERR: And you think it will be dramatically different in the nuclear industry from what it is in say the military or whatever?

DR. RYAN: What I guess I'm saying is that some of the numbers that are being generated out of PRAs are lower than what we are seeing in other industries, including the aviation industry, the military, and other places.

DR. KERR: I'm not trying to defend or criticize PRAs. I'm really talking about what people who study this sort of thing expect error rates to be and whether in your view it should be about the same thing in the nuclear industry or is there something about the nuclear industry that is dramatically different?

DR. RYAN: As of this stage, we have no reason to believe that there are dramatic differences between this industry and other environments, and we see that in other environments error rates that are reported are higher than the ones that we are reporting in this industry.

Unfortunately, the data collection mechanisms we have right now for the industry do not permit us to get the kinds of data that you can get in some of these other environments to really confirm this.

DR. KERR: Thank you.

MR. COFFMAN: We will come back to this topic, too, I think, shortly.

On these other procedures here we are looking to, there has been some evidence coming out of looks at events involving EOPs that indicate that there may be some problems

with other procedures. And so we would -- we are doing some work here to assess the potential benefits from improving other procedures, and subsequently determining some criteria for how one might go about doing that.

Some planned research that we have is in the area of procedural violations. This is an item identified as the Chernobyl followup. Here the objective is to identify the frequency and the safety character of procedural violations in U.S. plants.

And we would expect that if procedural violations are significant, then here again we would try to determine some guidance to minimize procedural violations.

DR. KERR: Is that simply going to be data collection or how are you going to determine that?

MR. COFFMAN: The current plans for this research, which has not been started, is to do some surveys at plants and it is going to be tricky to try to get credible data on how in fact, how frequently these procedures have been violated. We are certainly going to look. We are going to start with the LERs. But we have to look beyond the LER system.

DR. KERR: I would think so.

MR. COFFMAN: Accident management procedures is another effort that we are planning to do some work in. Managing accidents beyond the design basis envelope introduced some new facets or changed the character of the procedures

research because then it becomes, you add some questions like what's the appropriate level of detail that needs to be in the procedures, especially when these accident scenarios have large uncertainties, how reliable will the instrumentation and operator aides be; what is the proper balance between training for more frequent events and the less frequent events?

Particularly in this area, we want to focus some of the research on the interfaces between the local control rooms, the central control rooms, tech. support center and outside agencies, and what the influence on how the procedures should be established is, considering those added features to operations.

Presentation of EOPs deals really with advanced instrumentation and controls. Will that lead to new formatting of emergency procedures?

The third area where we are doing some research, and we are not doing any research in this area, but we are planning some, is in qualifications and training.

Here we are back to the basic objective of matching the innate human capabilities with the system task requirements and although we have no ongoing programs at this point, industry has some, has a number of programs and they are being followed by NRR.

As far as our planned project, we are looking to address the issue of how to objectively measure on a reasonable

time scale the effectiveness of training programs and how that enhances operator performance.

Also this question of training, which I mentioned, on severe accidents, the balance that you need, so that you are not training operators for only the mode events.

Organization and management. Here the objective is to monitor program effectiveness and identify potential improvements.

One generic issue here, which is human factors 1.1. And there was a reg. guide issued about January, 1987. And comments were received. And we need to simply wrap up the revision of that reg. guide. That's what's being done under 1.1.

As far as management and organization influences on human performance, the objective there is to identify methods to assess the influence of organization and management. Organization and management -- maybe we need some paraphrasing of that. It is really structure and policies, what the effects are on human performance and consequently plant risk.

DR. KERR: When you refer to research in that area do you mean you are going to try to learn what exists in the literature or are you actually going to try to go out and discovery information on that that doesn't now exist? There certainly must be a tremendous amount of literature on that subject.

MR. COFFMAN: There is certainly a lot of literature. And Dr. Ryan is the project manager on that task.

Let me -- Tom, why don't you take a couple minutes to summarize the approach?

DR. RYAN: I probably should have made a comment maybe an hour ago when you were talking to Mr. Murley. He has requested that we develop a methodology that will allow us to reflect the influences of supervisory management behavior in PRAs.

And so we have a project ongoing with the International Laboratory at UCLA and a rather prominent individual leading this particular area, Dr. Henry Minster from McGill University.

And basically, after a thorough synthesis of the literature, we have developed a dynamic model of the human organization of a nuclear power plant.

The second step in that process is using that model. We are in the process of identifying what the pertinent management and supervisory functions and roles are that would be expected to have influence on performance.

The next step in the process is to delineate in detail just what the mechanisms of that influence are.

The next step in the process is to identify the kinds of information that we will have to extract about the plants, about the organization and about the individual managers

themselves to get measures on that.

The final step in that process is to make a determination of how and if we can go about doing that, given not only technical considerations but some political considerations.

The last step for us is to then, for purposes of risk assessment, is to develop an algorithm for taking that information and integrating it systematically for application there.

We are working with Dr. Ziphostolacas over at UCLA top assist us in that part of this particular project. So we hope to have one, a methodology for better understanding what constitutes good and bad management to support several kinds of activities and also being able to capitalize on that understanding to do a better job of quantifying the results.

MR. MICHELSON: Who is your principal contractor for that work?

DR. RYAN: We are working with Brookhaven National Laboratories, a Dr. Sonya Aber, a specialist in the field, as a personal investigator.

MR. MICHELSON: Has she done similar kinds of modeling before?

DR. RYAN: Yes, she has. However, we have gone beyond that. I mentioned a Dr. Henry Minster who is also on the project team, who has written a number of textbooks in the

area. He is presently a full professor at McGill University.

MR. MICHELSON: When will they have a substantive product out? In other words, something you can read to get an idea whether they are making progress or not.

DR. RYAN: We are in the process of putting together a paper on peer review that deals with the model and those functions or roles that are considered to be crucial in a nuclear power plant within the next couple of weeks.

The next public indication of progress will be a paper that will be delivered at the IEEE conference in Monterey in the first week of June.

MR. MICHELSON: Could we get a copy of their paper for the subcommittee?

DR. RYAN: Are you talking about the IEEE paper?

MR. MICHELSON: No, no. You said you are working up a staff paper, so to speak.

DR. RYAN: What we are doing is, as part of the project, we are developing a paper to send out to other experts in the field saying are we on the right track. We are going to establish from amongst that group of approximately 20 people a standing review which is going to be brought in then to be a continuing part of this effort to have an input along each of the subsequent steps of this process so that we're going to get down to the point where we're saying here they are, here is the information, here is how you go and get it, and you stand up in

front of the NRC. We will not have a situation where it looks like a few people went into a phone book and brought this up, but we will have brought to bear on this issue the best minds that we could find.

MR. MICHELSON: I would like to see a copy of both those papers. You will send them to us?

MR. MICHELSON: Yes.

DR. SIESS: When you get through with this, who is going to use it and what are we going to use it for?

DR. RYAN: We basically see three uses. We see the non-probabilistic part of this to be used by Mr. Murley and his people because it will provide a set of reasonable criteria for them to make judgments about whether or not things should, action should be taken in plants because of management practices.

MR. REMICK: And they are the ones who requested the work.

DR. RYAN: That is exactly right.

The second use, and this is a non-human reliability or probabilistic use, Mr. Coffman mentioned a performance indicator program. And the Commission has directed the staff to develop some management programmatic indicators. The intent is that this work will provide an integrating framework for other members of staff who are working in that area to assist them in developing these indicators.

The third use is basically the PRA application. We hope to be able to take this information and develop an algorithm by which we can reflect this influence into the PRA.

DR. SIESS: Now, only the first use you mentioned is going to change anything. The other two are secondary type uses to develop more information that somebody else will use for something.

DR. RYAN: The philosophy that I'm aware of that the Commission is operating under, is that any of those three uses might have an impact.

DR. SIESS: I am surprised that you don't expect the industry to use it.

DR. RYAN: We would certainly hope that the industry will take advantage of the results of this work just like we hope they take advantage of all the other things we do.

DR. SIESS: Because if they used it, and changed their management in accordance with what the model says would lead to improved safety, then we really wouldn't need any of the others, would we?

DR. RYAN: We would be able to certainly confirm whether or not they had good management. Whether or not we'd want to just discontinue doing risk-related analyses, I think that's more of a policy decision.

MR. REMICK: I suggest we move along.

MR. COFFMAN: programmatic performance indicators. I

think we've probably all got a good feel of what is going on there. One question that came up in the subcommittee meeting was whether or not we were looking at what individual utilities were using and yes, the answer is that we are looking at -- those were sampling both PWR and BWR utilities, sampling about ten different utilities -- looking at what kind of indicators these individual plants use.

In the way of planned research, shift scheduling and overtime there, that is confirmatory research. We're just trying to -- there was a new reg. issued on shift scheduling and overtime that was based upon experience with non-nuclear industries and we're doing some confirmatory research to assure that it applies to nuclear.

Team performance. There we plan to study team skills that significantly impact team performance. And then again organization and management capabilities to cope with severe accidents.

There is a lot of tie in with the work in human factors, with that work being done on accident management, and rightfully so, because that's where the cost benefit ratio is best for you in accident management, is to change some of the procedures or organizational practices.

The last of the five areas is a very important area. And here our objective is to establish the credible data on human error rate and to establish the analytical tools for

translating that data into application and certainly reliability and risk application is a key application.

Establishing the tools, though, requires an understanding of the elements that human errors depend upon. So you have to come to that understanding. So part of this program, we have some work on cognitive modeling and maintenance performance.

Ongoing research includes the acquisition of human performance data, not only just acquiring it but collating it and storing it in a readily retrievable form. And we are also combining this with hardware failure rates. And the result is NUCLARR -- nuclear computerized library for assessment of reactor risk and reliability. And this is one of the programs that possibly the subcommittee may at least want to hear more about.

Data base on human error rates. Here we are looking as was touched on earlier, we are looking at military, aerospace, chemical industry, looking elsewhere for the purpose of enhancing the data that exists -- enhancing and validating the data that exists, what data there is, that exists on nuclear power plants.

This is actually being done by a grant to George Mason University.

Cognitive modeling. Intended human actions during emergencies. Here the objective is to identify improved

modeling techniques for cognitive performance where there is deliberation on the part of the operator. And we will focus in on causal factors. We would expect that there would be insights on the prediction of errors, both of commission and omission, and that we would then be able to take steps to improve cognitive error rates, or the precision of estimating the error rates and possibly reducing the rates.

Here again, this cognitive modeling area is one that I would recommend that the subcommittee at least hear more about.

Then there is the need to bridge the gap, to integrate the human reliability assessments into the PRAs so that we have accurate, have more precise assessments of human error rates because the results of PRAs are used in a risk management sense to direct and set priorities on research.

Maintenance, personnel performance simulation, MAAPS work. There it is to identify and improve methods for making more accurate assessments of errors during maintenance activities. And I expect the results to be a computer simulation to assess the effects of changes in maintenance activities on plant performance. And this is being done through international cooperation.

MR. MICHELSON: Let me ask a question at this point on maintenance.

I'm just wondering whether any of this work would

help me on a particular problem. So you can tell me if I identify the problem.

The problem is that in some plants the color coding, the labeling of piping, general identification of pieces of equipment is not too good. As a result, a lot of mistakes have been made and reported in LERs because the fellow thought he was on the particular component and it turned out the label wasn't very good and he worked on the wrong one.

Is any of this going to help? In order to get the situation corrected, it would be necessary to do probably a cost benefit study someday which shows that the cost of improving the labeling has got a sufficient benefit.

Is any of this study going to give me the kind of information that would possibly help in doing that cost benefit analysis of improved system and labeling and identification?

MR. COFFMAN: Certainly the labeling is certainly one thing that shapes the maintenance personnel's performance.

I'm going to ask Dr. Ryan to explain this because this is another one of his projects and I'm convinced I brought the right people down with me today.

DR. RYAN: Let me just say that about three years ago we used the expertise of R. Siegel and J. William. I don't know whether you are familiar with the Siegel modeling that has been used by the military and a lot of other agencies, to develop simulations.

And what MAAPs is is a computer simulation that allows us to mimic the activities the activities of a maintenance mechanic, electrician and INC tech. and a supervisory position.

It is very user-dependent. That is, the simulation will do all kinds of things depending upon the ability of the person using it to set the situation up. Certainly the simulation is capable of taking into account weaknesses and strengths and what we refer to as human error, in many considerations -- equipment design, work space, habitability issues. It will even let you simulate situations where protective clothing has to be put on and taken off and that kind of thing.

The simulation has some, between 35 and 40 types of output indices which allows you to investigate the effects of changes in staffing and so forth in terms of efficiency, time, success probabilities and so on.

So in a roundabout way, the answer to your question is yes, we can simulate those kinds of things.

MR. MICHELSON: I'm not sure I heard the key words I was asking about. Namely, the identification and labeling of equipment.

Is that somehow a factor in your simulation that you can vary it so that you can see how important it really is to error?

DR. RYAN: What the assumption here is, is that the individual who is setting up the input parameters for the simulation, has gone out with NUREG 0700 or has taken the EPRI human engineering guide or some mil. standard or something and gone out and done an evaluation of the labeling of equipment and has scaled that individual's rating of the quality of that labeling.

MR. MICHELSON: Is a part of this program to be to develop such data bases for nuclear plant environments?

DR. RYAN: When you say a data base, I don't know what you mean.

MR. MICHELSON: You have to determine what the effect is on error of painting it red versus green or not painting at all, whatever.

DR. RYAN: What we are doing in the NUCLARR program, which is the data base, is taking advantage of data that is developed from a variety of media, one being computer modeling. In fact, we have an activity ongoing in Idaho using MAAPS right now because we have been told by the users of the data bank that we have certain empty cells for which we doubt whether we're going to ever get any credible information from some of your media. And some of these have to do with the areas of maintenance.

So we are at present setting up a series of runs with MAAPS to allow us to collect information on these tasks. We

intend as part of that to systematically vary a whole series of what we would call performance shaping factors, including some of these human and engineering considerations so that one of the outputs of this will be a series of related error probabilities which then will go into the input.

MR. MICHELSON: I hope when it gets all done, it can also be used.

DR. RYAN: It can be used right now.

MR. MICHELSON: I don't doubt the simulation arrangement can be used. The results are what I'm referring to.

DR. RYAN: They are available. In fact, you can use it as a design tool to preview changes that you feel would enhance performance.

DR. KERR: What Carl wants to know is whether you can use it to paint that pipe.

DR. RYAN: We're working on it.

MR. REMICK: Frank, do you want to continue, and can we accelerate a little bit?

MR. COFFMAN: Okay. I'm trying to wrap it up. Where are we?

Criteria for safety operations. That's, you know, a more systematic look, and not forgetting about the ten-minute rule type of questions, balance being manual and automatic.

As far as planned research, we are looking at means

to identify more credible data.

We are also looking at these other areas. I'm going to group those last two together. Such questions as how do you improve operator performance under stressful conditions, severe accident conditions, other conditions that involve high humidity, temperature, the need to suit up or not.

MR. REMICK: Is the scope for any of these projects written in the planned research? Do they have the scope of work written yet?

MR. COFFMAN: On the stress under extreme environments, those have not been. We are drafting those.

Event reporting, there's been a lot of work done on event reporting and we've been pushing to get back broader distribution. So there is a spectrum.

Let me touch on resources here by way of finishing up.

The current staff resources to manage this research are, in the staff opinion, adequate and they will in fact increase to be more than adequate, to be ample and to assure some margin.

There are eight professionals involved, plus we are about to fill a vacancy at the 15 level. The staff is multidisciplinary, despite the fact that there are eight major disciplines listed there. That's not just one per individual.

The staff is entirely composed of senior

professionals. And these professionals are qualified not only by their formal training but by applied experience to direct the particular areas of human factors research. And this becomes particularly important when you are trying to select people and fill these vacancies. You are not looking just for people pushed out of universities but those who have some applied experience.

DR. KERR: From looking at that I could conclude that about half the people had engineering backgrounds and half non-engineering. But you said that was not a reasonable assessment?

MR. MICHELSON: No. That's a reasonable assessment, that about half have engineering backgrounds.

DR. KERR: In fact, maybe five out of eight do.

MR. MICHELSON: If you look at degrees, they tend to be heavy, well, they tend to be about equal, I guess, if you look at degrees.

But if you look at experience, then we're about 60 percent experience in psychology, human factors. Where you draw this line I'm not sure. But about 60 percent in here and about 40 percent of the total experience is in that area.

There are four Ph.D.'s involved, ten Master's Degrees. Every professional has at least one Master's. And every discipline involved has at least one Master's Degree.

We are heaviest, though, in psychology. Two Ph.D.'s

with psychology degrees, one Master's in that area and two B.S.es. That is counting degrees, that is not counting people. I'm not trying to shift over.

Applied experience can replace the classroom. But there is no substitute for experience.

There is a minimum of eight years of applied experience in every one of these areas. And the total applied experience among the staff is 167 staff years.

When we fill the vacancy, we expect that we will be adding another person with about 20 years of experience and it will be in the psychology or human factors area. So that would bring the total human factors experience for the staff up to over a staff century.

When we look at our contractors, we are looking for people who have experience in human factors, even though about half of our funding now goes to the labs. There are a lot of consultants associated with the labs. And we are definitely assuring ourselves, taking steps to assure ourselves that we have human factors qualifications in the people that are involved on the contracts.

Just this last viewgraph --

MR. REMICK: Let me ask you a question in that area.

Suppose now that Professor X or the XY Human Factors Research Institute wants to approach the NRC to work on some of these problems. How do they do it?

MR. COFFMAN: They can go to the lab and look for subcontracting. They can respond to broad agency announcements. One which we are in the process of putting out on maintenance and training and performance indicators. They can make unsolicited proposals for grants. And let's see. Did I miss anything?

MR. REMICK: Is there any limitation on the size on the unsolicited proposals?

MR. MICHELSON: Yes.

DR. RYAN: Tom Ryan again. There is no limitation on the size of an unsolicited proposal. However, you must keep in mind that as a general rule we do not let sole source contracts.

If you are talking about a grant application from a non-profit organization we receive those quite frequently. There are two of them that are in progress right now.

MR. REMICK: Any limitations on the size of those?

DR. RYAN: No. Let me say one thing. By statute, Congress has limited the NRC to I believe it's 1 percent of the total budget for the year for the grants.

One of the problems we've run into recently, especially in this area, is that we have grant applications we'd like to fund but it would put us over the ceiling. So we're really not able to let them. For example, the George Mason grant could have gone last year but it would have bumped

us over the ceiling so we had to wait until FY '88 to look at it.

DR. KERR: Is that 1 percent a ceiling? I thought it was a minimum.

DR. RYAN: No. It is a ceiling on the amount. And don't hold me to that exact number. But the fact of the matter is that there are a number of grants that are in process that are multi-year grants so what we're kind of up against is a very small amount of money. Not that it isn't good work and that but it would require the NRC to go back to Congress and ask for an increase in that ceiling. The answer is we may go back, and as Frank mentioned, another route is we are encouraging the labs to enter into sort of team approaches with the universities and others who have particular experience.

A good example is the management worker. We have Brookhaven, we have McGill University, we are bringing on a professor from Purdue and UCLA, that are all sort of working as a team to do this work.

MR. COFFMAN: If you can read the last viewgraph which deals with the funding allocation, among these five areas, and I just might mention that, or point out that the five-year plan is targeted for a level of effort of between four and five million per year.

The past funding, if you average the past funding, the mean was somewhere around 2.3 million so that in the fiscal

'88 budget we are about 50 percent increase over the past mean. Fiscal '89 there would be about an 85 percent increase over the past mean.

The fiscal '88 budget is about a 250 percent increase over the funding during the second NAS study.

Just by way of concluding remarks, I recall that to revitalize the human factors regulatory research requires more than just adding funds and compressing schedules.

To actually revitalize this requires restructuring, redirecting, coordinating and rethinking how to package for use the research products. That is, how to make the products friendly to users.

From this very brief presentation and discussion, I trust that you have a little better feel for the level of effort selected and some of the structure and some of the direction that we're giving.

This Commission paper that's being prepared, as was mentioned, will transmit both the human factors research plan and the National Academy of Sciences', the staff's use of the National Academy of Sciences' recommendations.

And the schedule calls for that Commission paper to be to the Commission by May 16th.

We would expect to be keeping you periodically advised of the status of the research.

MR. MOELLER: At some point recently you, or one of

your staff, reported to us that you would not be doing human factors research on waste management. Could you refresh my memory?

MR. COFFMAN: We do not currently have work going on directly related to human factors and waste management, although we have asked, we have gone out and asked NMSS for identification of their user needs. We are in the process of interacting with them.

MR. REMICK: Any other questions or comments? We thank the staff again. Mr. Chairman, I hand it back to you. We gained a half-hour time.

DR. KERR: Off the record.

(Whereupon, at 4:00 p.m., the hearing recessed, to reconvene at 8:50 a.m. the following day, Friday, April 8, 1988.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name: 336th ACRS MEETING

Docket Number:

Place: WASHINGTON, D.C.

Date: April 7, 1988

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken stenographically 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.

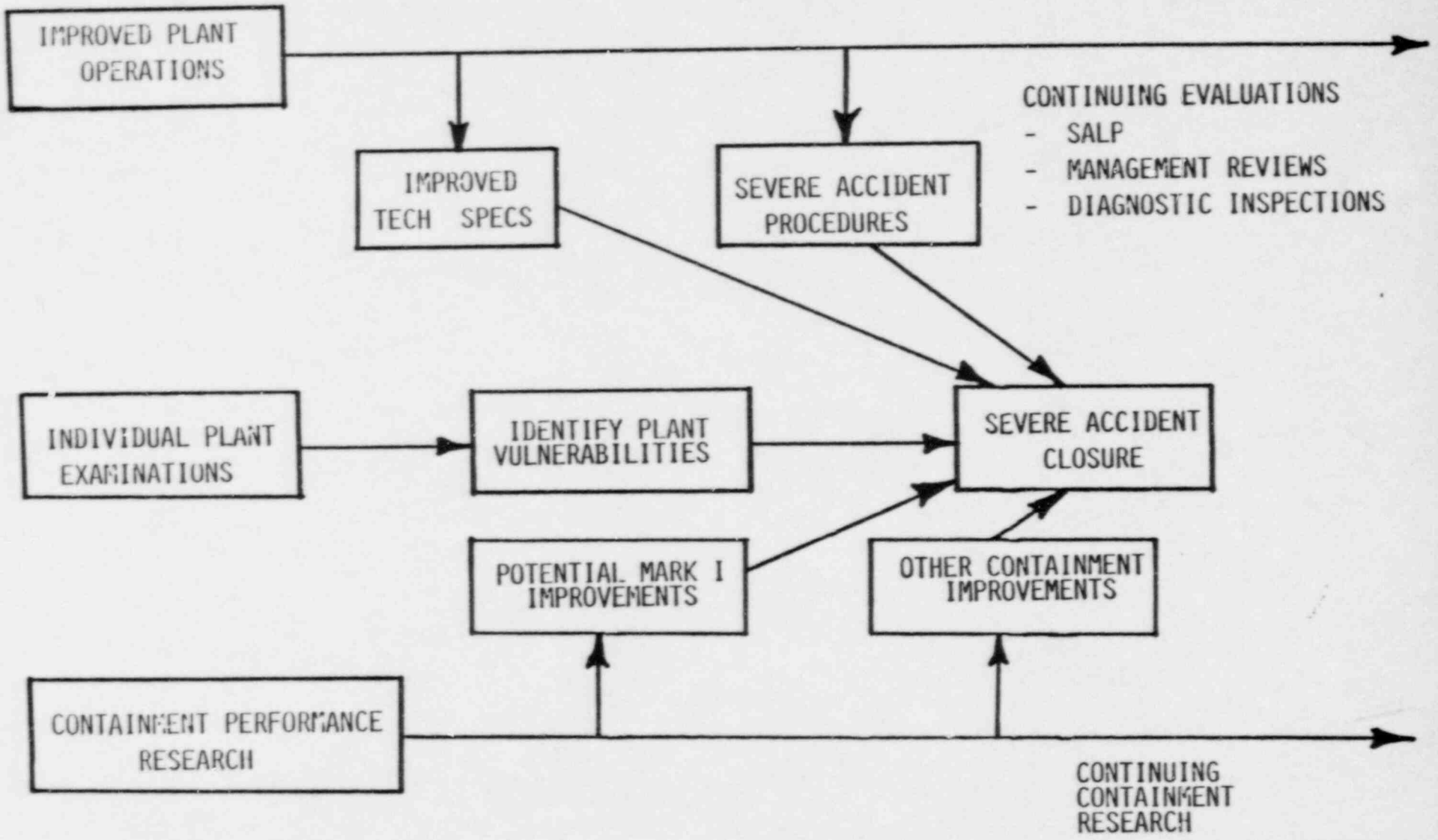
/S/ Joan Rose

(Signature typed): JOAN ROSE

Official Reporter

Heritage Reporting Corporation

SCHEMATIC SEVERE ACCIDENT PROGRAM



OSP/NRR RELATIONSHIP

- OSP Responsible for TVA/Comanche Peak

- Close Coordination with NRR

  - Integrated Design Inspection
  - Seismic Qualification A-46
  - Silicone Rubber Cable
  - Diesel Generator Loading
  - Appendix R
  - Inservice Testing Program

- NRR Conducts Certain Activities

  - Operator Licensing
  - EP
  - Safeguards
  - Health Physics

- Current Status

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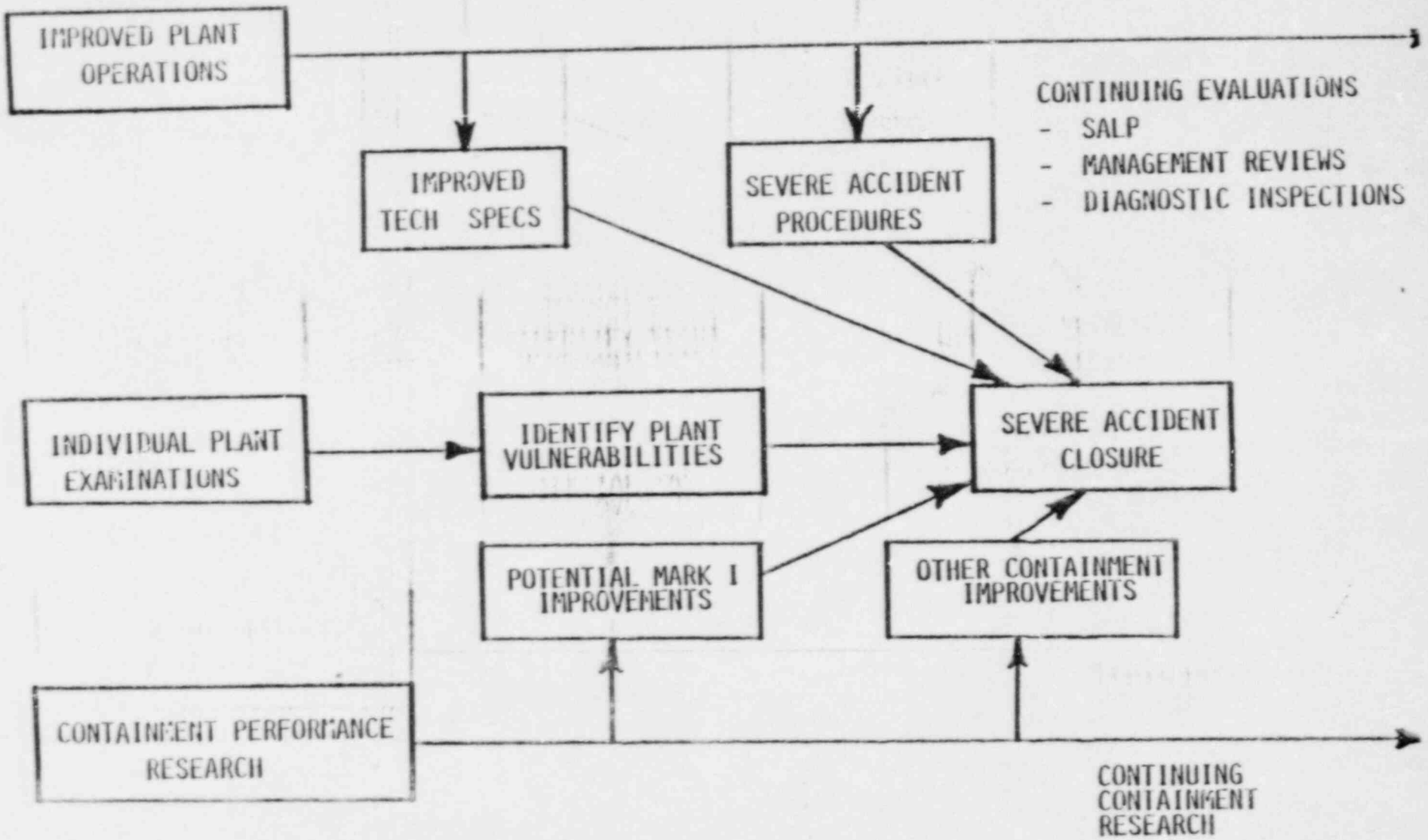

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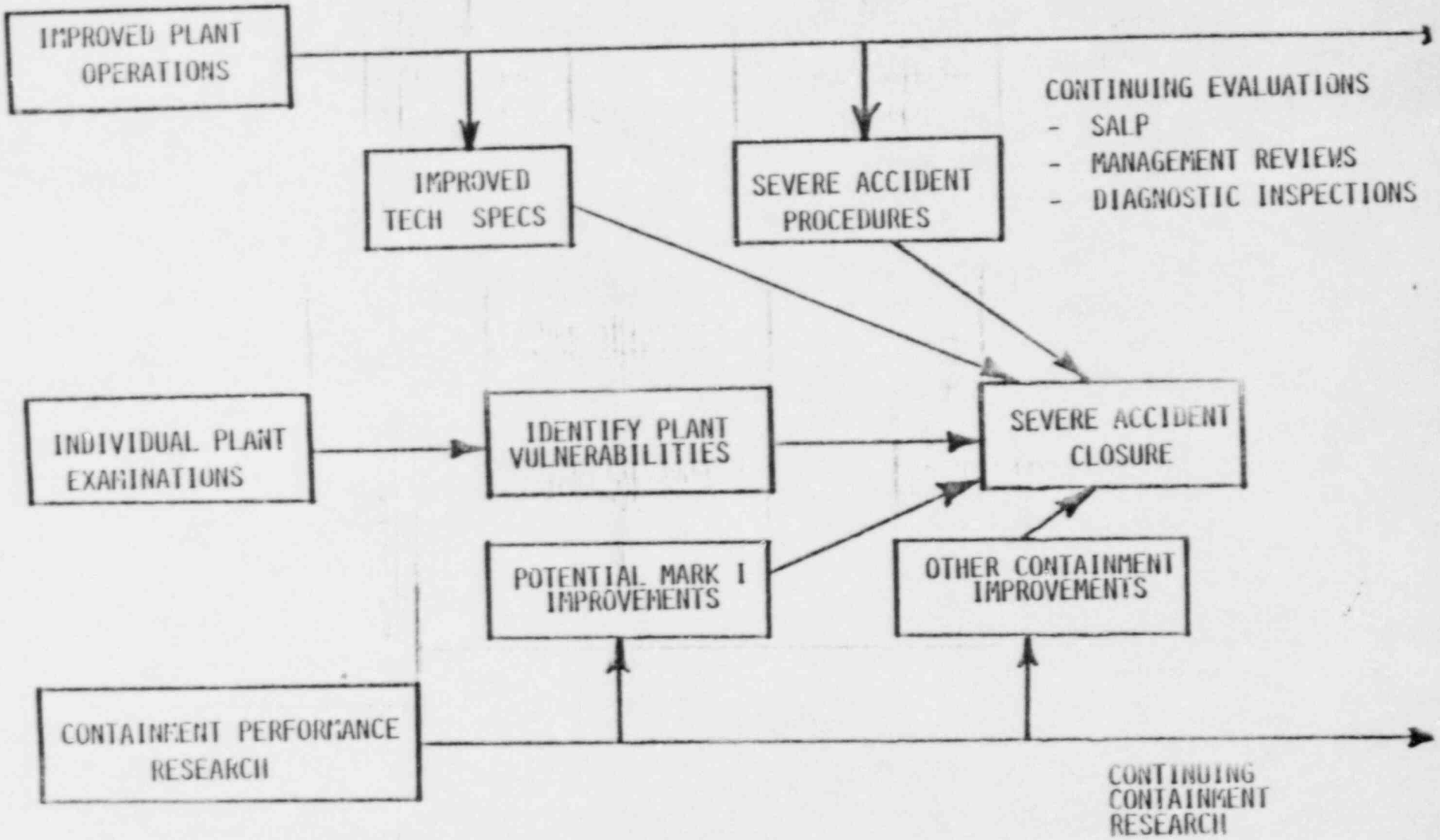

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