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OFFICIAL TRANSCRIPT OF PROCEEDINGS

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

Title: 449TH ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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NAME OF PROCEEDING: 449TH ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

DOCKET NUMBER:

PLACE OF PROCEEDING: Rockville, MD

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

Jon Hundley

Official Reporter

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

MARCH 2, 1998

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, taken on March 2, 1998, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript had not been reviewed, corrected and edited and it may contain inaccuracies.

UNITED STATES NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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449TH ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

U.S. Nuclear Regulatory Commission
Two White Flint North, Room 2B3
11545 Rockville Pike
Rockville, Maryland 20852-2738

Monday, March 2, 1998

The Committee met pursuant to notice at 8:32 a.m.

MEMBERS PRESENT:

ROBERT SEALE, Chairman, ACRS
MARIO H. FONTANA, Member, ACRS
GEORGE APOSTOLAKIS, Member, ACRS
JOHN BARTON, Member, ACRS
THOMAS KRESS, Member, ACRS
DON MILLER, Member, ACRS
DANA POWERS, Member, ACRS
WILLIAM SHACK, Member, ACRS
ROBERT UHRIG, Member, ACRS
DR. WALLIS, Member, ACRS

PROCEEDINGS

[8:30 a.m.]

CHAIRMAN SEALE: Good morning. The meeting will now come to order.

This is the first day of the 449th meeting of the Advisory Committee on Reactor Safeguards.

I would remind everyone that this bodes to be a rather formidable week. Self-flagellation will continue with the 450th meeting beginning on Thursday, at which time we will discuss the Research program, and I guess the comment about flogging will cease when morale rises is perhaps appropriate, I don't know.

Anyway, during today's meeting the committee will discuss the following: the draft Commission paper on Modified Approach to Fire Protection Rulemaking -- we will have some input from the NEI and FPA, I believe; the final rule on the requirements for shipping packages used to transport vitrified high level waste; risk ranking approach to motor operated valves; SECY-98-001, mechanism for addressing GSIs; there is a paper that the Chairman has written on risk-informed performance-based regulation that we want to take an introductory look at today; and proposed ACRS reports.

Dr. John T. Larkins is the Federal Official for the initial portions of this meeting.

We have received no written statements or requests for time to make oral statements from members of the public regarding today's sessions.

A transcript of portions of this meeting is being kept and it is requested that speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

I will begin with some items of current interest.

You have at your desk a list of -- a package of such items nearing a quarter of an inch thick. There is a series of speeches by various Commissioners -- Jackson, Diaz, and Dicus -- that I would call to your attention.

There are a couple of other items that are worth noting too.

There is a copy of a rule on inadvertent criticality requirements that the NRC has withdrawn.

I would urge you to take a look at that because it is a rule that was proposed, purportedly provided some relief to the licensees, and then after the comment period where the comments included input from several licensees, the decision was made to withdraw the rule.

This suggests some imperfections and I think we ought to be aware of when that kind of sequence takes place because it may tell us a little but more of the standards to which such rules ought to be measured against, so I would

urge you to look at that.

Also, we have a copy of the Regulatory Information Conference's preliminary program. That is toward the back of the enclosure here, and the very back sheet is -- the last page maybe I should say is a registration form.

Several of us have attended that conference in the past. It is going to be in April -- 14th and 15th -- and you might think about whether or not you would like to do that again.

Most of the Commissioners and the senior managers of the Commission put in public performances at that session, and generally it is quite informative and worthwhile.

Are there --

DR. POWERS: I will certainly say that last year's was excellent.

CHAIRMAN SEALE: I would agree. A couple years ago Dr. Kress and I attended and it was also excellent.

It was the occasion for some of the initial public comments on Millstone, and it was very revealing to be there at that time.

Are there any other items at this time that anyone would like to mention? John?

DR. LARKINS: Did you mention the letters?

CHAIRMAN SEALE: We have what may be a plethora of

letters this time -- improvements on the Senior Management Meeting Process; elevation of core damage frequency to the status of a fundamental safety goal and modifying the safety goal policy; Commission paper on the modified approach to fire protection -- which may or may not make it; proposed final SRP sections in Reg Guides for risk-informed, performance-based regulation.

Then there are a couple of others that may or may not rise to the occasion. We may wish to write a letter on generic issues and we may wish to give the Chairman some feedback on her paper on risk-informed, performance-based regulation.

So it looks like we may have as many as six letters to get out.

Any other comments?

DR. LARKINS: Copies of that paper should have been passed out -- if you don't have it --

CHAIRMAN SEALE: If you didn't bring your copy with you.

Anything else?

[No response.]

CHAIRMAN SEALE: Well, hearing nothing, I will move along to the first item on the agenda -- ah, the Staff is not here yet.

Gee, we are so efficient in getting through this

initial program so --

MR. MARSH: Well, one member of the Staff is here. My name is Tad Marsh. I am Chief of the Plant Systems Branch.

CHAIRMAN SEALE: Okay, Ted, we will not take names but we figure you will.

Ed Connell just came, so we can begin that if you would like, sir.

CHAIRMAN SEALE: Okay, fine. Thank you very much.

Well, with that in hand then, I will ask Dr. Powers, the Chairman of the Subcommittee, to introduce our speakers.

DR. POWERS: Thanks, Bob.

I think I alerted the committee at our last meeting that we might have some hasty action to take to prepare advice for the Commission in the area of fire protection and we might not.

Well, I think the operative word right now it we are making progress and we are making progress on multiple fronts.

Progress is going to be reported to us by the Staff but we are also going to hear about some progress from the work that is going on in the National Fire Protection Association as well today.

I'll remind members that the National Fire

Protection Association is trying to prepare a performance fire standard by the consensus process and anticipate that they might have a draft of that for us perhaps in September and they will tell us about their status of progress at the end of this briefing, but we will begin by having the Staff tell us about progress in developing their Commission paper, which I understand is coming along but just didn't quite make it for this meeting, and so I will ask the Staff to tell us what they would like the committee to do for them when they have -- and when they would like us to do that -- and they have to be nice when you tell us that.

MR. MARSH: We will try to do that. Good morning.

My name is Tad Marsh and I am Chief of the Plant Systems Branch, and we have the programmatic responsibility for fire protection.

We have made progress on the Commission paper on deciding on a course of action with respect to rulemaking and just looking at the slides that we presented to the subcommittee in January, looking through each one of these items, we are going to be able to tell you what we have done and where we are.

The Commission meeting that was originally scheduled for March 8th, the week of March 8th, is not now scheduled to happen. The meeting itself is in a state of question, and we can discuss that after the presentation by

Mr. Connell, so without any ado, I would like to introduce Ed Connell, who is the lead technical staff representative for fire protection, and we can discuss where we are.

DR. POWERS: In any event, Tad, you aren't looking for us to have a letter this meeting?

MR. MARSH: I don't --

DR. POWERS: There's a need to have one, and I don't know how we could possibly write one.

MR. MARSH: I don't believe I could ask you to do that without the paper in front of you.

DR. POWERS: That's right.

MR. MARSH: I think you need the paper in front of you that you could then react to. I mean, this is the second or third time you'll hear where our thinking is in rulemaking, and it's becoming a little more -- it's clearer each time we discuss this with you. But my recommendation would be to not write anything until you have the paper in front of you to which you can then react and respond.

DR. POWERS: Right. I think that's the preferred course of action on our part.

MR. MARSH: I'm as much more certain as to our course of action based on the interaction we've had with our senior managers, but still I believe you need to have at least that far along in our process.

DR. POWERS: Good.

Ed, it's yours.

MR. CONNELL: Okay. Good morning. Thanks for having me again.

I'm going to kind of notice the titles changed. We're not talking about rulemaking anymore, and we'll go into a little more detail on that in just a bit.

This is a list here of the current staff positions related to performance-based/risk-informed fire protection and rulemaking activities. The first one, I think the most important one, is at the present time the staff has not identified any safety-significant issue that cannot be addressed within the framework or the current regulations that would warrant a rulemaking, and I think that's pretty important. And that includes the Quad Cities issues and the hot short issues, the staff believes that all those types of issues can be addressed within the current regulatory framework.

DR. POWERS: But, I mean, that's not exactly a revelation. We --

MR. CONNELL: No.

DR. POWERS: We always thought that that was the case.

MR. CONNELL: But that's important when you think about is, you know, you want to go forward with the rulemaking or not.

The first thing you want to ask is is there any safety issues that you need to address via the rulemaking, and right now there's nothing significant that we're aware of that needs to be addressed through rulemaking, certainly not on an expedited basis.

The next item, next bullet, is one of the benefits of the rulemaking is allowing licensees flexibility in implementing their fire protection programs to meet NRC requirements. The staff believes that there is significant flexibility currently available within the existing regulations, within the existing guidance, especially for plants that have adopted the standard fire protection license condition which was suggested back in 1986 in a generic letter and again in a generic letter in 1988. Plants that have done this, you know, have a lot of flexibility. They can make changes to their program without prior NRC review and approval, provided it does not impact their capability to achieve and maintain safe shutdown.

The next item is that -- well, the benefits of the rulemaking would be to eliminate the burden on the staff who are reviewing and approving exemption requests. In our post-thermal-lag era that we're entering now the staff is receiving very few exemption requests from the existing regulations.

Now the exemptions, of course, apply to only

Appendix R plants, those that were licensed before January 1, 1980. So the number of plants that could apply for exemptions are going down. Some of those plants are ceasing operation, and we just don't see a lot of activity in that area.

DR. POWERS: I think it's worthwhile to remember that though there are a lot -- the integral number of exemptions that exist under Appendix R is large, most of those exemptions came early in the history.

MR. CONNELL: That's correct.

DR. POWERS: And again I guess you had a spate of them fall in Thermolag.

MR. CONNELL: Yes, we did.

DR. POWERS: But it's not like there's a steady stream coming in. There are specific things for specific design features, and in fact that's built into Appendix R to allow those exemptions --

MR. CONNELL: Well, when Appendix R was written it was built into Appendix R to allow exemptions. Plants that are applying for exemptions today do it under 50.12. The provisions for applying for exemptions under 50.48 has long since expired.

DR. POWERS: Okay.

MR. MARSH: Let me add a little something to that -- this is Tad Marsh again -- with respect to

exemptions. One of the perceived benefits of going to rulemaking would be all of a sudden these 850 exemptions would disappear, and as a legal matter, if you no longer have the regulation which was exempted, that would be true, but as a technical matter and as a safety matter, those exemptions would have to be at least thought through in terms of what was the underlying safety concern which prompted it in the first place, and what's the issue and how does it comport over to the new regulatory framework? So it wouldn't be as easy as sweeping away the regulation and the exemption goes away. You'd have to think through what the issue was in the first place.

MR. CONNELL: Okay. The next bullet as far as the actual realistic applications of performance-based/risk-informed methods, the staff believes that for the operating plants that have established fire-protection programs that they're comfortable with, their staff is comfortable with, we believe that the application of the methods would be limited, may be used to address issues in the future that pop up, like if we had another Thermolag issue or something else. But we don't see that it being adopted in its entirety for most plants. It just costs the plants too much to basically rebaseline their program. And that's also tied to some of the limitations in the methodology too. It doesn't apply to everywhere.

The next one is existing IPEEEs may not be adequate as a basis for performance-based/risk-informed regulations, and there are several reasons for this. One reason is for plants that use the FIVE method, and that's a majority use it either in whole or in part, it's based primarily on the Appendix R criteria, and if you're going to look beyond Appendix R, it really doesn't -- the FIVE method doesn't really help you with that.

The other is the results from the IPEEEs are primarily driven by the methodology used and the assumptions employed by the analysts and not by the plant design from a fire protection standpoint, and I'd give the Susquehanna and Limerick examples as an example, where we have three orders of magnitude difference for basically identical plants. So that's a problem as far as relying on this.

And that goes back to the previous bullet. Are we really going to expect plants to redo their fire risk assessment in order to use performance-based/risk-informed regulation when we kind of feel uncomfortable with using the existing IPEEEs, the IPEEE objectives were in the Generic Letter 88-20, Supplement 4 objectives were not to provide a basis for risk-informed/performance-based regulation. It was to look for accident vulnerabilities beyond the scope of the current regulations. And it's been fairly effective in doing that. But to make it do something that it wasn't

intended to do I think is fraught with potential problems.

DR. POWERS: Has the staff prepared some documentation with respect to this point on the applicability of the existing fire IPEEEs as a basis for risk-informed and performance-based regulation?

MR. CONNELL: Yes. If you look in the IPEEE --

DR. POWERS: Insight --

MR. CONNELL: Insight report, the first 24 submittals the staff basically draws that conclusion.

DR. POWERS: Um-hum.

This may be an item of particular interest to the Committee not so much for fire protection specifically as for the general technological basis that exists for risk-informed regulations, and may add to the confidence of at least one Member that most plants exceed the CDF limit.

MR. CONNELL: The next bullet, something that the Committee is well aware of, is the penetration seal issue and the requirement in section 3(m) that penetration seals be noncombustible. The staff has found no technical basis for the noncombustibility requirement. It's been demonstrated that combustible materials can meet the criteria for preventing propagation from one side of the barrier to the other similar to the stuff in this room. We have wooden fire doors and stuff. So we're going to delete that no matter what option we pursue as directed by the

Commission.

DR. POWERS: And everyone seems to concede this point, that the combustibility is not the issue on a penetration seal that is -- its reliability at providing the function that is the only question. Is that a correct --

MR. CONNELL: I won't say that everyone has conceded that point. The staff agrees with that. I think the Committee has indicated that it agrees with it. The Commission has indicated it agrees with it. But I think some external organizations still believe that since the penetration seals at Browns Ferry were quote unquote combustible, that having anything else that's combustible is bad. And I haven't seen any indication of changes from some of the external organizations.

DR. POWERS: I wouldn't propose to speak for every external organization that exists, but some of the more outspoken external organizations have in fact sat in front of this Committee and said you can make it out of kerosene and it would be okay with me if it did the function.

MR. CONNELL: Yes. I've heard that quote, and I think if you look at all their documentation, though, basically they believe that the combustibility requirement should stay, especially since their opinion is that the staff -- it was put in by the Commission when Appendix R was written by direction of the Commission and there's no reason

to take it out.

The last bullet is -- there's been a lot of comparisons between performance-based/risk-informed, whatever you want to call it, regulation with the international activities that are going on, and the staff believes that most of these comparisons or analogies are kind of specious.

If you look at what's going on in other countries, New Zealand, Australia, and Europe -- Sweden specifically -- you'll find that the performance-based codes and standards are applied to new construction or occupancies that are undergoing major renovation and they are usually applied in less than 10 percent of the cases. Another interesting difference is that the performance-based codes are being promoted by the building industry, not by the regulatory authorities. In our case we seem to be a little backwards.

CHAIRMAN SEALE: Dr. Catton would be interested in that.

DR. POWERS: I think everything that Ed has said is accurate.

CHAIRMAN SEALE: Yes.

DR. POWERS: And there is a difference of opinion or a difference in thrust here. I'm not sure it's bad, just that we're ahead of the eight ball here.

MR. CONNELL: Well, I've heard a lot of the

arguments that well, the rest of the world is doing this in fire protection so we need to do it too, and what the rest of the world is doing in fire protection is very different than what we were at the NRC do in fire protection. We are not interested as much in protecting the structural integrity of a building so that people can exit.

DR. POWERS: There's a different loss function here than there is in a commercial industrial building.

MR. CONNELL: Right.

Okay. These are the options, and the Committee has seen these before. Maybe with not quite as much detail, since we were still in the development phase. And I think we are kind of finishing up the developmental phase now. We are just running everything through management concurrence and making sure everybody is happy with it.

Option 1 is continue the performance-based, risk-informed effort to replace the existing fire protection requirements. Develop a comprehensive regulatory guidance document that provides for prescriptive and performance-based, risk-informed alternatives for compliance with the new rule. This would be mandatory, one rule, all plants would have to comply with this. And I'll go into detail on all the other options in a moment.

Option 2, which is the option that the staff is recommending the Commission approve, is develop -- defer the

performance-based, risk-informed rulemaking. Work with the National Fire Protection Association and industry to develop a performance-based, risk-informed consensus standard for fire protection which is NFPA 805 at the moment.

Develop a comprehensive reg. guide that consolidates the existing staff, and I should say prescriptive guidance. And the staff can adopt the NFPA standard in the future through rulemaking if we find it is acceptable.

Option 3 is basically maintain the status quo. We would still work NFPA on developing of their standard and that standard, if it was not adopted by rule, could be used in the future to support exemptions under the existing process defined in 50.12. And --

DR. POWERS: Distinguish between 2 and 3.

MR. CONNELL: All right. Option 3 does not have a comprehensive reg. guide that gathers all the existing guidance and all the standard review plans in the branch technical position, in the generic letters, in internal memorandum, in information notices. We did not do that. This is in --

DR. POWERS: Well, I think I understand most of the differences. But in Option 3, you explicitly call out participation in an NFPA effort and in Option 2, you don't.

MR. CONNELL: Well, no, we are working with NFPA

and industry to develop the performance-based, risk-informed consensus standard in Option 2 and in Option 3, that's the same. The only difference is that we wouldn't be planning in Option 3 to adopt it through rulemaking.

I am going into detail with option now. Option 1 would eliminate the existing exemptions and would eliminate the need for most future exemptions. However, we don't think there are very many that fall into the future category. It would provide a single uniform, consistent, however you want to phrase it, licensing basis for all of the plants.

Our proposal to the Commission is that we would do this on an 18 month schedule, following Commission approval to proceed with this option. This does put us in the area where we would be depending heavily on fire risk assessment, and we would have to address the limitations and uncertainties associated with doing that.

The staff believes that the cost versus benefit for most plants is not practical and we may not pass the 50.109 backfit requirements if we pursued this option. The staff believes that currently this would be difficult to inspect and enforce.

DR. POWERS: Why do you say it is difficult to inspect and enforce? That is a relative term. I mean the current regulations are difficult to inspect.

MR. CONNELL: That's right. We do have some experience though with the existing regulations. We would have no experience with this new rule.

DR. POWERS: You're -- all this says is there's a new learning curve here, and that if you want to -- learning curves are great if you want to invest in it. Is that where you spend your resources is basically what you are asking.

MR. CONNELL: Right. Are we going to train the -- we have inspectors in the regions that are familiar with Appendix R. Do we want to spend the time and the effort to, you know, start them all over from scratch and develop them as, you know, performance-based, risk-informed inspectors? I don't know.

DR. POWERS: I mean one would want to make a conscious decision to do that.

MR. CONNELL: Right.

DR. POWERS: It's the same problem that the industry faces. Do they want to invest in a new approach to fire protection in the hope that the ongoing costs are much lower?

MR. CONNELL: Yeah. And I don't have that comparison. But the idea is that it is not free. New regulations generally mean new problems. I use the maintenance rule as an example. This would require a significant resource commitment by the staff and industry to

pursue this option. And, as you have heard in previous presentations, industry does not support pursuing this option and it preempts the effort by the National Fire Protection Association.

CHAIRMAN SEALE: Am I naive in assuming that somewhere in the lexicon of do's and don't's that staff has to chide them along as they do their jobs, that there are certain things which are recognized as enhancing the inspectability and the enforceability of a regulation, and there are certain things that make that more complicated?

MR. CONNELL: I think that is correct.

CHAIRMAN SEALE: I guess what you are saying here is that this particular rule, and perhaps maybe the problem is any performance-based rule at this stage of the game. It is still a mystery, or at least it is not clear what makes it inspectable and enforceable.

MR. CONNELL: I can give you some examples.

CHAIRMAN SEALE: All right.

MR. CONNELL: For fire protection. For instance, let's say a licensee has elected to use some sort of fire modelling assessment to determine that some particular piece of equipment is going to be operable following a fire. All right. Well, the input into that model is critical in determining what the results are.

So are we going to have inspectors that are

reviewing the input data fields, which for some models are very complex, and verifying, either on a sampling basis or their entity, that this is an appropriate input to get the results that they have received to determine that everything was acceptable?

CHAIRMAN SEALE: So what you are saying is that such evaluations are more akin to the kind of assessments we do with complicated but not necessarily always transparent thermal hydraulics codes to assess the thermal hydraulic performance of a system in waste -- I mean in an accident sequence, rather than just an arbitrary kind of rule that you -- where now you do more of a prescriptive assessment of how well your fire protection system works?

MR. CONNELL: Right. Well, we don't -- I am not a thermal hydraulics code expert, and I am not sure we inspect and enforce against that, but I can not see, from a practical standpoint, having the inspectors go through, let's say, a licensee has 30 or 40 fire areas that they assess with some sort of computer model, I can not see them going through -- like the Harvard code requires a hundred input parameters for a run. I can't see them going through 30 or 40 areas and verifying the 100 input parameters for that model. I just can't see that happening.

So it is going to depend a lot on -- the licensee could make a mistake, and it could be very critical to the

results.

CHAIRMAN SEALE: Yeah, well, of course, in the thermal hydraulics area, those kinds of evaluations have graduated to being the responsibility of some of the analysts in headquarters.

MR. CONNELL: That's correct.

CHAIRMAN SEALE: You don't want to do.

MR. CONNELL: And I don't want to do that.

CHAIRMAN SEALE: You don't want to do that in the fire protection area.

MR. CONNELL: Okay. We can go on to Option 2, which is the staff-recommended option. Option 2 is consistent, the staff believes, with DSI-13, the role of industry involving consensus standards in our regulatory activities.

The comprehensive reg. guide that we would develop, I think would help in inspection and enforcement and clarify stuff for the inspectors, where right now it is scattered, and for the licensees, where it is scattered throughout, and then clarify anything where experience has shown that there is -- some clarification is needed.

DR. POWERS: What is your estimate on the time it takes to prepare such a comprehensive reg. guide?

MR. CONNELL: We estimate a year.

DR. UHRIG: What order of magnitude of math power?

MR. CONNELL: Well, we were planning on contracting this out, so it was about two FTEs. We have a contractor that has done similar work in the past, so they are up to speed on doing this kind of work. And the staff --

DR. UHRIG: On the order of half a million dollars?

MR. CONNELL: About a quarter of a million dollars, we estimated.

DR. UHRIG: Contractors aren't cheap.

MR. CONNELL: The current schedule for the NFPA standard is, for issuance, is May 2000. Under DSI-13, the staff would have a year following that, or May 2001, to accept the standard if we felt it met our requirements.

Option 2 is supported based on the feedback we received at the previous meetings we have had with the ACRS, by industry, and the NFPA.

One issue that we are resolving with NFPA is that staff believes that the NFPA standard should be risk-informed, not just performance-based, and we have a letter in concurrence to NFPA indicating our thoughts on that and also requesting that we put some additional personnel on the Committee to participate.

Option 2 is less resource-intensive than Option 1, we estimate about half as far as the cost. It does maintain

the existing exemptions and the existing process.

The downside of it is, if it was adopted by the rule, it could add a third licensing basis for plants. They could have the post-Appendix R plants, the pre-Appendix R plants, and these new NFPA 805 plants. So that is a thought to consider.

CHAIRMAN SEALE: If I may, I am anticipating something I expect I will hear a little bit later, but you indicate that the NFPA standard is performance-based, or you imply that it is.

MR. CONNELL: Right now the way the standard is being developed, it is a performance-based standard, consistent with the performance-based standards that you see in other countries, New Zealand and Australia, Sweden.

CHAIRMAN SEALE: Yeah, the problem I have is that there's an acceptability requirement, if you will, or goal, for performance-based standards in the nuclear industry that would suggest that performance-based standards for fire that depend on smoke detection is a little extreme.

MR. CONNELL: I am not following you.

CHAIRMAN SEALE: Well, as I understand it, or the things I have seen, is that -- suggest that the performance standard is the lack of any fires.

MR. CONNELL: Oh, okay. You are saying as opposed to -- you are looking at fire damage, thermal damage, as

opposed to potential for smoke damages, is that what you are --

CHAIRMAN SEALE: No, what I am saying is, I am being a little cute, I guess, in the way I phrased it. It is my understanding that a performance-based standard, in order to be acceptable, should be something that does not -- that when you detect it, the event that you detect does not, in fact, degrade the ability of the plant to do its function and so on.

MR. CONNELL: Okay.

CHAIRMAN SEALE: And from what I have seen of the NFPA standard performance-based measures, it seems to me, and I may be wrong here, but I had understood that, in essence, fire is an expected event -- I mean is the event that triggers the measure of performance.

MR. CONNELL: Well, that's true. I don't anticipate us ever to have any confidence that we are going to eliminate all fire incidents. I don't think we are ever going to get to that point. I don't think any fire protection program, no matter how good their administrative controls are, are going to eliminate that.

CHAIRMAN SEALE: And I am not arguing that. I am not arguing that. I am just saying that that seems a little inconsistent with the idea that the trip detection for performance acceptance or non-performance is a little bit

more severe than it is in some of the other areas.

MR. CONNELL: That may be the case because of the way that fire events occur

CHAIRMAN SEALE: Okay.

DR. POWERS: But I mean there's more to it, Bob. We all have difficulties when the performance indicator is smoke.

CHAIRMAN SEALE: Yes.

DR. POWERS: But it is not clear to me that that is the only performance indicator that can exist and I think one of our later speakers today will talk to us at least casually on the possibility of other performance indicators.

CHAIRMAN SEALE: Good.

DR. POWERS: And they may well exist, but on the other hand you have to remember that it is -- the plants have a defense-in-depth against fire and the incidence of fire is a little different than the incidence of a disruption in the thermal hydraulics and that you are not immediately on the pathway of undoing one of your barriers here.

In fact, all of your barriers are still in place, whereas in a paperwork sense maybe smoke does look like a bad performance indicator because it is too far along the line, in the reality, in the engineered hardware maybe it's not such a bad indicator.

CHAIRMAN SEALE: Yes.

DR. POWERS: It is an open question and it is one that we have had that all these people developing performance-based strategies need to wrestle with and it will be interesting to see how they come out.

CHAIRMAN SEALE: Yes. We may have to modify our tendency to cringe when --

DR. POWERS: Yes. I think we don't want to establish some position that says smoke cannot be a performance indicator, because in fact we do have fires and we will continue to have fires and the fire incident is not small.

On a worldwide basis it is roughly every two years that you have a reportable fire at a nuclear installation and so we have a frequency difficulty here that is different from other things and they are not comparable.

CHAIRMAN SEALE: Yes.

DR. POWERS: I guess my only point is that we want to approach these things understanding this is a different safety area than you encounter in the more classic operational accident area and maybe one of the best reasons I can think of for moving fire into a category like "external events" rather than "internal events" because it is different. It's just different and the plants may be inherently safety against fire than more other upset events.

CHAIRMAN SEALE: Very good.

MR. CONNELL: Okay. Any more discussion, option 2?

CHAIRMAN SEALE: Let me say I don't disagree with your point. I think you are characterizing this as something separate and the mode of the external events in fact may be a very important concept that we need to try to promote.

DR. POWERS: The other thing that I think we have to bear in mind is that there is a big technology within the United States that successfully protects our industry against fire that does not rely on risk, quantified risk --

CHAIRMAN SEALE: Yes.

DR. POWERS: -- I mean they all rely on risk but it is a less quantified risk, and that is developed in parallel with the more quantitative development of risk analysis in other aspects of safety and we ought not impugn that technology simply because it is not a quantitative technology.

CHAIRMAN SEALE: It's not the one we know about.

DR. POWERS: It is not the one we all know and love, but it has its strengths and its weaknesses --

CHAIRMAN SEALE: Sure.

DR. POWERS: -- and it's the balance of those strengths and weaknesses that are important to compare,

rather than just quantitative and unquantitative.

CHAIRMAN SEALE: I think that is a very important point to carry along.

MR. MARSH: When one thinks about the regulatory framework that exists now for fire protection and all its defense-in-depth measures that are superimposed on the regulatory framework for barriers, the fission product barriers, the fuel, direct coolant system, and the containment, it sounds like a very extensive umbrella. There's a lot of barriers involved in terms of keeping plant safety.

I think whatever we go to we have to keep mindful of not just the underlying barrier, safety, but also the fire protection safety measure too.

If we rely on performance-based measurements, then how does that new framework just associated with fire compare to the existing regulatory framework for fire? There is separation, detection, suppression -- there's a whole cadre of things that are there to keep the plant safe.

DR. POWERS: I think one thing the committee can do for itself, this committee can do for itself is to try to understand what the elements of defense-in-depth are in fire, and I think when they go through or if we went through and labelled it out, I think we'd find out there is one extra layer.

There is one extra layer that, for instance in the area of component protection, doesn't exist, and that is an interesting exercise to go through.

CHAIRMAN SEALE: Okay.

MR. CONNELL: And I might add that when we talk about quantitative, I think that the IPEEE experience has shown that quantitative is just engineering judgment when we have -- I don't believe the level of fire protection in the plants today is different by over 100 million times. I just can't believe that.

[Laughter.]

DR. POWERS: A perspicacious judgment.

CHAIRMAN SEALE: A safe one, too.

MR. CONNELL: Well, you know, I think the IPEEEs are primarily a qualitative assessment and they use the numbers but I still think it is engineering judgment, the four significant digits.

DR. POWERS: The difficulty that we are encountering is that there is a certain integration here. Fire protection can no longer stand in isolation from the rest of the safety community, as, it's my perception, it really has until now, because when the Staff comes along with its Reg Guide 1.174 and starts putting in some quantitative guidelines and says these guidelines, the value encompasses all the initiators including fire and we don't

have a good handle for evaluating the contribution fire makes.

We have an inherent vulnerability in the system and you are going to have people pointing fingers at fire because they can't make -- they don't have those technological bases to make their contribution. That is a problem --

MR. CONNELL: I agree.

DR. POWERS: -- we have to wrestle with and confront, but it is a problem that doesn't have anything to do with Appendix R.

MR. CONNELL: Right.

DR. POWERS: So we need to separate those two and not drag the inspection force and Appendix R into handling a 1.174 debate if we don't have to.

MR. CONNELL: It hampers your ability to understand the real significance of fire in the context of the entire plant.

DR. POWERS: That's right.

MR. CONNELL: You really don't know. I mean you can do some crude measurements but you just don't know how it all stacks up.

If you are going to start changing the regulatory framework for fire to go to something else, you need to understand where it fits into the big picture.

DR. POWERS: I agree with you.

MR. CONNELL: Of course it's not as easy to model, to measure and to predict as perhaps some of the other thermal hydraulics.

DR. POWERS: Well, you get caught on an interesting dilemma here and it is a database dilemma, I think, is that many of the other aspects of quantitative safety analysis are just happy as a clam if what they have is an incident database.

A fire protection incident just gets you started on the database you need. You need several other databases to carry out a quantitative analysis.

People complain about our incident database but it is a pretty good database. I mean there is a lot of information there. We just don't have any of the secondary databases to carry things out, and it is a problem and it is one we are going to have to wrestle with, but I think it's wrong to wrestle with that problem in the face of these three options because these are much nearer term than the resolution in that one is going to be.

MR. CONNELL: All right, and I would say one of the problems as far as data is component fragility due to fire and smoke.

DR. POWERS: Exactly.

MR. CONNELL: And we are in our infancy in that

area.

DR. POWERS: That's right.

MR. CONNELL: Whereas for a seismic event we can put something on the table. We can accelerate it horizontally. We can accelerate it vertically and tell you when it breaks, but, you know, the type of smoke, how big the particles are, deposition on different kinds of components -- I don't have a clue.

DR. POWERS: You bring up one of the really interesting questions here. It seems to me that when I hear lots of people setting up international databases and they talk about incident databases it is very difficult for me to understand how fire incident rates in CANDU plants, in India, in France, in Germany translate to fire incidents in the United States, but it is very easy for me to understand how things on component fragility might well translate, so I don't understand why there is a big pressure to develop international databases on incidents and not on fragilities.

Fragilities look like it's translatable. I mean I can make the correction for the fact that a pump manufactured in India is going to be a little different than a pump manufactured in the United States.

I know how to do that. It is difficult for me to make a translation between the procedures used in the United States and those used in India because I don't understand

India procedures nearly as well as I understand my own.

I digressed, but interestingly digressed.

MR. CONNELL: My last slide here is Option 3, which is the status quo option -- would maintain the existing exemptions.

We would not write the comprehensive Reg Guides so the guidance would remain fragmented and the FFPA standard could be used for licensees that have the standard license condition and under 50.59 or Generic Letter 86-10 to make changes or as the basis for exemptions in the future, and it is of course the less resource intensive from the Staff perspective of the three options.

That concludes my prepared presentation.

DR. POWERS: Did any of your options explicitly address Reg Guide 1.174?

MR. CONNELL: That's right.

DR. POWERS: Are you excluding the possibility of a licensee coming forward and saying I want to change my current licensing basis and I want to use 1.174 as the basis?

MR. CONNELL: They can do that now. That is where I talked about the flexibility that exists within the current rule and the current guidance is pretty broad. That is why we were not proposing that Option 1 is the way to go.

I think there is flexibility allowed and they

could use that Reg Guide today.

Then you get into the discussion of how confident are we in their quantitative values that they use to support their --

DR. POWERS: It seems to me that when you speak to the Commission that you at least want to consider bringing up -- making that explicit to them, reminding them that a licensee can come in under 1.174 and solicit changes to his current licensing basis and that the Staff would process it I assume.

MR. CONNELL: Absolutely.

DR. POWERS: And I think it is also fair to point out to them that it may be some rough sledding on the quantitative evaluation.

MR. CONNELL: Yes, I'll put that in. That's helpful.

DR. POWERS: I am suggesting that you want to appear integrated into this operation because I think you are whether you wanted to be or not.

MR. CONNELL: Well, you know, we intended it to be.

CHAIRMAN SEALE: You -- earlier we had heard about an architect engineering analysis that is going on of the various plants to review the overall configuration.

DR. POWERS: The functional fire inspections.

MR. CONNELL: Yes, the FPFI, okay.

CHAIRMAN SEALE: I don't think you mentioned anything specific about that here.

MR. CONNELL: No. The Commission directed the Staff in the September SRM to include the results from the FPFI and the IPEEE and any other sources of information, research activities, in our efforts and we are doing that.

CHAIRMAN SEALE: When do you expect those to be completed?

MR. CONNELL: The FPFI? The FPFI is going to be completed by the end of this year, isn't it?

MR. MARSH: Well, the pilot FPFIs will be done once four are done. That should be this summer, and then we are going to have a workshop in the September timeframe to go through what have we learned, what adjustments do need to be made.

We are going to make a recommendation to the Commission as to how to proceed -- should we continue with four per year, should we rely more on licensees to do self-assessments. We are going to make that judgment this summer.

You raise a point though about FPFI in the context of rules.

CHAIRMAN SEALE: Yes.

MR. MARSH: In the context of recommendations.

Our judgment is that the FPFI is a very important program. It allows us to get out and really see the implementation of the current day regulations and a lot of safety insights are coming from that and a lot of safety improvements are coming from that, and I would worry that going with Option 1, it would be legitimate for a licensee to say hold on, let's not be looking at us so carefully through the FPFI process because you are going to be changing the regulatory framework in a major way.

So Option 1 would have in it some type of major delay or maybe complete forestalling of the FPFI program.

CHAIRMAN SEALE: Well, or the alternative is that you might rush into some changes without having a full understanding of what the implications --

MR. MARSH: True. Absolutely true.

CHAIRMAN SEALE: -- of these inspections are.

MR. MARSH: Absolutely.

CHAIRMAN SEALE: I agree. I think particularly where you had so many exemptions that it is very worthwhile to get a coherent picture of what is being done across the board in the industry as a --

MR. MARSH: Benchmark at least.

CHAIRMAN SEALE: Essentially to reestablish the basis on which you are moving or where you are moving from, if you will.

MR. MARSH: That is why we thought that Option 1 and pulling together the cohesive set of current day guidance and requirements fits in with the FPFI program.

CHAIRMAN SEALE: Good.

DR. POWERS: And Tad, I believe you told us that we would be getting the reports for the first two functional fire inspections imminently.

MR. MARSH: The River Bend inspection report is past me in concurrence. It is on its way. Gary wants to look at that, Gary Holahan, since it is the first one and it is one of the most significant ones.

The Susquehanna inspection report, the second FPFI, I haven't seen that inspection report yet but the moment it's there of course we would be glad to send it to you.

DR. POWERS: Well, we have had a briefing on some of the interesting findings of those, and they look quite interesting.

MR. MARSH: They are.

DR. POWERS: So I appreciate whenever you have a chance to pass them on to the committee members --

MR. MARSH: Be glad to.

DR. POWERS: But we will be intentionally interested in the more insight kind of overview once you have completed that.

MR. MARSH: Be glad to.

DR. POWERS: Can you also talk to us about what is going on with regard to the India Station blackout and the IPEEE assessments there?

MR. MARSH: The SISBO, as it were?

DR. POWERS: Yes.

MR. MARSH: Ed, are you up to speed on SISBO?

MR. CONNELL: I can pinch hit for Pat Madden a little bit in that area.

Brookhaven -- I am sure you are aware of the Brookhaven activities. Ken Sullivan at Brookhaven Labs -- we got all the fire safe shutdown procedures for all the licensed plants, sent them to Brookhaven.

He went through them in great detail and identified I believe it is 11 plants that intentionally or could potentially enter a self-induced station blackout resulting in a fire. Plants that do this generally do this to eliminate the issue for hot shorts where they isolate the buses from offsite power and from the diesels. If the diesels start, they shut them down, so that work is still ongoing.

Several of those 11 plants like Haddam Neck is on the list or Maine Yankee is on the list or no longer an issue. Millstone 2 is on the list and we are working on Millstone 2 in great detail since that plant has a lot of

attention.

A similar issue has come up at a plant that wasn't identified in the Brookhaven list. I don't know if you are familiar with the Summer IPEEE.

Based on the preliminary information all we have done so far is do a review of the IPEEE submittal and we have REIs going to the licensee.

Summer is not a self-induced station blackout plant. Summer is a self-induced loss of offsite power plant. Therefore the diesel generator buildings are the most risk-significant. They do isolate offsite power for a fire in any area of the plant and if the fire was in one diesel, that diesel is written off, so they are solely dependent on the unaffected fire diesel and there's unavailability associated with that and that is what drives their core damage frequency and they are at a 10 to the minus 4 zone.

We are still working with that. That is -- we have only reviewed Summer about a month and a half ago or so.

CHAIRMAN SEALE: Right. That is an existing plant. They have other kinds of -- other options available for offsite power.

MR. CONNELL: Well, their procedures isolate offsite power from the emergency buses. They do say in their submittal that after things are taken care of, they

can restore offsite power, but their analysis does not include that in their core damage frequency calculation.

DR. POWERS: You see the difficulty you promptly get into is the recovery now becomes the driver?

CHAIRMAN SEALE: Yes.

DR. POWERS: For the core damage frequency.

MR. CONNELL: Right.

DR. POWERS: And I bring it up because here we have something on the order of 10 to the minus 4. For fire we'd previously seen Quad Cities.

We have got an interesting question coming up here and I think we --

MR. MARSH: Can I --

DR. POWERS: The comments that you have made, Tad, about the reliabilities of methodologies for the analysis, they seem very a propos here.

MR. MARSH: With respect to Quad Cities, there's some things going on that I would like to make sure that you are aware of.

We are briefing the EDO at this moment on Quad Cities with the regional administrator and we are briefing the Chairman later on this week on Quad Cities and where are we. That will be on Thursday at 11 o'clock.

Quad Cities has raised enough questions with respect to regulatory compliance and with respect to

operability and 5059s and questions of that sort that we are thinking about conducting a survey of all operating reactors to see whether that type of issue exists at other plants, so that if we -- we want to ferret out whether this is a generic problem, whether there's other plants that may have the same type of issue.

DR. POWERS: I think we want you to go ahead with that. I think what we would like to do is to get a briefing at least on the subcommittee level on Quad Cities, and I suspect some of -- since you can't talk about Quad Cities all day -- it's a lot more of Quad Cities than I am willing to put up with -- and we want to do that when it is appropriate to do it.

We have talked to the IPEEE people, review people, about doing that sort of briefing, but again when it is appropriate. Things are going on right now that I don't think you can give us a final word.

MR. MARSH: I am trying to -- you can't totally separate of course IPEEE issues from compliance issues, but we are concerned in both arenas.

We are concerned with respect to compliance, operability, reliance on the opposite unit -- those types of issues -- and the IPEEE issues as well.

DR. POWERS: Clearly these things raise questions that can be cast as questions on whether Appendix R is a

good rule or not -- an adequate rule or not -- or they raise questions about the analysis capabilities, and now you have introduced into a third "or" that raised questions about the interface with the rest of the regulations.

MR. CONNELL: Right, and just to get back to the self-induced station blackout, it is interesting to note that of the 11 plants that Brookhaven identified either intentionally or potentially enter a SISBO, none of those addressed it in their IPEEE submittal.

Summer is the only one that sort of addressed the cousin of it, and they weren't on the list.

DR. POWERS: An interesting feature on quality control here.

Well, thank you, Ed. That was an excellent briefing.

We have also a representative from NEI that wants to give us some further perspectives on the industry's position on fire protection rulemaking, Fred Emerson. I think the Committee has met Fred a couple of times now.

So, Fred, it's yours.

MR. EMERSON: Thank you once again for the opportunity to speak to you. What I would like to do this morning is to provide some additional thoughts on the options that we heard from the staff both today and the previous briefing on -- a previous briefing on January 22nd,

when we first learned of these three options.

The second thing that I would like to do is to clarify a couple of the positions that we have stated before so that there is really no doubt as to where we stand with respect to some of the statements that we have made in previous briefings.

I am not going to go through all of the history, nor do I intend to repeat a lot of the material from earlier briefings. This has been the subject of a lot of attention. We have talked to the ACRS a couple of times. We have briefed NRC staff and we sent a letter to the EDO. And I suspect that our briefings and letter writing days are still continuing beyond this meeting.

To get right into the meat of the presentation, the staff has outlined three options, and Ed did a very good job of describing those, so I won't try to repeat them. I have stated before that the option that we are the most interested in is Option 2, so I will spend most of my commentary on that.

Option 2 does appear to the industry to be the most productive path of the three that have been outlined. Ed stated that it would be a framework within which we could resolve existing issues, including the hot shorts issues. And I would agree with that, that the current rule can help us resolve some of these existing issues.

I would like to state clearly though that those issues, including the hot shorts issue, do remain and do require resolution, and we look forward to working with staff to resolve those -- those issues. I noted that the Committee, during a previous meeting, decided that they were, at some time later this year, going to address the hot shorts issue. And I would look forward to that, to your participation in that.

DR. POWERS: It's actually, the Subcommittee --

MR. EMERSON: That's correct.

DR. POWERS: -- has indicated, and what we have done is solicit the assistance of members of the Subcommittee dealing with electrical systems, because at least one member of the Fire Protection Subcommittee doesn't understand electrical systems very well. So he has asked for help.

MR. EMERSON: I stand corrected. We want to emphasize that with Option 2, we feel it is important to not just defer rulemaking, but not to have it at all. We are of the opinion that just deferring it only postpones some of the inevitable problems that you see with rulemaking that we have outlined previously in our -- we will be much farther along in our ability to comply with Appendix R. The exemption process would be even more useful and it would be much harder to do away with if we at that time have

allowances for risk-informed, performance-based methods, to the extent that they have been developed by that point.

In our -- if you did go to new rulemaking, you would still need to re-look at your plant programs under a new rule and that brings up the objection we have stated previously over rebaseling existing plant programs to a new rule, just even if there are no requirements attached to that new rule and so that -- that objection would not disappear with that.

So our view is that if the Option 2 appears to be the one, the direction the staff and the Commission are going, then we would urge them not to consider further just postponing rulemaking but not pursuing it at all.

DR. POWERS: That includes changing the combustibility or non-combustibility requirement for penetration seals?

MR. EMERSON: I don't think we have a problem with changing the non-combustibility requirement. That -- I don't think we have much to say about the staff direction in that area. I don't think there is any objection.

The Option 2, we feel the elements that have been outlined by Ed in this and previous briefings should be pursued. But I would like to stress that industry input, I think is important. I have stated previously that industry has many, many, many man-years of experience in dealing with

the current rule, as well as an eye toward how performance-based and risk-informed methods might be used, at least what their value might be once they are further developed. And I think that industry input should be considered an essential element of proceeding with Option 2.

We support the development of a comprehensive reg. guide to clarify the methods of compliance, hopefully, in dealing with some of the more troublesome issues that we face now, and provide a platform for the resolution of new generic issues that arise in the future.

The discussion earlier of IPEEE an FPFI safety issues, we support completion of those, as we have stated previously. And any insights resulting from those should be rolled into this comprehensive regulatory guide.

As we have stated previously, we support the NFPA Standard 805 development process. We see a lot of value in that process continuing and look forward to seeing what the results are.

Given the discussion over whether risk-informed methods should be reflected in that NFPA process, I don't have any comment on whether that should be the case, but we think the NFPA process should be continued.

Maintaining existing exemptions in the process for approval is certainly the right way to go, but we would like to see an expansion of that process to include clear

criteria for the application of risk-informed and performance-based methods. And there has been discussion this morning about whether the IPEEEs furnish the right platform for applying risk-informed methods, and perhaps some of the insights from them are useful, and perhaps some changes would have to be made.

But I think the main point of this is that risk information allows you to -- some better tools than a deterministics basis does for judging the -- for providing a more realistic view, or a more objective view of plant safety than you have, again, with deterministic methods. And we think it is important that the risk tools be developed, whether you call them IPEEEs or whether you call them something else. The risk tools need to be developed further so that we can take advantage of this technology. I know Dr. Apostolakis has made statements about that before and we share that view, that these risk-informed methods need further development so that they can be applied.

DR. POWERS: And I thought that was the real lesson that I took home from your previous presentation, that industry was very interested in applying these, not so much in a rule context, but in balance of plant areas. Can you tell us more on that?

MR. EMERSON: I don't have anything prepared to say on that. I think that there are -- I have been informed

by a number of plants that there are areas that they -- where they would like to see these tools be put to greater use. They haven't elaborated on specific examples yet, but I would be happy to try to find those out and share some of those with the Committee.

DR. POWERS: As that comes along, I think -- it struck me is that was one of the most attractive ideas I had seen. If you can apply them outside of a rule context, but still in a nuclear and an industrial setting, and hone them down to gain some experience on where they are useful and not useful, that might be one of the best pieces of data one could ever have with that.

I mean the trouble is, once you start applying them to rules, you have a legal framework laid on top of them that tends to ossify the methods. Whereas, in a non-rule framework, they are free to adjust themselves to become more useful.

MR. EMERSON: I share that view.

CHAIRMAN SEALE: So I take it you don't know of anyone right now who is willing to stick their neck out on any kind of pilot studying applying risk-informed, performance-based techniques in the fire protection area, but there may be some interest for that in the future?

MR. EMERSON: One of the tents of my job is that I don't volunteer our utility representatives.

CHAIRMAN SEALE: I understand that. I understand that. But I am just wondering is there an odor in the breeze that this might be the case?

MR. EMERSON: Yes, there is. Yes, there is.

CHAIRMAN SEALE: That's great.

MR. EMERSON: And I think that if that were encouraged, there would certainly be those who would want to use some of these methods on a trial basis.

CHAIRMAN SEALE: I am sure you aware this Committee has encouraged those efforts in the past on our staff friends --

MR. EMERSON: Yes.

CHAIRMAN SEALE: -- and on the industry both.

DR. POWERS: Dr. Apostolakis' point, repeatedly, is that if we don't use them because they are immature, they will always be immature and we will never get any advantage.

CHAIRMAN SEALE: Yeah.

DR. POWERS: Fred, if I can come back to your -- address the function fire protection issues. The staff, in their first two inspections have found some interesting, what they characterize as vulnerabilities in the fire protection functional inspections. Has that surprised the industry?

MR. EMERSON: I think some of the issues came as no surprise, and others -- others did appear to be a

surprise. Which I think goes to the point that we need the ability to deal with issues that come out of these inspections through the greater use of the methods that we are espousing.

I think one of the difficulties that we have had in the past is that we haven't had the ability to deal with new issues as gracefully as we would have liked, and the ability to do that, I think, will be enhanced through the pursuit of Option 2. I think the ability to use some foresight in developing a regulatory guide that provides greater clarification to the existing rule will be a definite advantage.

And at this point I would like to move to a bit of clarification of the current industry positions. I want to emphasize that industry is -- I won't say comfortable with the current rule, but I would say we are accustomed is probably a better word. And at this table, I have heard the phrase, "better the devil you know than the devil you don't know", and I would say that was probably, that would be an accurate statement of our view of the current rule.

The exemption process, again, we feel allows sufficient flexibility for the increased use of risk-informed, performance-based methods. Whether they are in their infancy or not is an issue that we will have to work through, but the fact that we can use this, that

individual plants can use this to apply the rule to existing plant situations, I think will be a benefit.

There was some discussion earlier about the cost of complying with a new rule, and we perhaps made more of an issue about the cost than was really the case. It has been pointed out that risk information is two-edged sword. You could come up with risk significant things that you have to deal with, as well as being able to show that certain things are not risk significant. And, obviously, there might be a cost associated with dealing with those risk significant issues.

I would just like to very clear that in a case like that, that cost if very much a secondary issue to the improvement of safety. What we object to is the application of cost to issues where you don't get a significant improvement in safety, that there's just a cost for carrying out a procedure or a requirement that appears to have no safety benefit.

CHAIRMAN SEALE: In that area, if there is a risk benefit, there clearly is a cost out there that might -- you might face if you don't do something about it.

MR. EMERSON: Yes. If there's --

CHAIRMAN SEALE: So, yeah, it's very logical.

MR. EMERSON: A number, any number of utilities have stated, in discussions we have had with the staff, that

if there is a risk improvement identified that has to be done, we will do it.

I have touched on already a bit of the discussion of the maturity of risk-informed, performance-based methods. And I think some -- as Dr. Apostolakis has said, some of the methods that we have can be useful now for a more efficient compliance or safety improvements. But the key here is implementing a framework that encourages the continued development of these tools while they are developing.

I would go back to my early days in the severe accident management when we were trying to cope with what we were going to do in that area, what severe accident management actually meant. And we worked through the process, and I think arrived at a conclusion that was satisfactory to both the staff and the industry. It took some time to work through it, but we made some major strides in that area. And I think that given -- we can do the same here. If we recognize that the goal is desirable, and that a framework needs to be put in place for reaching that goal, I think it will make things a lot easier for both staff and industry.

Our principal concern right now is with the uncertainty of regulatory acceptance of applications of the risk-informed method. When the staff doesn't have a strong basis to judge a request and industry doesn't have a strong

basis by which to -- of criteria by which to submit a request, you know, that does not lend itself to a lot of acceptance by either the staff or the regulator -- or the staff or the industry. So -- but if we get the framework in place and begin to arrive at some agreed upon areas where it can be applied, that, I think, will be useful.

Lastly, Ed brought up the issue of the fire PSAs perhaps not being useful for this area. And I think that there is some concern in the industry as well about the usefulness of the fire IPEEEs. Generally, they were considered a one shot deal.

There is some concern that there might be a requirement come out of this to maintain these one time analyses. We need, as I indicated, whether we call it a fire IPEEE or whether we call it another PSA method, we still need the ability to apply risk significance criteria. But the IPEEEs may not be the tool for that use, and that is something that we will have to work through as we go along. I don't have the right answer yet.

CHAIRMAN SEALE: But you know it is, the problem is there?

MR. EMERSON: The problem is there. I would like to conclude. The industry direction is that generally we support the staff's Option 2, if you include the provision for cancellation rather than just the deferral of

rulemaking. And I have pointed out why I think that just, where deferring does not resolve some of the issues that we have with it.

If you clarify the compliance methods in the provision for generic issue resolution, that will certainly be a valuable addition. And you implement a framework for development of clear criteria for the use of performance-based and risk-informed methods.

DR. POWERS: I guess I am still a little confused about exactly what you mean by that bullet. The staff has the reg. guide 1.174. I certainly don't think -- don't look upon those as particular clear criteria, but deliberately so. There's lots of discussion of fuzzy lines and bright lines and whatnot, and in the end, they have lots of fuzzy lines with integrated decision making. And if your point is here that the outcome of the integrated decision making is the problem, you don't know how that is coming out, then I understand it.

There's nothing laid down to say that this integrated decision making will make its decisions this way. Definitely nothing with regard to fire protection issues. If it is something else, then I am not sure I understand your point.

MR. EMERSON: No, I think you have captured that.

DR. POWERS: Yeah, I think that's -- I think

that's -- that's the issue that the staff confronts, is it is great, you can go in and say, sure, you guys can use 1.174 any time you want to address fire protection issues. But at some point, they have to be prepared to say, and here is how we are going to make our integrated decisions. That is just something that has to be factored into the staff's plans at some point. I don't think it is a burning issue right now, but -- I guess that's the wrong term to use here, isn't here. I don't think it is the highest priority issue that staff has on its plate. But in order to integrate 1.174 into everything, they are going to have to address this issue.

MR. EMERSON: As the industry, you know, there is a lot of value in complying with clearly understood regulations. It is certainly not in the staff's best interest, or in the industry's, to have any confusion about the application of these methods through 1.174.

CHAIRMAN SEALE: But, in a sense, it is trying that garment on for size that the pilot studies are all about. And as that process goes forward, I think a little confidence --

DR. POWERS: That may be the answer to it.

CHAIRMAN SEALE: Yeah.

DR. POWERS: The only way you can answer this question is to have a pilot study in the area of fir-

protection.

CHAIRMAN SEALE: Yeah. Exactly.

DR. POWERS: That may be the answer. On the other hand, I'll have to rap you on the knuckles. I don't think industry always supports clear criteria, and I am thinking in terms of the industry response to the 10 to the minus 4th CDF on goal, which is a pretty clear criterion that they pretty well opposed.

DR. BARTON: Maybe it is too clear.

DR. POWERS: Maybe too clear. Well, maybe it is the wrong criterion, but it is a clear criterion.

Fred, I'm sorry, we deferred you.

MR. EMERSON: No problem. Secondly, we would like to reemphasize our desire for extensive industry input to the reg. guide and the development of the tools that go forward.

DR. POWERS: How would you do that?

MR. EMERSON: How would we do that?

DR. POWERS: I mean how you would propose that -- suppose staff pursues Option 2 and going to collect this diverse information and it is a box of information like this, I know what the size of it is. And we are going to put it all in one place, and you want to have, you, as representative of industry, how would you design getting your input into it?

MR. EMERSON: The first thing that I would do is, once the Commission briefing, if it takes place, proceeds, is I would like to request a meeting with the staff to go over some general goals and objectives for both of these areas, just get on the table what industry and what NRC would like to see from this reg. guide and like to see from these tools.

And where that would go, I can't say. There may be some joint research efforts possible. You had some commentary on that before. That's a possibility. But, certainly, I think it is in our best interest, as the regulator and the regulatee, to develop some ground rules before we develop full blown regulatory guides that are then perhaps more difficult to adjust. Work, if not in lock-step, at least with an understanding of each other's views as we -- at every step of the process, rather than at the very end of the process, as has happened before.

DR. POWERS: We seem to have, in the last three or four years, an absolute flood of scientific meetings, technical meetings with broad representation in the fire protection area. They are coming along about the frequency of every six months, I would guess. And it seems like an awfully valuable forum to start articulating how to put this guidance together and getting some peer review. It just looks like it is made to order to try to get -- to trot out

ideas and see how they are received.

MR. EMERSON: We have also recognized that and one of the areas that we are attempting to address at our next industry information forum is the use of risk methods in the plant, to begin developing some ideas of how that -- what productive directions for that might be. Certainly, staff will be there and can share in that exercise.

And, finally, and the last point is, again, we support the continuance of the NFPA 805 process. We think that a lot of the best minds in the industry are working in that area to develop what true risk performance -- or performance-based methods are, even if we don't understand completely what they should be at this point.

I have confidence that the application of these minds to this problem with result in greater insights than perhaps we see now. So we support continuing that process.

And with that, that concludes my prepared remarks.

DR. POWERS: As usual, an excellent briefing. But I'm going to hold your feet to the fire that as you get information about what's going on in the industry on application of more quantitative techniques in the balance of plant outside the strict applicability rules, I'll hold your feet to fire to keep us informed as best you can.

MR. EMERSON: I will make an effort to gather such information.

DR. POWERS: Thank you very much.

CHAIRMAN SEALE: And certainly as you -- as we go forward, the staff will be coming back to see us as they move through this process, and so on, and you're always welcome to come, listen and make any comments that you may wish to add. I think input from you and like we're going to hear in a few minutes from NFPA really make these discussions a lot more helpful, a lot more balanced, and really help inform us as to what true and full perspective is, and we thank you very much for that.

MR. EMERSON: And I would offer the opinion that this forum allows both the staff and the industry to collect their thoughts in a more coherent form than they might without having such a forum available.

DR. POWERS: Now we will have the benefit of a presentation by some representatives of this National Fire Protection Association effort to develop a performance-based standard. The committee has heard from this group earlier and I had a feeling that things were just getting started, but I'm told that this is like a freight train right now --we're getting a lot of progress and I think the committee owes a vote of thanks to these gentlemen for volunteering to come to speak before us, to take up their time which must be fairly hectic if they're making as much progress as it appears.

Gentlemen, the floor is yours.

MR. O'NEILL: Okay. Thank you. Give me one second for the microphone to be installed.

DR. POWERS: Maybe the floor may be yours, but the microphone is not yet.

CHAIRMAN SEALE: You're not stereoscopic, that's for sure.

[Laughter.]

MR. O'NEILL: Thank you. Thank you, Mr. Chairman. I'm Tony O'Neill with the National Fire Protection Association and I am representing the association here in Washington, and I'm accompanied here by Rich Bielen, who is the project manager for and administrator for the 805 project which you've heard about a little bit already.

We appreciate the opportunity to once again visit with you. We had presented a full briefing to the Fire Protection Subcommittee, and that is a matter of record with you.

So we'll attempt to be brief this morning, and our purpose is to address several issues that have been raised in the subcommittee's review of the NFPA project, so we want to be able to address those several questions and also to answer any questions that you might have, and ultimately today we would like to give you a progress report on the 805 project.

I would also mention one other thing. We have provided to the committee a briefing package on the National Fire Protection Research Foundation activities which also was a focus of discussion previously.

With that brief introduction, I'm going to turn it over to Rich, who is the person who actually administers the project with our consensus committee.

Rich?

MR. BIELEN: Okay. Thank you, Tony.

If you remember, back in January, we made our original presentation to the ACRS Subcommittee on Fire Protection. We addressed three different points. One of them was the NFPA process, I addressed the performance-based codes and standards, and our chairman, Len Hathaway, updated us on the NFPA 805 work that the committee is doing.

At that presentation, there were several comments and concerns and questions about some of the things that we had talked about, and what we want to do is try to address some of those now, and we have had some further discussion on those.

One of the areas of concern was that NFPA 805 was going to be a performance-based standard only, and I will address each one of these points as we go along.

Another concern was the inspectability enforceability issue of NFPA 805. A third one was

performance indicators, and there's one that I don't have listed on the slide here, but I do have an overhead that I will be discussing, which was expert elicitation.

So our response to that -- I'm sorry, I'm a little bit out of order. This was the slide I was just talking about -- here we go -- with performance based, the first concern.

One of the things that was discussed and is a concern, and Ed Connell had addressed it earlier, was that NFPA 805 was going to be a performance based standard only, and that is true. At the last draft, which is our draft number 2, NFPA 805 was going to be performance based, and at that time, we did not consider risk informed.

However, just saying that now, we're still in the very early development stages of NFPA 805. We have completed the second draft. We're going to be meeting again next month to discuss the third draft, looking at the third draft of the standard. We propose to have a draft available for the public in September of this year.

So the point I'm making here is that we can still address other options or other things such as risk-informed, as we're still in the early stages, and we will be addressing risk-informed approach at our next meeting at the end of April.

DR. POWERS: Let me return to the point you made,

at the end of September, if all goes well, that you'll have a draft available for the public. This isn't the one where you solicit input, I mean comment from all affected personnel?

MR. O'NEILL: That is correct. It's a public document, and that's -- the purpose of which is to solicit that public review and comment, and then the committee needs to address -- is required to address each and every one of those comments that come in relative to the draft document and then we publish the results of those.

DR. POWERS: Let me turn to my chairman, then, and make him answer questions here.

Has the committee ever written a letter to a consensus review process?

CHAIRMAN SEALE: I'm not aware that we ever have, and it's an interesting thought. I think the more appropriate way to handle it is perhaps to work with the staff, which does have participation in these review groups, and certainly whatever we do, that would be the vehicle, whether or not -- well, we don't have to discuss that.

MR. O'NEILL: If I might, Mr. Chairman, the staff is involved with the process, as you know.

CHAIRMAN SEALE: Yes.

MR. O'NEILL: And we were very pleased to hear this morning that the staff expects to increase their

participation activity in that.

So yes, there will be opportunities within the staff to participate directly in the committee. There's also opportunities for industry and anyone else to participate in that review of the draft that Rich is indicating is coming out in September.

DR. MILLER: I have one suggestion since I am involved indirectly on consensus standard development, that a member or members of ACRS might become informational members of a standards development. As a consequence, then you have the opportunity to write your own comments directly, I believe. That's the way it works with this one.

MR. O'NEILL: That would be very acceptable and encouraged, as a matter of fact. Again you can do it wearing the hat of the ACRS or you can do it as individuals who are interested in nuclear safety.

CHAIRMAN SEALE: We'll take that into advisement and figure out which way is the best way to approach that.

DR. MILLER: That also puts you on the mailing list, so you get all the stuff.

CHAIRMAN SEALE: Yes.

MR. O'NEILL: Well, we will make sure that you get complete sets of the draft and also the filing comments.

CHAIRMAN SEALE: Okay.

MR. BIELEN: Right. I would also like to note the

draft coming out in September is going to be the first draft for the public to look at. The committee is still going to be reviewing that document in the springtime of next year along with all the other proposals, and then there's a comment stage after that. So this is only one of many steps as far as commenting goes.

DR. MILLER: Also, I might even suggest that you attend one or so meetings. You might get a feeling of the consensus standard development process.

DR. POWERS: You mean it might persuade one member of the committee that this consensus process is an adequate expert elicitation?

DR. MILLER: My comments were not particularly directed to one member of the committee. If one member took it that way, that's fine.

DR. POWERS: I doubt that he is persuadable on that regard.

DR. MILLER: I would doubt that, too.

CHAIRMAN SEALE: Okay.

MR. BIELEN: Expert elicitation, it sounds like we're talking about. We'll address that here a little bit.

We had a hard time getting our hands around expert elicitation. That was brought up and discussed last time at the presentation. Jim Singh was very helpful and was able to track down, do some research for me about the expert

elicitation, and he is going to be providing me with some information. I don't have that here at this presentation, so we haven't been able to take a look at it; however, the sense that I get is that it's the ability to get experts on the committee in areas where we feel that we might need some extra help.

If that's the gist of what expert elicitation is, we can do that. The NFPA has NFPA in-house staff for risk assessment, who is John Hall, a PhD, he has a bachelor's degree in mathematics, PhD in operations research. Also, the NFPA process allows us to go out and recruit experts in any particular area that we need, and we will do that. As we go along through the committee process, if we feel we need someone who is an expert in risk analysis, PRAs, we can go out and get that. The same thing with any other area in the development process of the standard.

So the NFPA process allows us to go out and find experts, and we will do that as we see fit. Also, I heard from Ed earlier that we're going to be getting a letter recommending that we do that, so we'll definitely be taking a look at it. That is a very doable option in the NFPA process.

Inspectability enforceability -- that was another issue that was discussed last time. We heard earlier from Ed Connell that this seems to be a problem area when it

comes to performance-based standards.

Actually, maybe when we're -- when we're thinking performance-based standards, we probably should say performance-based/risk-informed, because we will be discussing that.

Ed indicated in one scenario that it might be difficult for field inspectors to look at the input parameters for the various models out there when it comes to modelling, and I think that statement is true. It will be difficult for field inspectors to look at all the input parameters.

What I'm proposing here is a different scenario. I don't know if this is how the final outcome is going to be, but it's another scenario to consider, and that's that the performance-based standard allows for a very close working relationship between the authority having jurisdiction, which is the NRC in this case, and the users.

The NRC would be involved throughout the performance-based design process, validation process, and I think, more importantly, the final approval. So what I can see happening is that a performance-based standard/risk-informed would go through the NRC process throughout the design process, validation and the approval, then this approved performance-based fire protection plan can then be inspected by the various inspectors out there in

the field.

So we have an NRC-approved plan, we have the inspectors out there who can inspect something now that has been approved by the NRC. And then once you have inspectability, I think that leads to enforceability.

So again, this is one scenario. It may not be the scenario that's finalized, but it's another option which I think is easier to enforce than to have each of the inspectors out in the field looking at the performance-based designs, because that does sound like a very difficult task to do.

The last issue was performance indicators. Performance indicators is an area that not too many people have a very good handle on when it comes to fire protection. I think the NFPA committee is going to be breaking new ground when we get into performance indicators. Some of the discussions I've had with NRC staff and the industry, there isn't anyone that we know of, isn't anyone right now that we know of that is looking at performance indicators for fire protection.

Again, we've got to remember that we're in the early stages of development. We can address performance indicators with the technical committee as we're developing NFPA 805, and with the NRC staff on the technical committee. We expect input from them to help assist us in identifying

and possibly developing performance indicators.

So right now, I don't have a good handle on what they are, but it's something that needs to be discussed, and we have time to do that.

In conclusion, I would just like to state again that NFPA is in the drafting stage. We can change course relatively easy at this point because we're still developing the standard. The technical committee can make modifications and additions such as risk informed, as we mentioned before.

Our desire is to have NFPA 805 suit the needs of the NRC. And we also welcome and expect their input. Since we have NRC staff on our committee, we expect to have input from the NRC, and as Dana had mentioned earlier in discussions before the hearing, we expect this to be an iterative process.

So we'll be proposing a draft in 805. We hope to get input from the NRC or anyone else as far as where we need to do some improvements, where we need to change course, and then we can go back and make those modifications. So it's an iterative process that we expect to have as we go out and develop NFPA 805.

MR. O'NEILL: So that concludes our report, Mr. Chairman. We pledge to keep the committee and particularly the Fire Protection Subcommittee informed of the steps that

are being taken, and to try to address the questions, and this, therefore, is a status report.

DR. POWERS: I think it's an excellent report, and I'm glad -- I'm flattered that you paid so much attention to the things that we said in the subcommittee, and you hit the right ones, too. And thank you, gentlemen, for the generosity of your time, and what I can promise you is that the subcommittee will take an active interest in this development of this new standard and will probably ask to chat with you a little bit once you have the first draft out for public comment, and I may lobby the rest of the committee to take an active interest in commenting on that draft.

MR. O'NEILL: Thank you.

DR. POWERS: Do any of the other members have questions or comments they would like to pose in the area of fire protection, both specifically here and broadly to the rest of the presenters?

MR. BIELEN: I think the 805 project seems to make a lot of sense, and I can tell that you're doing a good job because Dr. Powers doesn't usually get this excited about projects.

[Laughter.]

DR. POWERS: Do any of the presenters want to make final comments?

[No response.]

DR. POWERS: Well, thank you all very much. The presentations were excellent --

MR. O'NEILL: Thank you.

DR. POWERS: -- and fit our needs, just exactly what we were looking for.

With that, Mr. Chairman, I will turn it over to you regrettably two minutes late.

CHAIRMAN SEALE: Well, I want to thank you for such prompt adherence to our time line, and without further ado, we'll recess for 15 minutes and come back and talk about final rule requirements for shipping packages for high-level waste.

[Recess.]

CHAIRMAN SEALE: We'll come back in session.

Our next presentation is on the final rule for requirements for shipping packages used to transport vitrified high-level waste. Dr. Kress, as the chairman of the subcommittee, would you introduce our speakers.

DR. KRESS: I sure will. First a couple comments.

There is a rule currently available on shipping high-level waste, and it basically calls for a double containment in the shipping containers, but the rule specifically exempts a number of things.

One of them is reactor fuel elements that are

clad, it exempts any metallic forms for this high-level waste. It has a catch-all exemption that reads something like "other plutonium-bearing solids that the Commission may determine should be exempt."

I think originally, the attempt was to have vitrified high-level waste included in this other category and already have an exemption, but the Commission, for whatever reason I'm not sure of -- maybe it's because they don't like exemptions -- declined to have the vitrified high-level waste included under that other category.

So the staff, I think with the prodding of DOE, has come back with a new rule which I guess just basically spells out vitrified high-level waste as being exempt from the double containment requirements. This is based on the perception that vitrified high-level waste would be basically equivalent to spent fuel in terms of its disperseability, and this perception is based on some modular accident analyses as well as some tests that were conducted at Savannah River.

One of our members, Dr. Powers, has raised what I think are some very good questions about the basis for this perception, and these have been passed on to the staff and you have a copy of them under, I guess it's tab 3, and I won't repeat them here, but I hope that the staff has had a chance to look at those and will address those today.

So with that, I'll turn it over to --

DR. POWERS: Maybe I could ask a couple of additional questions.

DR. KRESS: You could ask some, yes.

DR. POWERS: In addition to the Commission having a certain reluctance to have lots of exemptions to the rules, they have also suggested that we use risk and risk information wherever it's possible in the formulating of rules.

The exemptions you spoke of, or the exempted as opposed to exemptions, the exempted material forms were selected not based on risk but more on what I would call hand-waving arguments, and they seem that if you approach them from a risk basis, they might not be the things that you would select to exempt.

For instance, we know that plutonium will combust in air, and the products of that combustion can be and often are respirable aerosols, that the combustion, once initiated, can be self-sustaining, that plutonium melts at a relatively low temperature, and once it melts undergoes exothermic inner-metallic reactions with contained materials that would only exacerbate production of respirable aerosols.

So if one went through this in some sort of a quantitative analysis, one might not come away with the same

sort of conclusions concerning its transportability without double containment.

Similarly, if one goes through and analyses the performance of a clad plutonium and the way we analyze the transport of clad fuel rods in general, one might not come away with the same conclusions that were reached in the past.

So the question I have is, given our better information now, is it useful to reason by analogy?

The next question I have is that we're talking here about transportation across the public highways. I would be interested to know if transportation of plutonium materials within a DOE site is also exempted from the double containment rule.

DR. KRESS: Okay. Very good.

With that, I'll turn it over to our staff, the NMSS. I presume you're Susan Shankman?

MS. SHANKMAN: Yes. I was this morning.

[Laughter.]

DR. KRESS: Who are you now?

MS. SHANKMAN: Okay. Good morning.

Dr. Powers, you have challenged us with some interesting information. Let me tell you what we thought we would do this morning. We would like to make a presentation, just go through the background of the rule,

where we are with the rule.

You know, the final rule is going up to the Commission for review. Bill Lake is here from DOE, and he will have an opportunity after we talk to present information to you about -- some of your questions spoke to DOE and their internal processes. So he'll have a chance to speak to that, and then I brought some staff with me, people who have been very much involved in this. I have to tell you, of everybody here, maybe Mark also, we're the most junior in terms of this rule.

Bill Lake, who says he was here in the last millennium, says that this rule predates him. Ross Chappell also has been with the Commission and AEC a long time. So maybe they can provide more of the historical evolving of this rule. But let me just speak to where we are on the rulemaking package and how we got there.

The background basically -- I'll talk about that. I'll talk about how we certify a package for transportation. As you know, because of the Nuclear Waste Policy Act of '82, all high-level waste and spent fuel needs to be transported in NRC Type B certificated or certified -- I don't know, whatever word you want, but it has to have a certificate of compliance and it has to comply with Part 71. I'll talk a little bit about that, the final rule, our basis for accepting DOE's petition, and Bill can get into more the

number of shipments expected.

We were not sure DOE was going to be here this morning, so some of our presentation speaks to things that I think that he can better speak to.

Basically, as Dr. Kress mentioned, we started with a petition from DOE which requested that vitrified high-level waste be added to the forms of plutonium which are exempt from the double containment requirements of 7163(b).

That petition came in in 1974. We looked at part 7163, and after some meetings with DOE -- I'm sorry -- the original double containment was 1974. Their petition was 1994, 20 years later. Okay.

We looked at 7163(b) and looked at the history of it and felt that we could look at it as a determination. Basically, in '74, AEC was concerned with the likelihood that respirable plutonium would be released during transport, but they were focused on human error and the issues of securing the transportation package.

They also were concerned that in a reprocessing environment which was postulated to have a lot of transport, that plutonium would be part of that reprocessed economy. Now, as you know, that never sort of came to pass, so the amount of plutonium that was shipped related to commercial processes was never the volume that was envisioned.

You asked, Dr. Powers, whether DOE has covered transport within DOE sites. They are not.

DR. UHRIG: By the original rule?

MS. SHANKMAN: By the original rule, because DOE as an entity is exempt from following NRC regulations for transport except --

DR. POWERS: But DOE has its own rules.

MS. SHANKMAN: Yes.

DR. POWERS: And it has --

MS. SHANKMAN: Mr. Lake can speak to that.

DR. POWERS: And they have really stringent double containment rules.

MS. SHANKMAN: Okay. But he can speak to that. It's not something -- these are packaging that NRC does not review, nor do we certificate.

DR. POWERS: I think I understand.

MS. SHANKMAN: Okay. I don't know where we are on the slides. Okay.

Anyway, as Dr. Kress noted, there were determinations. The third part of 7163 was that you could make a determination that something was in the form that it could be exempt from double containment, and that was a recommendation that the staff sent to the Commission in, I guess it was -- it was 1994.

Anyway, the Commission in the SRM in response to

that said no, they thought a determination was not the appropriate way to exempt this form of plutonium and that we prepare rulemaking that would allow vitrified high-level vitrified waste to be exempt from the double containment provisions.

We processed that, and in May of 1997 sent forward a proposed rule which the Commission approved, and that has been out for comment since then. We received, depending on how you count, approximately six comments -- many of them were from DOE or DOE contractors -- telling us that they thought that the proposed rule was a good idea.

We have prepared a package to go back to the Commission with the final rule, and what I was going to tell you today is where that package is and what language has been modified from the proposed rule.

Now, I know you have seen the proposed rule; have you seen the package of the final rule?

DR. KRESS: I don't think we have seen that package.

MS. SHANKMAN: Okay.

DR. KRESS: I haven't.

MS. SHANKMAN: I believe Dr. Powers was making comments on the final package, or were they --

DR. POWERS: I think I had the final package.

MR. DUDLEY: There was a memorandum from February

9tn, 1998 --

MS. SHANKMAN: Right.

MR. DUDLEY: -- that was put in for office concurrence.

MS. SHANKMAN: Okay. All right. Well, it has been modified since then, so let me speak to where it is.

CHAIRMAN SEALE: You said you got about six comments to the original rulemaking --

MS. SHANKMAN: To the proposed rule that went out in May.

CHAIRMAN SEALE: Yes. Right.

MS. SHANKMAN: Right.

CHAIRMAN SEALE: And most were from contractors.

MS. SHANKMAN: Or from DOE.

CHAIRMAN SEALE: Yes. Did you get any from what I will call adverse reviewers?

MS. SHANKMAN: We got one letter that -- I don't know -- do you want to speak to the comments?

MR. BROCHMAN: There was one commenter, a member of the public, that proposed some changes to the rule language which would have put -- while not opposing exemption, would have put some additional requirements on the quality assurance requirements and other testing requirements that, when looked at, would almost create the case where you -- if you had an exemption, you would also

have a requirement -- you would have some very stringent requirements as well. That was the only, quote, member of the public. Everyone else was either DOE or a national lab or consultants to DOE.

CHAIRMAN SEALE: But there were on comments that essentially --

MS. SHANKMAN: That opposed it?

CHAIRMAN SEALE: That directly opposed the --

MS. SHANKMAN: No.

CHAIRMAN SEALE: -- relaxation of --

MR. BROCHMAN: There were no comments that directly opposed it.

MS. SHANKMAN: No.

DR. POWERS: It is my understanding as well that there was at least tacit agreement from some of the state regulators. I'm thinking of Idaho in particular.

MS. SHANKMAN: I'm not aware of that. We didn't get any objections from them, anything in writing, so I don't know if you would call that tacit agreement. You know there are some very vocal transportation committees that work in concert with each other, and that's part of a DOE-funded activity related to transport to the geological repository, wherever that is, or any kind of interim DOE facility.

Well, as we develop the final rule package, the

package still exempts vitrified waste from double containment, and that would be vitrified waste from any facility, not necessarily only DOE. Now, I can't postulate where else it would come from, but just to say the exemption is not DOE specific, it's vitrified high-level waste specific.

We looked at the equivalent -- I don't want to say equal, but the similarities between spent fuel and high-level vitrified waste and determined that some of the properties of defense in depth that we would get with spent fuel were also attributes that we could find in vitrified high level waste.

Do you have that picture?

DR. POWERS: A question that is being posed is, is that the process -- is the analogy that you want to draw here and can be drawn the way we want to go on this regulation, a regulation in general? Is analogy the right way, or should we actually be looking at something -- some measure of risk?

MS. SHANKMAN: Well, in terms of probability, we're not looking at probability, but we are looking at consequences if you say that the risk is -- the consequence is what you're trying to have your defense in depth protect against.

Now, has it been assessed in the same manner as

the probability equations that we've been using with reactors? No. As you probably know, in NMSS, there are no funds for probabilistic risk assessment. We proposed it for storage and that was cut from the budget. We also wanted to do some risk assessment on transportation, and we have actually a revalidation of our generic environmental statement going on at Sandia Labs and the funds for that were cut, and so that project will be slower than we originally planned.

It had some elements in it of looking at probable risk, but I don't know that that will be -- that we will have the funds to do that since the budget cut all funds for any PRA in NMSS.

DR. POWERS: The members will have to recognize that I am an employee of Sandia Labs.

MS. SHANKMAN: Right.

DR. POWERS: I haven't a clue what's going on with respect to transportation at Sandia Laboratories --

MS. SHANKMAN: Right.

DR. POWERS: -- but nevertheless, members should weigh any comments I make on these activities --

MS. SHANKMAN: All right.

DR. POWERS: -- with the knowledge that I do work for the institution.

MS. SHANKMAN: I know that you have been in a

totally different part of Sandia, and it is a vast laboratory.

Anyway, but --

DR. KRESS: But part 71 does call for you to evaluate with respect to certain design basis --

MS. SHANKMAN: Absolutely. Hypothetical accident conditions.

DR. KRESS: Could you give us a quick overview of what those consist of?

MS. SHANKMAN: Sure.

DR. KRESS: I mean, just name --

MS. SHANKMAN: Can I let Ross Chappell?

DR. KRESS: Yes. Just name some of them.

MS. SHANKMAN: All right. I would like Ross Chappell to address it because he is the section chief for the Licensing Group. It includes shield -- well, that's the list of attributes that we look at.

DR. KRESS: Okay. That's the attributes.

MS. SHANKMAN: Right. And 71 has a specific list of normal conditions of transport and hypothetical accident conditions, not hypothetical accidents --

DR. KRESS: These are wrecks at a certain speed or fires or --

MS. SHANKMAN: Right.

Ross, you want to answer Dr. Kress' question?

DR. KRESS: Just sort of in general.

MR. CHAPPELL: What part 71 requires? Part 71 is performance oriented. We have a set of tests that are representative of the conditions and normal conditions of transport, and we have a set of tests that represent hypothetical accident conditions.

For each set of tests, there are acceptance standards with respect to containment shielding sub-criticality, and the acceptance standards for normal conditions are more stringent than those following hypothetical accident conditions.

DR. KRESS: Are these tests all just on the casks, shipping casks?

MR. CHAPPELL: Well, the package we call it.

DR. KRESS: Including the stuff you're going to put in it?

MR. CHAPPELL: The package includes the hardware plus the contents. The characteristics of the contents are evaluated as part of the package. For example, if there is a heat load or weight for inertia, whatever, we look at it all as one thing.

DR. KRESS: The acceptance criteria for passing these tests are some measure of survivability of everything or some measure of what gets c.

MR. CHAPPELL: Well, e you mainly interested in

accident conditions or normal conditions?

DR. KRESS: I'm interested in the accident.

MR. CHAPPELL: Following the hypothetical -- first of all, exactly what are the hypothetical accident conditions, they are a series of tests that are done in sequence. So the damage from each test is compounded by the next test.

The tests are 30-foot drop, which is onto an essentially unyielding surface in the most damaging orientation, followed by -- there's a crush test that would not be applicable to this kind of package.

The second test for this kind of package would be a puncture test, which is a 40-inch drop onto a six-inch-diameter steel pin, again in the orientation that would cause the most damage.

The third test is a one-half hour fire test, 1475 degrees. Following the fire, you can't extinguish any smoldering things. The things must be allowed -- and that's followed by immersion in water, which has significance for the criticality safety moderation.

After those tests, the package cannot have released more than an A2 quantity of material. For plutonium, for example, a typical plutonium mixture in A2 quantity would be about two milligrams of material.

DR. KRESS: How is this determination made that it

passed that?

MR. CHAPPELL: I beg your pardon?

DR. KRESS: How do you know that it passed that test? How do you make the measurement?

MR. CHAPPELL: Well, we do containment analysis, we measure the leak rate of the seal, the package seals.

DR. KRESS: After all the tests are over --

MR. CHAPPELL: Yes, sir.

DR. KRESS: - you do a leak rate test.

MR. CHAPPELL: Do a leak rate test, right.

CHAIRMAN SEALE: Triumph of technology over common sense.

DR. KRESS: I think that gives you a good idea.

MR. CHAPPELL: This also a standard for shielding, one rem at one meter from the external surface of the package, and there are standards for criticality safety following the test.

DR. KRESS: Thank you.

MS. SHANKMAN: This is not of the DOE package. It comes from BNFL. But it's typical of the way in which we envision the stainless steel canister sealed with vitrified high-level waste inside, and this is not the canister that would be shipped.

DR. KRESS: Does the rule as amended require the stainless steel?

MS. SHANKMAN: It's a sealed canister.

DR. KRESS: This says it's a sealed canister?

MS. SHANKMAN: I will read you the exact wording.

DR. KRESS: Okay.

MS. SHANKMAN: As it's going forward. But my point is that all the things that you just talked about would go -- this would be put into a cask that meets all those standards.

DR. KRESS: The whole package would be given these tests.

MS. SHANKMAN: Yes. Exactly.

DR. KRESS: Is that what was done at Savannah River?

MS. SHANKMAN: I don't know. Bill?

They just subjected this canister. So the canister itself that was tested at Savannah River I believe was a seven-meter drop instead of nine. But that was without any impact limiters that would ordinarily be in the Type B packaging, so it's actually, although it's two meters less, it would be a more conservative standard.

Let me find --

DR. POWERS: We know that how, that it's a more conservative standard?

MS. SHANKMAN: What do you mean by how do we know that?

DR. POWERS: Instead of having a nine-meter drop, you have a seven-meter drop.

MS. SHANKMAN: Um-hum.

DR. POWERS: How do we --

MS. SHANKMAN: You have no impact limiters that you would have when you have the nine-meter drop, so you have no -- this is not protected in the way that it would be protected at nine meters.

DR. POWERS: And what I'm trying to understand is how do we know that the impact limiters are worth two meters of drop distance?

MS. SHANKMAN: Well, I don't know that.

DR. POWERS: Okay. So we really don't know that it's a more conservative test.

MS. SHANKMAN: No, I don't know empirically. You're correct.

All right. The wording in the language that's going forward says vitrified high-level waste contained in a sealed canister designed to maintain waste containment during handling activities associated with transport.

The reason that that wording is in there is in the proposed rule we harked back to the standards that were used for the geological repository canisters, and that's in Part 60. We had some commenters who said that it didn't seem appropriate to use standards for a nontransport package, so

we looked at the characteristics that Part 60 was envisioning and Part 71 and found that the only one that was not already embedded in Part 71 for the packaging was maintaining waste containment during handling activities associated with transport. So we left that into this exemption.

But we did put in what would be an acceptable canister. It says for the purposes of meeting this paragraph the NRC will consider acceptable a canister which is designed in accordance with the ASME boiler and pressure vessel code, section 8, additions through the 1995 edition. And we then went on to speak to specific parts of that code that we would be looking for in certificating this package. That is incorporating by reference the ASME code, and we feel that that provides a licensing basis for this canister.

DR. POWERS: Does the ASME code speak to the issue of external contamination that's not removable?

MS. SHANKMAN: No. It speaks to the strength of the canister.

DR. POWERS: This is the part of the language I found very perplexing.

MS. SHANKMAN: Um-hum.

DR. POWERS: At least when I have seen or had described for me the filling of those canisters, it would seem to me that it's impossible not to get external

contamination of the canister. Now some of that external contamination will be removable. It's a form of dust.

MS. SHANKMAN: Um-hum.

DR. POWERS: It comes from the glass pouring operation. Some of it will fall in the category of nonremovable in the sense that you can't wipe it off. That doesn't make it nonremovable in the sense of it won't pop off in the course of an accident.

MS. SHANKMAN: Well, but the package still has to meet the Type B standards under Part 71.

MR. CHAPPELL: Under the present rule plutonium up to 20 curies is exempt from double containment, and I don't know the level of contamination that might be on the outside of a cylinder, but it's perhaps less than 20 curies.

DR. POWERS: I would think that it would be less than 20 curies.

MS. SHANKMAN: Right.

DR. POWERS: I think you would run into --

MS. SHANKMAN: Right.

DR. POWERS: The difficulty with the shielding standard if it were more than that.

MS. SHANKMAN: Right.

MR. BROCHMAN: DOE said in their technical justification that after the canister is filled and sealed and all the other things done that it's decontaminated by a

glass frit blasting method to the Part 71 contamination standards, and by that I think I interpret it as DOE -- the standards for the exterior of a Type B package. So there is some standard of decontamination that will be specified for these canisters even though they're still inside a Type B package.

DR. POWERS: The problem I have with that is what I couldn't see was how the rule specified that. I mean, I understand the glass bead painting of these --

MS. SHANKMAN: Um-hum.

DR. POWERS: Canisters that Savannah River does, but you're depending on Savannah River doing it, but you're writing a rule that you say this is whoever, the Japanese want to ship things across the country --

MS. SHANKMAN: Right.

DR. POWERS: They can do it according to this rule, and I have no assurance that they're going to take the same precautions they do at Savannah River, nor do I have any assurance that the other institutions within DOE will follow Savannah River's --

MS. SHANKMAN: Right.

DR. POWERS: Provisions here.

MS. SHANKMAN: No, I understand, but what we're doing is not certificating the canister. We're certificating the package. So the standard that has to be

met is the Type B standard for shielding and for levels of exposure of the public.

DR. POWERS: See, that's the other thing that I find perplexing --

MS. SHANKMAN: Um-hum.

DR. POWERS: Because it says vitrified high-level waste contained in a sealed container designed to maintain waste containment.

MS. SHANKMAN: Right. During handling.

DR. POWERS: During handling associated with transportation.

MS. SHANKMAN: Right.

DR. POWERS: But if I have external contamination on this that's not removed, the part that's doing the containment is the transportation device.

MS. SHANKMAN: Um-hum.

DR. POWERS: Well, that runs counter to the handling process. I mean, it's just very confusing to me.

MS. SHANKMAN: Well, in the licensing process we'll have to look at the statements made, but we certify a design, and the issue that you're speaking to is a problem we have I think in any transportation package, which is the design is certified with a margin of safety.

We have taken significant actions against fabricators because they have not fabricated to the design

because we don't look at every single package that's transported. We have to inspect and we have to fine and we have to take enforcement action against anyone who fabricates or who ships in something that doesn't meet the design.

We have regional inspectors who inspect shipments being made from reactors and from NRC licensees. We also have agreement States who are aware of the standards for shipping. But we don't -- I can never say to you that there isn't a package that's shipped that doesn't meet the design standards to which we have certificated it. I can't guarantee that. But it's not unlike any of our other regulations where there's a certain degree of inspectability, and that sample is from what we generalize.

DR. POWERS: I think I appreciate that.

MS. SHANKMAN: Yes. Okay.

DR. POWERS: The problem I have is it was not clear to me how you could -- how you assured the design submitted to you achieved all the things that may be achieved by this --

MS. SHANKMAN: Right.

DR. POWERS: One coming from Savannah River.

MS. SHANKMAN: I understand. Let me -- the basis for our accepting the petition is not the physical tests that were made at Savannah River. That may have helped us,

and of course when we review a specific package, we will look at their procedures and we will look at what they tell us they're going to do to assure that the package meets the design that we certificate, so that we do that in the individual packaging certificate, not in the rulemaking.

Ross, do you want to speak to -- or is that -- I mean, do you want to say how we -- what kind of procedures we look at and when we do a certificate?

MR. CHAPPELL: They send us an SAR with a technical analysis or test results in it and we do a technical review.

Can I just add --

MS. SHANKMAN: Yes.

MR. CHAPPELL: I think his point is that the DOE petition referred to a seven-meter drop, and it's not in our rule, we've got ASME code. What are the standards for the canister. And that is -- in the rule is left unspecific. We do expect the quality of it to be comparable to what DOE tested. That's why we put a reference to the ASME code in there. And the design of the canister will become part of the transportation package, and its design will be reviewed by the staff before the package is approved.

MS. SHANKMAN: It is also a requirement that anyone who ships a Type B package or fabricates have a quality assurance program that's been approved by the NRC

under Part 71. So that quality assurance program and its implementing procedures is also another way in which we through our regulatory authority are looking for assurance that the fabricated package is as designed. And we do inspect against those QA -- Part 71 QA programs.

DR. SHACK: Go back to the question. You can design to Section 8, but what are the loads that you're going to design to? You know, the Savannah River people sound like they have very stringent, you know, it would strike me stringent for the canister, but it's totally unspecified in the rule now.

MR. CHAPPELL: Yes, sir, you're right. Section 8 is in there I think mainly as an assurance of the quality of fabrication and the selection of materials that there are some types of constraint on the canister. I haven't -- I'm not sure I've seen the most recent version of the statement of considerations, but I think what's being regarded here as being acceptable is the combination of a glass log inside a stainless steel can, that that combination is comparable.

DR. SHACK: The Savannah River canister sounds like a lot more than a can to me.

MR. CHAPPELL: Yes, it does.

DR. SHACK: A can to my mind is a can.

MS. SHANKMAN: Right. But it's also vitrified. It's in a solid form, so that -- I mean, you have more than

one element that we're looking at.

DR. POWERS: Well, that of course raises --

MS. SHANKMAN: Right.

DR. POWERS: The next issue of solid -- there are solids in this world and there are solids.

MS. SHANKMAN: Correct.

DR. POWERS: And the solid in this particular case is an interesting glass. It is a glass loaded with a non-glass-forming solid. And those glasses are good and bad, and it hinges very much on what the loading is, what the kind of glass is, and how it's fabricated.

MS. SHANKMAN: Um-hum.

DR. POWERS: Basically they're talking about using a borosilicate glass here. Borosilicate glasses are inherently unstable glasses. So you can get two-phase formation that does make the glass surface very susceptible to fracturing. But there's nothing specified.

MS. SHANKMAN: There would not be anything specified in the rules to that because we also don't specify exactly the properties of spent fuel, although we've said that they are exempt from double containment. We also allow, in our spent-fuel transport standard review plan we speak to pinhole leaks and hairline cracks which we are still looking -- we have not defined exactly what that has to be, because for each cask that we look at, they propose

to us the contents and how those contents will be inspected and verified. So that not -- the rule is not the level at that level of detail.

Now I brought with us our spent -- this is the non-spent-fuel standard review plan that Ross Chappell's section is using for fresh fuel radiography cameras and everything, and if you want to look at that, you'll see the level of specificity in there goes beyond the rule.

DR. POWERS: I think the Committee has actually reviewed that.

MS. SHANKMAN: Okay. All right. So then you know that it's in the standard review plan and in regulatory guidance -- of the regulatory guidance like reg guides that we speak to those issues. But the point I think I want to make is that we have gone further in this aspect by specifying that it be a canister that meets certain aspects of the ASME code as an acceptable way of meeting the exemption -- I don't want to call it an exemption, but allowing this to be transported without double containment so that there is some level of detail in the rule.

But the specifics that you're speaking to would more likely be in a standard review plan, but even the standard review plan you can't just build a canister to the attributes in the standard review plan. You still must have a specific certificate in which the staff has made a safety

evaluation for that specific contents.

DR. POWERS: To avail myself of this --

MS. SHANKMAN: Um-hum.

DR. POWERS: I want to ship some plutonium --

MS. SHANKMAN: Um-hum.

DR. POWERS: And maybe plutonium and a variety of other materials associated with it.

MS. SHANKMAN: Right.

DR. POWERS: I just have to have some glass somewhere. I don't have to say the glass remains vitrified, that there's no devitrification.

MS. SHANKMAN: No. You have to tell us that while it's being transferred it maintains a solid form.

DR. POWERS: But again, I mean there are solids and there are solids. Fine particulate solid --

MS. SHANKMAN: Right.

DR. POWERS: Is one kind --

MS. SHANKMAN: Right.

DR. POWERS: Which would not qualify by analogy.

MS. SHANKMAN: Right.

DR. POWERS: And a vitrified material is another kind of solid --

MS. SHANKMAN: Right.

DR. POWERS: Which you're arguing will.

MS. SHANKMAN: But I guess I can't tell you

specifically, and neither can Ross, exactly what we would ask for as documentation to show that while it was in transport it was safe to transport under this particular provision, but we would definitely look at the items that were listed, shielding and containment and criticality and how it survived the tests, and all of those things would be considered before we would give our certificate. So I can't tell you exactly what analyses we would ask for, but it would depend on what was --

DR. SHACK: But those are all a part of the outer package, right?

MS. SHANKMAN: Yes. Yes.

DR. SHACK: Coming back, for example, I mean presumably a Miller beer can then would be acceptable as the can as well as the Savannah River canister.

MS. SHANKMAN: I don't -- I don't -- I don't want to say yes to that, but I will say that the double containment, if you're going to provide relief from double containment, you can't ask that the inner canister still meet all the requirements of Part 71, because then you have double containment. So we're sort of not exactly there, but we're also not exactly saying that it can be a Miller Lite can, because we're putting in the attributes of the ASME code as an acceptable level of strength. So -- does that answer your question?

DR. SHACK: But the code until you give loads says nothing about strength. I mean, it says that you can't make it out of certain materials, you know, you have to use a code-acceptable material that's going to be welded, it has to be welded in an acceptable way, but until you tell me something about the loads this thing has to accept --

MS. SHANKMAN: Right. But that's my point, that we would review it against the proposed contents and shipping and then apply the code. The code is not applied in a vacuum.

Ross, do you want to --

MR. CHAPPELL: Well, the code is there mainly as a means of assuring quality of fabrication. You're right, unless you specify the loads, the design part of the code has little meaning. Section 8, unlike section 3, only deals with one condition, normal conditions, and it's principally concerned with pressure. However --

DR. SHACK: Which doesn't seem applicable here --

MR. CHAPPELL: Which doesn't seem applicable here. However -- and the rule, at least the version I saw last, does not require stamping, because I'm not sure that a vessel like this can meet all the criteria for -- with respect to the final closure weld. However, meeting Section 8 does assure that there is some level of quality in the fabrication, that it's not a Miller beer can, and that it's

an engineered vessel in some respect. The design criteria are not in the rule. That is to be left to I guess staff review.

DR. SHACK: And then you're arguing by analogy that it's got to be at least as robust as cladding and fuel --

MS. SHANKMAN: Yes.

DR. SHACK: So this is again --

MS. SHANKMAN: Yes.

DR. SHACK: Regulation by analogy.

MS. SHANKMAN: Yes. Yes. Definitely.

MR. CHAPPELL: That's the basis of the rule, that this was exempt and this is roughly similar to it. I have to say one thing. Dr. Powers' remark, in considering this rule we considered the vitrified high-level waste that DOE is planning to ship as logs. We did not consider other types of plutonium waste that someone might want to put glass around. I have to -- like Trupac or waste going to WIPP, for example. We considered the glass logs that DOE has as high-level waste and other forms of plutonium weren't considered.

MS. SHANKMAN: Right. Okay. Let me just --

DR. POWERS: Let me pursue that just a little bit. The nomenclature for waste is something that I remember episodically, because there are a variety of different terms

here. The viewgraph says vitrified high-level waste. But I took it when I read the rule that that may be a little sloppiness in the nomenclature there, that this was really plutonium?

MS. SHANKMAN: Well, plutonium is -- more than 20 curies of plutonium are required to be in double containment to meet the Type B standard, yes.

DR. POWERS: I guess what I'm trying to understand is that suppose I have some plut that I want to vitrify, it's been sitting around a while, contaminated with a little americium, maybe there's some neptunium in it. Maybe I've even got a little technetium, a few other things in there. I can still do it with this rule?

MS. SHANKMAN: It still has to meet the standards of Part 71, no matter what the contents are, so you have to show us that your shielding is adequate for the isotopes that you're shipping, and we do -- we ask for that.

So that regardless of what's in the contents, it has to meet the external standards, and so the shielding and then you have to balance that with if there's a criticality issue, if there's a -- yes, it's all looked at, the structural strength, so if your shielding -- your shielding has to be within a certain structural strength, so you can't have shielding that compromises the strength of the package, and you can't have something that's lightweight and strong

but doesn't -- you won't have any shielding. So yes --

DR. POWERS: And what -- and under the accident situation my definition of an A2 amount of material changes.

MS. SHANKMAN: Yes.

DR. POWERS: Okay.

MS. SHANKMAN: Yes.

That is why it is put in terms of A2 amount, because, obviously, you can't specify a volume or curie amount because it changes with the isotope.

Okay. We have talked a lot about its comparability to irradiated spent fuel. I am not going to go through all of that. And this was part of our assessment with accepting DOE's petition.

The estimate of the number of canisters in this would be quite a campaign of shipping --

MR. LAKE: What do you want, the number of canisters?

MS. SHANKMAN: Okay. Yeah. So it is a large number shipment. And I am going to let Bill Lake talk to you a little bit about what DOE proposes to actually do, and what they would be sending to us as an application.

Do you have any other questions of me or my staff?

DR. POWERS: I guess I am still confused a little bit about the materials that would be shipped under this exemption. Numbers that I have seen from the Hanford site,

for instance, range up into the tens of thousands.

MS. SHANKMAN: That's a good introduction of Bill Lake, isn't it.

No, come over here. After Bill makes his presentation, we will all be glad to answer any questions you may have. Do you have five?

MR. DUDLEY: No. No, I don't.

MS. SHANKMAN: Okay. Then we can turn that off.

What I asked -- I guess Noel made, did you make copies of those two pages?

MR. DUDLEY: I am in the process of doing it now.

MS. SHANKMAN: Okay. What I read to you is what I believe is going up to the EDO's office. This -- let me tell you that this is where the rule is, it is going to the EDO's level. So it has gone through NMSS, Dr. Paperiello and, as you know, the rulemaking function moved from research to NMSS. But the packet started when it was in research.

So the package you saw went out for office concurrence. We got no legal objection from OGC and so Dr. Paperiello is sending it forward to the EDO. That's where it is right now. And the wording that you are seeing is what went out of NMSS. I say that because it is not necessarily what goes to the Commission, there's one more group to review it. It has gone through the CFO and CIO,

but there were no objections there either.

Okay, Bill.

MR. LAKE: Thank you. My name is Bill Lake, I am with the Department of Energy's Office of Civilian Radioactive Waste Management. Basically, as you know, I think we both derive our regulatory authority -- NRC has civilian regulatory authority. We both derive our authority under the Atomic Energy Act of 1954. Under the '75 Reorganization Act, the DOE, as ERDA, then DOE, retains some of those regulatory responsibilities.

Ours is very restrictive though, it is restricted to activities that the Department of Energy itself engages in. So, for example, the facilities that we are discussing here, that are the so-called waste generators, are under DOE's regulatory or rulemaking, which is done through DOE Orders, which does not have public comment and so on.

My office, the Civilian Waste Program, under its enacting legislation, is required to follow NRC rules for transport of radioactive materials. We are also required by that -- by that legislation, it comes hand-in-hand, that we, unlike the other DOE offices, have an NRC approved quality assurance program.

DR. POWERS: It was my understanding that Department of Energy, under the Price-Anderson Amendments Act, was trying to move away from an Order system into a

rule-based system that did go through public comment.

MR. LAKE: The other parts of DOE, yes, I believe that may be in the works. But --

DR. POWERS: And, in particular, in the area of radiation protection, they have already done that.

MR. LAKE: Yeah.

DR. POWERS: That there are -- they would fall in the 800 series of Chapter 10, Code of Federal Regulations.

MR. LAKE: Yeah. Actually, the other parts of DOE are in the process of considering NRC regulation for all of their activities. My guess is that transportation may be one of the first to go in that direction simply because there is a great deal of comparability between those regulations.

We, however, in the Civilian Waste Program, follow NRC regulations explicitly and we do -- we will only ship in NRC approved transports casks.

As I said, there is a distinction between the offices that produce these canisters. Defense Programs is the biggest producer of canisters, and that's -- that's Savannah River, INEEL in Idaho, and Hanford sites. Savannah River has already begun some production. I am not certain if it is hot production, I believe it is.

The other small shipper is the West Valley Project which has about 300 canisters from an old civilian

reprocessing waste demonstration program. But the bulk of these 3,000 to 4,000 canisters probably will come from the Defense side of the house.

Now, we may look -- we may see bigger numbers coming along, but for this high level waste that we are talking about here, I think we are in that ballpark, because we pretty much have characterized what kind of -- how much that inventory is.

There are other -- other considerations underway of how to deal with excess plutonium, but I think we would be in for another issue if that came about. I don't see that as the same high level waste as we have got here, and I am sure the NRC will not see it when they review our application for approval.

The casks themselves have not been designed. The reason we are looking for an early decision on this is so that we do know how to design these casks. There is a big difference if you need double containment on the cask or single containment, and it would be good to know that ahead of time. We have chosen not to rely -- not to rely strictly on the canisters for the double containment, because it would involve certain tests and things of that sort, which we would rather not do.

The canisters basically are designed for two purposes. One is to contain this material and eventually be

disposed of. And that brings in the issue of the characteristics of the glass, and that is the primary basis for the requirements on the glass. It is not supposed to recrystallize and things of that sort -- decrystallize. There are requirements on stability and so forth and so on. This will also be --

DR. POWERS: These are your requirements?

MR. LAKE: Yes. These are requirements that are agreed upon by the Civilian Waste Program and they are basically called acceptance requirements, and that's what our repository will agree to accept.

It is incumbent on the producers, which will be Defense Programs at the present state, to meet those qualifications. There are also qualifications on the canister. Some of these are imposed by the producer themselves to address handling situations, for instance, that seven meter drop requirement has to do with the handling at the generation site.

We probably will not be shipping these until about the year 2030. There are a lot of other generators or purchasers, as we call them, who come ahead on the line of receipt, and these are the commercial utilities. When that is well underway, we would start taking DOE generated material, which would include this.

In the case of the casks, we expect -- the way I

would envision this, and I probably -- I don't know if I will be around 2030 working on this project. I hope so, but --

MS. SHANKMAN: I was planning on going out and having lunch with that day.

[Laughter.]

MR. LAKE: But what I envision the cask requirements to be is very much as Ross had described it, this is basically a content which would have to be well characterized and meet whatever requirements the NRC would impose on the specific contents. And for an analogy, I think when you talk about surface contamination for spent fuel, we also look at the so-called crud that forms on spent fuel. I see this as being similar, but maybe easier to handle. In terms of shielding, we -- the cask would require shielding. There are some gamma source materials in this content and those would be measured and the cask would be designed accordingly.

In terms of criticality, we would also keep a tally of the fissile content and there would be fissile requirements set on the cask as well.

With regard to the quality assurance, as I said earlier, Defense Programs Department with the Department of Energy does not follow NRC QA requirements. They probably have their own. I am not sure what those requirements are.

However, because we are -- we have a quality assurance program followed by the NRC, and we basically bring -- bring Defense Programs in much the way a reactor utility would bring in contractors and subcontractors. They fall under our quality assurance program and we do have auditing rights and so on, which we do -- we do audit them. And I assume that NRC does have rights to audit them under that as well.

DR. POWERS: That they exercise, too.

MR. LAKE: Well, it's very far down the stream. It would be similar to, probably to auditing a valve manufacturer, which I am sure --

MS. SHANKMAN: Which we do.

MR. LAKE: We do. Okay. Well, we may see you then.

MS. SHANKMAN: As an example, we did an inspection at Westerman, who provides the UF6. They make the canisters for UF6 for USEC, and found that USEC did not appropriately implement the quality assurance requirement. So the violation is against USEC, even though we found it at Westerman.

MR. LAKE: One other thing that I think -- I heard raised a little while ago is the size of these canisters. We currently have specifications for 10 foot long canisters which are about two foot in diameter. The Hanford site is considering a 15 foot canister, but there would be nothing

larger than that. The constraining dimension is essentially the length of a spent fuel assembly, which is 14 to 15 feet for some of the larger ones.

DR. POWERS: I have at least seen trade studies that speak of a jumbo canister. It's 15 feet long, to be sure, but it is a good deal bigger than 10 feet -- or two feet in diameter. I mean it seems to me that -- it seems to me the Department of Energy has not settled upon a standard canister at all for its waste material, and we have to anticipate the rule. You can't design a rule thinking that it is just going to be the Savannah River canister.

MS. SHANKMAN: Right. I agree with you, and I think that that is why the rule does not include anything about the exact properties as described by DOE, because they were describing it based on the Savannah River tests.

It does -- I guess I sound like a broken record. But the reliance here is on the meeting Part 71 and the relief is to allow the contents, with this level of plutonium, not to meet the double containment because of the waste form, and having a canister at all.

DR. POWERS: In the discussions in the package that I reviewed, there is a statement, which I cannot find in what I have in front of me, that -- concerning the hazard, transportation hazard, and it says something like one-half of one percent of the normal hazards faced by the

public on transportation. Where did that number come from?

MS. SHANKMAN: I am not exactly sure. We do -- I am not exactly -- I am not relating it. We do say that 99.5 percent of the risk associated with transport comes from normal conditions, is that what you are talking about?

DR. POWERS: Well, it says -- it says it the inverse.

MS. SHANKMAN: Okay.

DR. POWERS: It says transportation in this material constitutes one-half of one percent of the hazard the public normally faces in transportation. As we all know, that is a reasonably hazardous undertaking, to go from one place to the next. I still don't know where the number -- I mean I don't know how you know that it is only half of one percent.

MS. SHANKMAN: I don't know either.

John, do you want to speak to that?

John Cook is with our transportation safety group, and they have been developing the background material to the rulemaking.

MR. COOK: Yeah, I think that's a reference to a statement in NUREG-0170, which is the final environmental statement on the transportation of radioactive material by air and other modes. And that looked at the risks of transporting all radioactive materials by all modes. And it

has a statement in there the impacts from transporting materials, that is the normal transportation of materials, that is with no accidents, at 1975 transportation activity levels would result in about 10,000 person rem of exposure to the public and to the work force from all the exposure in 1975. And that would, therefore, equate to an estimate of one latent cancer fatality per year of operation at the 1975 shipping levels.

DR. POWERS: So it's a normal exposure, societal risk measurement?

MR. COOK: From transporting all radioactive materials throughout all modes.

DR. POWERS: So it really speak to the issue of shielding and not to the issue of accidents?

MR. COOK: Well, that's the normal transportation assessment. The study goes on to take a look at the assessment of risk from accidents. And there, the value that the study comes up with is one latent cancer fatality for every 200 years of operation at the 1975 transportation level. So it is the relationship of the two, the 1 to the 200 that generates the half percent value.

MS. SHANKMAN: Does that answer your question?

DR. POWERS: It just provokes a host more that can't be answered.

MS. SHANKMAN: Right.

DR. POWERS: I mean, fundamentally, the question I originally posed was, okay, we set up standards for reactors that say it is a tenth of one percent, but for transportation, we are allowing a fivefold increase. Why is this? This sounds like a massive incoherence. I don't really understand a tenth of one percent for reactors. But I sure know that that's a factor of five less than what is being cited here and why is that acceptable?

MS. SHANKMAN: Well, I don't think they are comparable numbers, and they are looking at exposure.

DR. POWERS: Yeah. I mean, obviously, they are not. Because one is a societal number and the other one is an individual risk number.

MS. SHANKMAN: Right. So I don't think it is a fivefold increase in tolerance for risk.

DR. POWERS: It appears to me that you are probably right. That if we took the same analysis that was done here and translated it into an individual risk number, it would probably be substantially lower.

MS. SHANKMAN: Right.

DR. POWERS: Because it is a societal function.

MS. SHANKMAN: Right. Right. Yeah, transportation, as I think you have noted, gets a lot of attention because it is not behind a gate, it is not in a building, you know, it is on the public highways. And, of

course, you know, DOT has their regulations on carriage transport. So what we are looking at is the protection of the public against the radiological risks.

DR. POWERS: I have to admit when I pulled the package out, I could just see the headline that says NRC allows exemption for shipping glass.

MS. SHANKMAN: Right.

DR. POWERS: I mean that would -- that would not -- I think you have to have your ducks very much in a row here because this is not -- transportation gets an unusual amount of public scrutiny, especially by those that live along actual routes or projected routes and when you talk about transporting glass --

DR. KRESS: I think the headlines would say plutonium. But go ahead.

DR. POWERS: No, it would say plutonium glass. And people will imagine drinking glasses or something like that.

MS. SHANKMAN: Right. Right.

DR. POWERS: And the fragility of those things. And I think that's why I think we have to be absolutely stringent and have our ducks in a row here, because the optics of this particular regulation are just going against you going in. I mean when you talk about shipping plutonium metal, which I think is far more hazard that this, nobody

knows what plutonium metal is. It just does not elicit the kind of public response. You talk about clad fuel elements, again. But glass, people know, and glass, people know breaks.

MS. SHANKMAN: Well, yeah, it does say high level waste.

DR. POWERS: Now, I defy them to break a two foot diameter, 15 foot long glass log by an conventional means, be it a nine meter drop or even greater. But that is going to be the public perception. I think -- I think you have to have a very coherent story here.

MS. SHANKMAN: Okay. I agree with you. There's definitely -- I have been out to many meetings and public forums, had the benefit of some of -- probably the people that you are referring to, questioning me, and part of it has to do with the length of time that we have been transporting material in type B packages and that history. It is not probabalistic, but it is definitely a larger number without incident.

Okay. Bill, I'm sorry.

MR. LAKE: No, I have finished my statement. If you have any specific questions of DOE, I would be glad to answer them.

DR. POWERS: Well, I think I understand where I need to look to understand the risk analyses. It is not out

of your office, it is out of -- and I think I understand the strategy on this rule relies heavily on the applicant and the subsequent review by the staff.

MS. SHANKMAN: Yes. And it does for other type B packages also. I mean this is --

DR. POWERS: And that I think I understand that this is strictly a rule created by analogy.

MS. SHANKMAN: Yes.

DR. POWERS: And the question -- the question you are caught on here, very really is it would be much easier to judge if the analogy were to go the other direction, that is, if we were debating here shipping plutonium metal and clad fuel rods versus glass, because, quite frankly, you are taking no credit for the glass at all. You are taking, essentially, no credit for the canister and saying all we need is the outer shipping package. That's essentially what you are saying.

MS. SHANKMAN: No. I guess what I am saying is the standards against which we judge the whole package are the standards in Part 71. But as contents, we are taking some credit, just as we do with fuel pellets and the cladding of the fuel. So, you know, we will have to see what that contents is and what is proposed and how that vitrification is accomplished and what properties it has and how long, you know, that it is vitrified throughout transit.

DR. POWERS: Let me ask this question. I don't know that you are the right one to know, because I don't -- how much shipping of plutonium metal takes place?

MR. LAKE: I don't know the answer to that. It is, obviously, it is defense -- defense-related. My guess is it will go down in the future since we are not --

DR. POWERS: Yeah, presumably it goes down, all right.

MR. LAKE: -- using these types of materials.

MS. SHANKMAN: If you have no other questions, we thank you for the opportunity.

DR. POWERS: Mr. Chairman, I have -- I think I have run out of gas.

DR. KRESS: Okay. Well, with that, I will thank our presenters. We certainly appreciate your coming by and clarifying things for us.

MS. SHANKMAN: And we thank you for working us in so quickly. I hope we have answered your questions, or at least put them in the perspective of where we are. Again, if you have -- let me ask you, because I am not exactly sure what I gave you. The two pages of the -- do we need to put that in the PDR, or if it is just used here? No. But we do need to take it from --

Okay. All right. Thank you, again.

DR. KRESS: Thank you. And with that, I will turn

it back to you, Mr. Chairman.

DR. POWERS: I might just interject to say that I think we need, as a Committee, to go look at these transportation issues a little more carefully.

DR. KRESS: With respect to the metallic forms and the --

DR. POWERS: Well, the metallic forms and the clad fuel. Lord, on a risk basis. But it seems to me that, certainly, if we are going to discuss anything with the Commission about issues that other people are not looking at, it looks to me like risk is an interesting vehicle to apply here.

DR. KRESS: I don't know where to send you, but we did look at that at one time, the Committee did, and there is a letter from the Committee that basically says what you are saying now. I don't know if we can -- we need to see if we can find that.

DR. POWERS: It would be interesting to resurrect that.

DR. KRESS: Let's see if we can find that, Noel, resurrect it.

CHAIRMAN SEALE: How long ago was that, Tom?

DR. KRESS: Gosh, it must have been before any of the people here present were on the Committee.

MR. DUDLEY: I remember as a result of that

Committee letter, there was a contractor who sent in his work in the areas of doing transportation PRAs.

DR. KRESS: Yeah, there was something like that. But it would be nice to resurrect those and see what we had done before, Dana.

CHAIRMAN SEALE: Anything you can do for us on that, Noel, we would appreciate it.

Any other comments from anyone before we recess for lunch?

[No response.]

CHAIRMAN SEALE: We want to thank the staff. We want to the thank the visitors from DOE and we appreciate your input.

With that, we will recess until 1:00 p.m. for lunch.

[Whereupon, at 11:52 a.m., the meeting was recessed to reconvene at 1:00 p.m., this same day.]

AFTERNOON SESSION

[1:03 p.m.]

CHAIRMAN SEALE: We'll come back to order.

This afternoon we have a briefing on Risk Ranking Approach for Motor Operated Valves. Bob Uhrig is the chairman. I understand we are going to get a little bit broader variation than we originally expected but Bob, go ahead. Introduce your speakers.

DR. UHRIG: This issue is a response to the NRC Generic Letter 96-05 entitled Periodic Verification of Design Basis Capability, Safety-Related Motor Operated Valves. It was issued in September of 1996.

It requested the licensees to establish a program to ensure the effectiveness of the current program, to verify on a periodic basis that the safety-related motor operated valves continue to be capable of performing their safety functions within the current licensing basis of the facility.

It required that the licensees provide a written response relating to the implementation of the requested program.

Now this generic letter was based on general NRC requirements that the components that are important to safety to nuclear power plants including the MOVs be treated in a manner that provides assurance of their performance,

and of course the historical basis of this is Appendix A, the General Design Requirements, and Appendix B, Quality Assurance Criteria to 10 CFR 50.

Furthermore, 10 CFR 50.55a(f) required licensees to comply with Section 11 of the ASME boiler and pressure code.

Operating experience, performance problems and research show that the focus of the ASME code on stroke time and leak rate testing for MOVs was not sufficient in light of the design of the valves and conditions under which they must function, so they issued -- the NRC issued Generic Letter 89-10, which is the precursor to 90-05, requested that licensees ensure the capability of the MOVs and safety-related systems to perform their intended functions by reviewing the MOV design basis, verify MOV switch settings initially and periodically, and improve evaluations of MOV failures and necessary corrective actions and to trend MOV problems.

The NRC requested that licensees complete this 89-10 program within three refueling outages or five years, and it specifically required licensees prepare procedures to ensure that correct MOV switch settings are maintained during the life of the plant. Licensees should periodically verify MOV capability every five years or every three refueling outages, and the licensees evaluate trends in MOV

performance every two years or at each refueling.

There were seven supplements issued to give guidance to the licensees.

Now in response to Generic Letter 96-05, the Westinghouse Owners Group issued an engineering report, "Risk Ranking Approach to Motor Operated Valves" to provide assistance to individual licensees in ranking MOVs according to the risk significance and submit it to the NRC Staff for review.

In this report the test intervals for MOVs were to be established based on MOV risk significance and functional margins. The NRC Staff issued a safety evaluation report on this program accepting the concept of requiring changes in methodology and we will hear about this this afternoon.

NRC held a public meeting with Westinghouse Owners Group to discuss the proposed changes in their report and they also accepted with certain conditions and limitations a method developed by the Boiling Water Reactor Owners Group to risk rank MOVs in BWR plants and issued an SER on that report.

So this is the background for today's discussion on motor operated valves and with this I will turn it over to the Staff to make the formal presentation.

MR. WESSMAN: Good morning, gentlemen. My name is -- good morning? Good afternoon.

CHAIRMAN SEALE: Time passes fast --

DR. POWERS: We're all having trouble with the time anyway, so --

MR. WESSMAN: My name is Dick Wessman. I am the Chief, Mechanical Branch, in NRR. With me here is Tom Scarbrough on my immediate left, also of the Mechanical Branch, and on his left is Steve Long from the NRR's PRA branch.

I want to introduce the first couple of viewgraphs and make a couple of observations and then turn the briefing over to Tom Scarbrough, who will do most of the presentation for us this afternoon.

You may recall several years back that Tom appeared for you with some periodicity like every six months or so to give you sort of a status update of the activities involving MOVs.

Tom, as I think many of you know, is the Agency's expert int his area and he has been up to his neck in the MOV activities for the better part of 10 years of his life and is well known throughout the industry and throughout the agency in this area.

When we discontinued those periodic briefings a couple years ago we at that time also discontinued semi-annual reports to the Commission on MOV activities because there was a perception at that time that there was a

relative maturity as far as the evolving work and that the industry and the agency were well underway towards resolution and closure of Generic Letter 89-10 and associated activities.

I think reality and as we will show you this afternoon there has been a number of activities in the course of the past two years, and this is one reason why when we were contacted by the ACRS Staff we suggested let us give you an update and get you carried forward from some of those more detailed six month periodic updates that we did in the past.

I would also point out that with us today in the back row are representatives from the industry, owners group representatives, the joint owners group, and if there is an opportunity or you so desire, I think they would be willing to say a few words or help us with questions should they come.

Turning to that first viewgraph that says Background, we pretty well covered those issues there.

I want to turn really to the next slide, which is a little bit of a roadmap of all the different things going on, and you are going to hear about the details of most all of these things as Tom takes us through the afternoon.

The one area that we won't spend a lot of time on is on the far right there, the Reg Guides, which we have

been working extensively on with Dr. Apostolakis and we will touch on that briefing with you all tomorrow as part of the application-specific risk-informed initiatives.

But I think it is worth taking a peek a this roadmap momentarily and notice the titles in some of the things there because when we were doing our periodic briefings to you the only thing that was there was Generic Letter 89-10.

Certainly what had been there had been the traditional approach from the ASME code, very prescriptive, typically quarterly stroke time tests, and also at that point in time was a realization that that particular test regimen was not effective enough in assuring that these valves were capable of meeting design basis requirements.

Along came Generic Letter 89-10, somewhat in response to various plant events and activities and intense Staff interest.

In the aftermath of 89-10 was a lot of work by the industry to develop their technical knowledge and understanding of valve performance and to develop various programs to deal with both the requests by the Staff in the area of MOV performance and their own perceptions and recognized needs that it just has to be done better.

Along came an extensive program that Tom will tell you about, the EPRI MOV Performance Prediction Methodology,

which involved millions of dollars and several years' worth of work.

The ASME developed a code case known as OMN-1, which is currently part of the current rulemaking activity that is still out for public comment, and this was a recognition that quarterly stroke time testing wasn't the real answer for inservice testing but that a more comprehensive regimen of both exercising and a mix of static and dynamic testing was necessary to ensure that those valves were ready and capable of fulfilling their safety mission.

As you know, several years ago the emphasis on risk-informed initiatives began to rise and the Staff of course was tasked with the work that has led to Reg Guide 174 and 175.

At the same time the industry was working towards risk-informed, risk-ranking initiatives to deal with MOVS. It first came -- the BWR Owners Group with their initiative initially though as a way of prioritizing the implementation of the Generic Letter 89-10 work. In reality, much of the 89-10 work was pretty well completed by the time the Staff had finished their interaction with the BWR Owners Group and had issued an SER for this ranking approach, and so it has become a more useful approach to periodic work on the valves.

As time came forward, 96-05 came into being. It endorsed things like the EPRI Performance Prediction Methodology, the OMN-1. In response, the industry formed a Joint Owners Group, JOG, to provide a coordinated and more efficient approach from an indu ry standpoint towards responding to this generic letter.

More recently of course have come things like the Westinghouse Owners Group work on risk ranking and the ASME code cases, all of which are still under development and none of them have really been published for use and none of them have yet been endorsed even with limitations by NRC.

With that, I want to stop and turn it over to Tom, but I thought it was important to take a quick look at the roadmap sort of picture and Tom will take us through, fairly quickly, the first few viewgraphs that deal with some history and all to reacquaint you, and then we will spend a little more time on the JOG program, the WOG program, and maybe we will think of another buzzword in there as we go along.

MR. SCARBROUGH: I'll run through briefly some of the background. I think some of the background has been very well stated, so I don't need to spend much time on it.

First of all, to kind of get our bearings, the ASME inservice testing requirements currently for motor operated valves focus primarily on quarterly stroke time

testing, and as we talked about, there's been some concerns about the viability of that for quite some time and that was one of the reasons why Generic Letter 89-10 was issued and it very clearly states that in the background section of Generic Letter 89-10.

Most plants have found that MOVs are not testable during operations very well and many of the ASME requirements for stroke time testing have been moved to cold shutdown conditions.

I did a quick survey for Comanche Peak just to see how their IST program was set up and roughly half of their MOVs are currently shifted to a cold shutdown interval rather than quarterly stroke time testing interval, so it kind of gives you an idea that already people are on this -- a lot of people are on a cold shutdown interval for many of their valves.

Also, the leakage testing provisions -- that is covered separately. A lot of the stuff we are talking about today won't deal with that.

Generic Letter 89-10, as has been mentioned, we issued to ask licensees to verify the design basis capability of their valves. There was a number of aspects of that generic letter in terms of reviewing design basis and testing where practicable and improving the valuations and trending.

As we got more involved with 89-10 and MOVs and the problems associated with them, we found that we needed supplements, and we ended up with seven supplements to 89-10 and that has been a difficult process to go through to get those supplements out and it has appeared at times that we are moving things along, but it was just the fact that we were learning so much on MOVs as we went into this testing program.

As of currently, all the active record units have notified us that they have completed their 89-10 programs.

The only two that you would say would be active or haven't notified us are Browns Ferry 1 and Millstone 1 and they are in sort of a longterm refurbishing process and so before they start up, they said they would let us know that they have finished, but everyone else that is what I call active has notified us that they're completed.

We have been performing inspections to valuate these Generic Letter 89-10 programs. This 89-10 Generic Letter was implemented differently than any other generic letter that probably has ever been produced where it wasn't an NRR function to review, produce safety evaluations and then issue them. It was given to the regions to evaluate implementation, and that has required quite a bit of work on all the parties to understand what is in the generic letter and to be able to move out and make it a generic letter that

is reviewed by the process of inspections, and we have been doing that, working very closely with the regions for that.

We have currently completed 88 of our reviewed for reactor units so we're down to just a handful left. We are working on those and they should be done in the near future.

MR. WESSMAN: Let me interrupt Tom for just a second as this viewgraph goes up, because Tom triggered me to think this has been activity that has had extensive involvement by the various offices and the regions, and perhaps more so than many of our generic activities, and in fact with us is Jerry Weidenhamer over on the side there from Research, who has played a leading role in coordinating contractor and research activities.

Also with us is Earl Brown, back in the audience, from AEOD. He has been studying a lot of these issues for a long time.

We have had extensive work by the regions from the inspection standpoint and extensive by Tom and a couple other members in my own group from the standpoint of supporting the regions, and lots of money has been spent to bring in the technical assistance experts primarily from the INEL laboratory to support these onsite inspections -- so it is a fairly broad agency activity.

DR. BARTON: Tom, excuse me. This says most remaining reviews will be completed soon.

What is your target to complete all of the plant reviews?

MR. SCARBROUGH: It's a little hard to say exactly because some of them are on very long terms.

For example, Millstone Unit 2 --

DR. BARTON: Okay.

MR. SCARBROUGH: -- that is in a very long-term startup mode.

The ones that are active and are operating plants, they will be done very soon -- within the next few months.

Anything that is shut down, that assumes a long-term sort of shutdown mode, those might take a little bit longer.

DR. BARTON: Thank you.

MR. SCARBROUGH: Okay. Just very briefly I wanted to mention about, to recognize all the efforts that the Office of Research have done for us.

Their support had made this possible to do this effort. Without them, we would not have been able to perform our evaluations of the MOV program, but they have done studies in thrust and valve thrust calculations. They have done quite a bit of gate valve testing. They have looked into valves and friction, valve and friction coefficients, and also pressure locking and thermal binding and that is involved in Generic Letter 95-07, which we are

not going to talk about very much today or at all, but they have helped us in that area as well.

Currently they are working on aging effects of valve thrust requirements, which will help in the ongoing JOG program and give us information to do some comparisons there.

Also, they have been working on performance aspects of motor actuators under the greater voltage and higher temperature and loaded conditions, and because of some of that work, Limitorque, the manufacturer of the primary actuator out there for MOVs, is planning to revise its sizing criteria so a lot of their work has been quite beneficial in terms of improving MOV performance.

Okay. Generic Letter 96-05, as mentioned, it is sort of the long-term aspect of 89-10.

We wrote a new generic letter to try to bring in some of the additional information that has been developed since 1989. It talks about some of the attributes we feel would lead to an effective MOV program. It talks about some of the industry activities which we'll mention here as well. It talks about some ongoing research.

It does note that this generic letter is laid on top of the ASME stroke time testing requirements. It is not a replacement for it, so it is on top of -- and it indicates -- well, there is the JOG program, which we will

talk about --

DR. POWERS: Give me an understanding of why you laid it on top of the stroke, the episodic stroke testing?

MR. SCARBROUGH: Right. When Generic Letter 89-10 was written it was intended to be a supplement to code work. It was decided not to try to change the code at that time and work through the code process.

When we wrote 96-05, we continued that thought process to have this on as a layer over. Now what we have done to try to link them is we do endorse the OMN-1 code case which is a replacement for the stroke time testing as a part of the response to 96-05, so someone could come in and request relief from the quarterly stroke time testing and use OMN-1 and at the same time satisfy 96-05, but we didn't try to do a sort of a rulemaking where we changed the requirements of the ASME code at this time.

DR. POWERS: So what you are saying is the rationale was that the code is embedded in the rule and changing rules is difficult.

MR. SCARBROUGH: Right.

DR. POWERS: So you just avoided that.

MR. SCARBROUGH: Well, we haven't avoided it. What is happening now is the ASME itself through working with the code committees has produced OMN-1 as an alternative, acceptable alternative to stroke time testing

and the long-term phase of that code case is to move it into the code, so that is an effort to work through the code to upgrade the code, and at that time it will merge in with 96-05, so there are almost like parallel tracks that are ongoing.

DR. POWERS: But you saw nothing in the quarterly stroke time testing that was of benefit to preserve.

MR. SCARBROUGH: Not nothing, but what has been preserved is the exercising requirements. That's been preserved but lengthened out from a quarterly to an outage frequency, because there still is that need to lubricate the stem and the actuator gear and things of that nature, but not on a quarterly basis. That's been moved to an outage frequency.

DR. POWERS: So you have some confidence based on empirical evidence that the lubrications and the exercising done on a roughly 18-month and 2-year time frame is just perfectly adequate.

MR. SCARBROUGH: Yes. For example, from like Comanche Peak, where they already do it on half of their valves in that frequency, and we have not observed any, you know, accelerated problem with that.

Now since it is ONM-1 and 96-05 are living programs, if they do start to see some adverse reaction, they have to pull that length of time back in. But as an

initial step, we don't see a problem with allowing that initial flexibility to get the program started.

DR. POWERS: What you're saying is that you're going to rely totally on empirical evidence to make these decisions -- experience.

MR. SCARBROUGH: Yes. The initial decision was experience and in terms of that nature. We've had some discussions about looking at it from a more probabilistic point of view. But the initial decision was from a deterministic experience point of view.

DR. POWERS: If one of our thermal hydraulics consultants were here, he'd be interrogating you very closely about some detailed analytic work that has been done in Germany and places like that on trying to model these valves in great detail and asking you bluntly whether you were aware of that work and whether it had anything that could speak to this so you don't have to wait for valves to start showing damage.

MR. SCARBROUGH: The Electric Power Research Institute, EPRI, has performed a significant program to do something similar, and I'm not familiar with the German work, but I do know that the EPRI program has done quite a bit to look into that question itself.

DR. POWERS: Are your research partners aware of that work that goes on in Germany? I'm speaking for our

thermal hydraulics consultant.

MR. WEIDENHAMER: I don't know if it's -- I'm Jerry Weidenhamer from the Office of Research. I'm not specifically aware of it, but I intend to go over to Germany in the near future to discuss these aspects.

DR. POWERS: Before you go, you might just give Dr. Catton a call so that you know more about it than I can reproduce here.

MR. WEIDENHAMER: Okay.

MR. WESSMAN: We certainly have been doing some work via research with the INEL folks about some of the aging phenomena in valves and on the wear films and this sort of thing, so we've had some ongoing research at work in this general area.

The other thing I would point out is that the evolution of 96-05 and the evolution of work in the Code Committee was almost simultaneous. We were vigorous participants with that Code Committee. In fact, Earl Brown, who is here, was the Agency's representative working on the working group developing ONM-1. We think of course that following the precepts of OMB-119 to use the consensus process makes good sense. In a sense 96-05 was an overlay on top of that.

We also recognize the evolution of the consensus work was bringing an improved regimen of testing and

assurance. So I think the steps that we took at the time were reasonable, and in looking back on it, we think that we still have a good assurance of confidence of the ability of the valves.

MR. SCARBROUGH: Just to finish up this slide here, the licensees have submitted a summary description of their 96-05 responses, and we'll be reviewing 96-05 more in the traditional approach of a safety evaluation, written sampling inspections, things of that nature, and not evaluation by inspection that we did for an 89-10.

One of the things that we did in 96-05 was tried to give an idea of what are some of the attributes of an effective program that licensees could see so they understand sort of where we're coming from, what are our thought processes and what would be a good program. We talk about risk insights being used. You need to have confidence the valve will operate the next time you test it. You look at an appropriate mix of the types of testing, exercising diagnostic testing, static, dynamic, you look at all that and determine are there any potential benefits or adverse effects such as damage or such to the valve as you test it.

We talked about scope. We wanted to basically look at 89-10's scope and also look at any valves that might be placed in a nonsafety position for testing and things of that nature to make sure they're aware of those. And

finally that it's a living program and you monitor and you evaluate and you update as appropriate.

DR. KRESS: Excuse me. How do you test to provide confidence that a valve will remain operable until the next scheduled test? How is that done?

MR. SCARBROUGH: Okay. For example, in ONM-1, what the licensees do is they're planning on developing a degradation rate, and that's part of what we'll talk about in the JOG program, where they're going to look at how much degradation occurs over time, and when they do the testing they'll determine how much margin they have, and then through analytical processes look -- determine at that degradation rate an interval at which they're going to --

DR. KRESS: Degradation in what? The required torque?

MR. SCARBROUGH: Yes, the required thrust and torque. Yes, sir.

DR. KRESS: So they'll be plotting that and looking at --

MR. SCARBROUGH: Exactly. Yes, sir.

DR. KRESS: Okay. And then extrapolating to the next scheduled test and to make some judgments --

MR. SCARBROUGH: Right.

DR. KRESS: Okay. Thank you.

MR. SCARBROUGH: Thank you.

As we mention, the EPRI folks did a very extensive program to look at -- to develop a methodology to model the performance of gate, globe, and butterfly valves, and we have reviewed the topical reports that came out with that. There was a significant list of findings that came out of that program. The Office of Research and the Idaho laboratory people provided support to NRR in terms of viewing that.

It took several years to do that. We issued a safety evaluation in 1996 which endorses the methodology with certain limitations and conditions. Then we prepared a supplement to cover a few outliers or remaining models that we had to look at and then some general issues. And we issued an Information Notice 96-48 to alert licensees to some of the lessons learned. And I'll just mention a couple of those lessons learned.

There was more thrust required than predicted by the gate valve manufacturers in many cases. They were using what they called valve factors in the .3 range, and we found that .6 is not uncommon for some of these valves. The potential for damage under blowdown conditions such that it's very difficult to extrapolate performance of gate valves and globe valves from under pump flow conditions all the way up to dynamic blowdown conditions. They saw that the thrust requirements can increase as you stroke the valve

over time, and that some of the butterfly valve sizing criteria needed to be updated, and there's work by EPRI right now to update those application guides for those documents.

DR. POWERS: One of the questions that always arises in this context when you look at -- I have a valve that is going to operate under conditions I really can't test very well is that upstream and downstream configurations make a big difference here, and the criteria I judge from one particular configuration may not be applicable to the real configuration I find in plants I know that EPRI in developing their test program certainly looked at some range of those upstream and downstream configurations. Do we have an experimental data base now that spans the spectrum?

MR. SCARBROUGH: Well, what EPRI tried to do, when you use the EPRI model is you develop a comparison of your exact piping arrangement to the model, and you set up the model based on the closest representation of that actual in-plant piping arrangement, so that when the model runs and produces its performance indications, that will model the actual plant conditions as close as possible.

And then they did in situ testing and modeled them to see how they compared, and they came out pretty well. So that's what they have done. Typically when we look at

in-plant data, you know, we do request that licensees make sure that when they share data that they understand the arrangements of the valves and the performance over the flow regime that they see. So there is a recognition, as you said, of how the valve sits in that system can make a very large difference in terms of how it performs in reality.

DR. POWERS: So I think what you're saying is that we do have an experimental data base that allowed EPRI to develop a model that could be used in an interpolative fashion.

MR. SCARBROUGH: Yes.

The ASME code case, ONM-1, that we've mentioned, was developed to be an allowable replacement of the quarterly stroke time testing provisions of the ASME code, and it has two definite parts to it. One is that rather than stroke time testing you go to exercising once per operating cycle unless there's conditions or safety significance that suggests a more frequent exercising. So that's where you're sliding from the quarterly to an outage sort of frequency.

Secondly, on top of that is you have diagnostic testing on a frequency that's determined by the output margin and the degradation rate, and this is where you start modeling how much degradation rate you have over time, and you have to develop that information. And part of what the

JOG program's doing will be helpful in that regard.

The total frequency for this diagnostic testing you cannot exceed ten years. So that's the longest -- as far out as we would like them to go. And so that's the combination of the types of test that are used to replace the quarterly stroke time testing.

In 96-05 we indicated that ONM-1 met the intent of 96-05 because it talks about periodic verification, and that's what it's doing, but we did add a few limitations. One was a precaution about the adverse effects or benefits of different types of testing to be aware of advantages and disadvantages for any valves that you went out beyond sort of the five years or up toward -- beyond the five years toward the ten-year interval that you take the information over the first five years and evaluate it so you don't step out too far too fast.

And lastly we indicated that the pilot plants for the risk-informed IST programs -- they need to look at their programs and see how that relates to ONM-1, 96-05, and so forth. And we've had discussions with Comanche Peak about that, and I have a slide later which talks a little bit about how they're going to fold this all together.

Now we currently are planning to endorse ONM-1 in the rulemaking that's out for public comment right now, and the conditions currently in the rulemaking are very similar

to these right here on this slide.

Now we get into the risk-ranking sort of discussion. Here was the boiling water reactor owners group a couple years ago came in and wanted to be able to develop a ranking methodology for their MOVs for -- to 89-10. It involved placing each MOV in the categories of high, medium, and low. It used risk-importance methodology and expert panel considerations and looked at discrete contribution to overall plant risk. And we had continuing dialogue with them, and they've made some changes to their methodology in response to our comments and such. And we did issue a safety evaluation in '96 on that methodology.

Here are the summary of our conditions that we placed. We indicated that it was a specific application for this situation, for MOVs and not a widespread endorsement. Limitations included the expert panel. We wanted to emphasize the expert panel. We wanted to -- we indicated that, as Dick mentioned for the initial testing under 89-10 that mostly was done and there was a supplement which dealt with that, so we indicated that was more of a appropriate path to go for the 89-10 type schedule extensions.

We talked about the verification and frequency for these valves need to be based on both the risk and deterministic, and we used deterministic in regard to margin, such that each valve was capable over its entire

test interval. So the next time you test it, you have good confidence that it'll work. We talked about once again the looking over the first five years before you step out toward the ten-year interval, and then we reminded the users that their code of record, they're committed to the ASME code for stroke time testing and that would have to be dealt with separately if they wanted to change that.

So from there we had -- so we had ranking methodology for MOVs for the boiling water reactors. Then in response to Generic Letter 89-10 we had -- the owners group came in and wanted to try to develop a more broad approach to the generic letter. One of the lessons learned I think everyone found from Generic Letter 89-10 was that the approach to have everyone do it their own way was very difficult. You ended up having so many different review processes and approaches that it was hard for licensees to share data between each other under the 89-10 approach.

Just as we started 96-05 the owners groups decided to work together to share that information and try to come up with an industry-wide approach, and we've been working with them for the past year or so to look at that and develop -- we just recently put out a safety evaluation on that. But basically the owners groups involved are Westinghouse, the boiling water reactors, and the Combustion Engineering owners group.

There's a three-phase process to the JOG program, and I have a slide on each one. There's an interim program which involves diagnostic testing under static conditions, and you look for degradation margin for the first -- over the first five-year interval as we develop a more elaborate test criteria. The second phase is a dynamic testing program that's ongoing that will take five years and do repetitive testing of valves to look for degradation over time. And the third will be to feed back that information and update this interim program to making the final changes to it to come up with the final process.

What we have is right now I have 93 written down here, but the JOG representatives who are here indicated that's higher. I have a slide that I'll put up for them in just a minute. But the JOG has submitted responses or did submit responses to our comments, and we issued a safety evaluation in October of last year.

So let me flip through these slides a little bit, and then we'll put that status after I go through these.

The three phases, the first is a JOG interim periodic test program. Each licensee will test all their MOVs and 96-05 under static diagnostics, static conditions using diagnostic equipment. The frequency -- and I have a matrix on the next slide which shows a frequency -- it's based on margin and risk. There's a ten-year maximum on the

interval. For ranking their valves they can use the boiling water reactors approach, which is endorsed in the SE, or they would need to develop their own, and the Westinghouse owners group has one which I'll mention in just a minute. And then for the licensees, continue to meet their ASME code testing requirements unless they ask for relief following ONM-1 or if the NRC endorses ONM-1 through rulemaking.

This is a slide which has the test matrix in it for the static. It's ranked into three groups of high, medium, and low risk, and then high, medium, and low margin. And it works out under certain intervals. Now cycles can be -- the operating interval can range from like one to two years, but as long as it doesn't exceed ten years, they can work within that.

Margins -- as you can see, the margins are very small, and we've made some comments regarding that in terms of how they look at the individual inputs of their calculations for degradation rate because of the small margins involved.

The dynamic test program is a series of in-plant tests. All the participating licensees have their assigned valves, and it ranges, you know, from two to three valves per plant, because they have so many utilities participating, and they developed a test matrix to look at types of valves in the plants, to service conditions, to

test availability to come up with a matrix of this, and they have a contractor working for them to do this type of evaluation of the test matrix.

On my list they have a hundred gate valves, 30 and 10 -- 30 butterfly, 10 unbalanced disk globes, and 10 balanced disk globes, and I have an update of that in a more recent slide.

Each valve was tested a minimum of three times to try to repeat these tests over about a one-year interval to look for degradation. They analyze the data at the plant. Then JOB analyzes it. And then there's a more formal periodic evaluation of the overall program that takes place.

JOG will address all these test results and communicate these back to the individual utilities, and then we're going to meet with the JOG representatives on a periodic basis, and our first meeting is sometime this spring to look at where things are for the program.

The long-term aspect of the program will be to take this information from these dynamic tests in terms -- and develop a final test criteria. That could be the type of testing, the margins, the intervals, the risk ranking, all that will be reassessed at the end of the five-year program and then they will prepare a revision to their topical report, submit that for NRC review, and then will update our safety evaluation as necessary.

Now our safety evaluation we issued last October and we endorsed the approach as a response to 96-05 for valve age-related degradation and we had several conditions and limitations. First JOG needs to submit an update to their report once the dynamic test program's complete. If a licensee doesn't -- has not participated in the BW owners group MOV risk ranking for ranking their valves they need to develop their own, and we mentioned about the log methodology that's ongoing -- under ongoing review.

We talked about licensees addressing the safety evaluation to make sure they read the safety evaluation, implement its conditions. Any valves outside the scope or fall out of the scope as the dynamic testing program of JOG takes place they need to justify the degradation process for that. They need to address any information that comes out of the program, the sort of the Part 21 question, anything that comes out they're responsible for considering. They need to have confidence that the valves will have enough margin so that they will be operable next time they test it. They need to have -- that remains a deterministic criterion.

They have to apply the uncertainties in the appropriate manner when they're looking at the test frequencies, and the reason why I mentioned about the small margins is sometimes licensees will do things in terms of addressing errors or repeatabilities, uncertainties on one

side of the equation because this makes it much simpler to give the information to the technicians in the field. But with the small margins we've indicated that when they're doing it that way they're going to have to apply the margins and the uncertainties to the portion of the equation that it belongs to. And we've talked about that and they understand that.

Next is, because the JOG program is focusing on thrust requirements, the individual licensees will need to address output. So there's two sides, requirements and output, and the licensees will need to look at this by measuring actual output and looking for changes in stim friction coefficient and things of that nature as part of their program.

JOGs will be looking at the test sequence to see if there is any consideration, concern there for any sort of calibration stroking that might take place before the ongoing diagnostic type testing. So they are going to be looking at that as well. And, once again, we talk here about grouping valves that have long frequent -- test frequencies with valves that have shorter test frequencies to make sure that you validate the assumptions before you go too far.

So, this one, and I'll hand out this slide. This is a slide which the JOG representatives gave me just, right

before the meeting, to give you an update of where they are. They conducted training to make sure that everyone understands how the in-plant test specification will be conducted. They have -- the test matrix has been signed. They now have 97 units, I said 93. They have 195 valves, a slightly different number than what I indicated, but still very close. We expect some valves to fall out and so -- I think finalized their test matrix.

They received 23 packages to date, and they will be reviewing and inspecting those and determining any lessons learned from those packages to make them more smooth in the near future.

They have already had their first meeting to review the data and they didn't see any degradation, but we didn't expect a lot in that very first package of information. But that's where we are, that's where they are right now. And I'll make sure you have a copy of that.

Next, the Westinghouse Owners Group came in and decided that they also would like to have a methodology for their members for risk ranking their valves. And this first started back in June. An engineering report was submitted. We held a meeting with the WOG folks. They submitted a revision to the engineering report to reflect our comments, and we are currently reviewing that.

But I wanted to mention some of the aspects of the

WOG approach. It is six steps. The first step basically refers using back to the JOG program, which is good. We wanted to make sure there was continuity and integration between the approaches so that everyone knows what the scope is and what the test frequency matrix looks like.

The second step is to determine the at-power risk importance of each valve by using the plant PSA model to calculate the MOV relative importance to a pre-defined consequence measure.

The next is they assessed the completeness of the PSA, looking at the limitations, and any of those limitations could affect the importance measure calculations.

Fourth, the evaluate any other considerations that may not have been included in the PSA during operation at the at-power mode.

Step 5 is they prepare information work sheets in preparation for the expert panel to make sure that they have a good process to look over areas that were not covered by the PSA.

And Step 6 is to conduct the expert panel session, determine -- and to determine the MOV risk importance by the expert engineering judgement.

Also, Westinghouse Owners Group has prepared a general list of valves and the Boiling Water Reactor Owners

Group did something similar. It helps provide a comparison of the various plants. But what the WOG did was they prepared a list of the valves that should be compared against for MOVs ranked as either medium or high in each plant. If a utility follows the Westinghouse approach, finds out there's some valves that are not included in medium or high and are on that list, this general list from the WOG, their expert panels needs to go back and assess why they not, and make a determination of why they were not included in the medium or high categories.

So that's an overall safety net that the Boiling Water Reactor Owners Group did and we thought it was a good addition to what the Westinghouse Owners Group is doing as well.

DR. POWERS: That may be the answer to the question I am going to pose.

MR. SCARBROUGH: Okay.

DR. POWERS: But I will pose it anyway to see -- when you come to Step 4 here, and you say evaluate considerations other than the occurrence of internal events during operation in the at-power mode. Do they give you a hint what those things are?

MR. SCARBROUGH: Oh, yeah, there's -- in the report, they go through and they talk about the various aspects that may not be -- they talk about level, you know,

level 2's and the other initiating events, and they give -- they give you areas that may not have been addressed by the normal PSA, and those have to be addressed separately. And they give instructions and guidance for doing that. So that was part of what was in there.

Oh, right, right, right. And we are working on the SE. Let me -- yeah, so the final result is to take the expert panel process, using their experience and judgment, use the insights from the PSA, and any threshold -- the threshold values and rank your valves.

Now, the risk -- the safe evaluation on this report is working its way through the review process right now, where it is heading toward the CRGR and -- but it is not there yet. But the package is prepared and it is working its way through the review process.

Okay. Let me just talk a little bit, now we are into the, sort of the next column of that initial table that we had for you, where we are talking a little bit more about -- we sort of have worked our way through the SME. We talked about some traditional approaches and such, and then we worked our way down through the risk considered, and now we are over here in this area of risk-informed processes.

Okay. There we go right there. Okay. And you all talked quite a bit -- the Subcommittee talked quite a bit about these last -- yeah, 122 -- a while back, so I just

want to summarize this. But Reg. Guide 1.175 involves a four element approach to risk-informed decision making.

The first is you -- element one defines changes to the program. Element two uses traditional engineering and PRA methods to categorize the valves as low safety significant or high safety significant. Element three determines the test methods to be used and frequency of testing, and element four prepares documentation to be submitted.

And they should look very similar to what we have just talked about in terms of risk ranking and such, because Dave Fischer was talking to you a couple of weeks ago, and we work with Dave very closely in terms of what he is doing with Reg. Guide 1.175 and what we are doing, which -- 96.05 and the risk ranking there. So we tried very carefully, try to make sure that we are always understanding what the other one is doing and to make them as consistent as possible.

The proposed test interval should be less than expected time to failure and the licensee should demonstrate that adequate compliment margin exists to accommodate degradation to next test. So very similar language for what you have seen for 96-05 sort of programs.

Comanche Peak, we have talked quite a bit with Comanche Peak on their program and how they are going to integrate OMN-1, 96-05 and all of these into their pilot

application. They are planning to categorize their valves as high or low safety significant using PRA techniques and engineering judgment. They once used PRA risk -- PRA insights to identify any high safety significant valves that may not previously have been included in their IST program. So they are using risk insights to look at things that might have been, slipped through the crack, so to speak.

They are going be using OMN-1 to test, to develop a testing program for their valves for both low and high safety significance and also incorporate in their 89-10 and 96-05 commitments.

All of the LSSC MOVs will be grouped and tested on a staggered basis so that they can provide assurance for the ones with the longer test intervals. So they want to try to make sure there is grouping enough to get information as they go along, as we talked about, so they don't go too far, too fast.

And, finally, they are going to reassess their program periodically. Okay. So that's --

DR. POWERS: When you say testing program for the low safety significant valves staggered over a six year period, you are speaking of the diagnostic type tests?

MR. SCARBROUGH: Right.

DR. POWERS: Okay.

MR. SCARBROUGH: Again, they are going to still

file an OMN-1 which was the stroke time, the outage based stroke time.

DR. POWERS: Okay. They will be outage based.

MR. SCARBROUGH: Well, actually, it is exercising, I guess, because they are not going to measure stroking, but they are going to exercise it every outage, and that will still be in place. But then as go out farther with their LSSC valves, they want to stagger those so it gets them information as they go along.

So, from our discussions with them, they are in the process of integrating all these approaches, and it looks like they are doing well in terms of seeing how they can combine efforts to minimize the amount of resources in terms of needing all of the various guidance that is out there right now.

Well, let me go through some of these conclusions. Basically, over the implementation process of 89-10, significant weaknesses in the design and qualification and maintenance of motor operated valves were identified and resolved. We have been quite pleased with that. We recognize that there was a lot of resources involved in 89-10 and there's no doubt about that. But we think the benefits were sufficient to warrant those resource expenditures.

Tests and studies by the Office of Research have

provided very important information to us to ensure that various MOV performance issues were properly considered.

DR. POWERS: What particular bribe did Research pay to you to get these high accclades laid onto them? Is there something I should know about here?

MR. SCARBROUGH: Actually, they didn't --

MR. WESSMAN: These guys are so tight, and they talk all the time, nobody had to bribe anybody.

DR. POWERS: I see.

MR. WESSMAN: Really, it is a fine coordinated activity, really, with Earl and Jerry, Jerry Jackson and INEEL folks. In a sense, the MOV community, and I point also to the industry folks in the back row, it is a very tight community. A lot of people associated with it have been there a number of years. People know each other. I think there's high technical respect and competence scattered all over this. And I think it is a strength of this particular facet of regulatory and industry activity.

And, so, we have had tight work on the staff. I think we have had very good communications with ASME, and with the folks in the industry. And I am very glad to be associated with the whole thing.

DR. POWERS: Oh, you catch us a point where we are reviewing the research program and I think it is important that we be able to communicate that in many cases, the

research program has, to quote you, been essential to doing the work.

MR. SCARBROUGH: Absolutely.

DR. POWERS: And so it may make a good object example to include in our letter. And they may come back to you and ask you some questions.

MR. SCARBROUGH: Absolutely. This is one area where, without their help, we could not have done what we did. And I think -- I think we have talked to the regi ns, we have worked very closely with the region, inspectors and such. We have a very close relationship with them as well, and they would agree the support the Office of Research has given us has been just --

DR. POWERS: I am surprised a little bit that our Chairman has kept quiet here, because I am sure that were he not distracted onto other areas, that he would pop up and ask questions about your coordination with inspection.

Now, did you factor the inspector? I mean they are the front lines that are going to tell you about this testing and things like that.

MR. SCARBROUGH: Right. Well, yeah, I was going to mention that. We didn't have a slide on that. But, basically, what we have done is, back when we started this process back in sort of 1991 is when we first started rolling on this.

DR. POWERS: Actually, I was going to do something else. I'll tell you about it.

MR. SCARBROUGH: But we did develop -- we develop a temporary instruction, inspection instruction for generic letter 89-10, for the inspectors, in terms of a three phase. Phase 1 was the program reviews, similar to we used to do, what we would have done at NRR, but it was given to the regions to do. So we developed instructions to do the program reviews. We did an instruction for doing an implementation review and then an instruction for a close-out review. And then in 1991, we started a series of training classes which we held with the inspectors in the, regions and also at Idaho, who helped us with a contract that we had.

CHAIRMAN SEALE: Well, I think -- I am pretty sure that the Chairman believes you can write instructions for inspectors. What he is not convinced of is that you can write instructions for inspectors that the inspectors will welcome getting. And he thinks that maybe the inspectors might have some insights on how to write those instructions.

MR. SCARBROUGH: Right. I agree. And so what we did was all of those instructions were reviewed by the regions and, at the same time, when we did the pilots for that TI, I went out with -- we took these pilots, went out with the regional inspectors and then we did it. And since

then, as part of that, we developed a contract with some of the folks at Idaho, Idaho National Laboratory, who would go out with almost all of the inspections of 89-10, and I went on many of them, either directly, in all of them I participated either directly or by phone, where we went through all the processes in those temporary instructions.

So there was like almost daily contact between either myself and the inspectors, or my contractor and the inspectors, and he was on the field. Actually, he is -- I am going to Brunswick on Wednesday to meet our contractor and the region II inspector to finish up Brunswick for their 89-10 program.

So we have a very close interaction with the regions on this, and I agree -- I agree exactly, and we have periodic meetings, counterpart meetings with the regions and their inspectors to review where we are going, try to make sure we are all staying in the same direction, we are not wandering off. But, yeah, all that interaction is very important. And I think we have -- I think we have a very strong relationship with the regions, and I think they agree that this has been a very profitable relationship in terms of making sure that the technical issues are addressed consistently across the regions.

DR. POWERS: I think you have probably got a big gold star in his black book.

CHAIRMAN SEALE: I was going to congratulate on the way in which you set the process up, in the sense that one of the real problems that we are going to have as we go into this risk-informed regulatory approach, implementing many of the pilots, not just this one, and so forth, is developing and demonstrating a sense of confidence in the expert panels. Because they are really kind of the crucial point.

Now, in the long run, as I understand the way the utilities are doing it, the expert panel is a very, very versatile group of people. You would expect them to be knowledgeable. But you also expect them, apparently, to be very versatile.

Now, your expert panels, as I gather, were people who -- they were picked primarily because they knew something about MOVs and had had a lot of experience in using them and making them work and figuring out why they don't work and all of those kinds of things.

MR. SCARBROUGH: A lot of systems-oriented people as well.

CHAIRMAN SEALE: Yeah. Sure. But what I am driving at is this was a wonderful learning experience for the user of expert panels as an integral part of this kind of risk-informed testing program.

Now, in your presentation, I have the impression

that you have tried to distill as much of the information on the expert panel, how it worked and so forth, I assume for the use of your staff. And I assume that the utilities that were involved also learned a lot about expert panels and how they ought to work as result of this exercise.

But I think it is very important that that experience be shared, and I would make that comment to the people from industry as well, that the -- how do I want to call it? The aura, the mystique of the expert panel is something that has really got to be passed along and, you know, they are just crucial to the way this whole process is going to work. And I hope you are successful in passing along to your compatriots in the NRC as well, including the inspection people and so forth, what the expectations are for the expert panels. It looks like you made a good start here.

MR. WESSMAN: I think we have made a very reasonable start, and I think we are sensitive to this. When we were working on both the Comanche Peak and Palo Verde reviews, we gave a fair amount of attention to the activities of the expert panel. In fact, part way through one of the pilot works, and I just don't remember which of the two it was at, there was a realization by the utility that their trail of the expert panel deliberations was not real sound, and they really had to go back and reconstruct

that. Because that becomes for why did you decided to place that component in that particular bin, when somebody is trying to understand its performance five years later, for example.

And so I think this is an important part. I have a perception, and it may be anecdotal, that our QA folks, as some of their work, they may have sat in on a couple of the expert panel meetings for South Texas or something like that.

But I think there is a reasonable sensitivity that this is a very important safety net in the entire process. I mean it is a place where the different disciplines, whether it is the maintenance folks, the operational folks or the IST, or systems folks, kind of come together and you have a component that looks -- hey, this is an LSSC guy and the maintenance guy needs to stand up and say, well, wait a minute, we have to do work on that all the time. You have got -- if you are going to call it LSSC, you still have to give it a more frequent or more rigorous test regimen. You can not ignore it, because it is in such a crummy environment and we are having trouble with it, type of scenario.

CHAIRMAN SEALE: Yeah. Yeah.

MR. WESSMAN: Well, let him finish his conclusions and we can work with the rest of the questions.

CHAIRMAN SEALE: Sure. Sure.

MR. SCARBROUGH: Okay. Yeah. And, as we said, all the active plants have informed us that they have finished 89-10. We completed our reviews at 88 reactor units.

The 96-05, it is just getting underway. We will be reviewing submittals. The Owners Group have a strong joint program and we have already issued our safety evaluation on that. The BW Owners Group has a risk ranking approach and we are completing our review of a Westinghouse approach as well.

Pressure locking thermal binding, we didn't really talk about it, but generic letter 95-07, that review is ongoing. The safety evaluations are currently being prepared on that. We do a little bit of spot checking of pressure locking during the 89-10 close-out inspections to see how that is moving along. We will be preparing our safety evaluations on 96-05 submittals and conducting a sample of inspections, not nearly as many we did before for 89-10, but just to get a feel for what is out there and make sure that everything is kind of going the way we would like.

And we are going to continue our cooperation and dialogue with JOG and ASME and move everything forward.

DR. SHACK: When you have actually done one of these, just -- how much focusing occurs? You know, what

fraction end up high risk, and what fraction medium, low?

MR. SCARBROUGH: I know for the boilers, when they came in, it ranged from -- I would say sort of the 10 percent of valves would be high and the rest would be medium or low. Is that --

MR. LONG: There were five pilots done by the BW Owners Group and they varied substantially from plant to plant. And that's what actually had us add some of the additional things in the SE to make sure that they had covered some of the valves. The biggest difficulty with doing what we are doing here is that it is, from a regulatory perspective, it is hard to be sure that everybody's expert panel will indeed be expert and indeed be really careful about bringing in all the considerations. So we tried to list the considerations that they should include in the SE and the type of expertise they should have on the panel.

And, in particular, we requested that they look at a particular set of valves in the BWR and now the Westinghouse type reactors, that look like they were probably going to be risk significant, and that we recognize there would be other valves. That list of valves, if I remember correctly, is on the order of 20 valves in the -- I think there's actually maybe a few more than that. I know the PWR -- not to say that all those valves have to

included, but at least, if they are not included, there should be a good description of why, for that plant, they weren't really risk significant.

DR. BARTON: Was the difference between the ranking due to plant design, between the different vintage BWRs or for other reasons?

MR. LONG: It is hard to tease apart what was modeling assumptions and what was actually differences in the plant design. And also what was differences in the way the risk measures were taken. So we found some of each is the best thing I can say.

MR. WESSMAN: On the PWR side, my recollection from the Comanche Peak work is that their valves, and, of course, this is both check valves and MOVs, but the total valve population is somewhere in excess of 500, and maybe 25 percent or so are in the HSSC bin.

CHAIRMAN SEALE: Disabuse me if I am wrong. My perception, this is kind of in summary from my perspective, my perception is that MOVs have been a pain in the neck since infinity was minus, and so -- and there are enough of them in the plant so that they are a continuing problem, and every plant had a group of people who were by bitter experience if nothing else very well up on what their plants were like, what their MOVs were like, the kinds of problems they faced with their MOVs and more than that they had more

work than they really needed so they didn't feel like they were having to protect any turf or anything like that, developing job security, if you will, as they labelled things high or low safety significance and all of that.

Is that a fair statement?

MR. SCARBROUGH: That's true. Yes, they have been very difficult to --

CHAIRMAN SEALE: They have had their fill of MOVs, if you will?

MR. SCARBROUGH: Oh, yes. That's true. It's been a long learning curve for these valves over time.

CHAIRMAN SEALE: Well, you see, that is the -- those are the circumstances in which you can put together a credible expert panel and your modeling assumptions, whatever your PRA guys did, it's almost secondary to the process, because you have these people who really know how it works and why it doesn't work when it doesn't work who were there. They were an indigenous resource. Nobody was coming in from the outside telling them how to do it or anything like that.

That is what makes an expert panel work.

I hope we will be as successful in representing the other areas of risk informed or risk based regulatory thinking as we go into the other implementation programs for these other plants.

MR. LONG: I think I agree with that. The need in the expert panel is to take the knowledge from the PRA people that has to do with conditions that maybe the people running the systems in the plant have never seen and hope to never see, and cross that with the day-to-day problems they have in making sure that the equipment is functional during the conditions that they do see, trying to make sure that they have got a complete picture.

The good thing about the MOV situation is that there is a lot of information. They have spent a lot of time working on it and the thing about the process we have set up, the industry and the NRC together, is that we are able to essentially drive it with data.

We can look at the risk and we can decide some of these valves look like we really want to be careful with them. Others look like we can afford to take the data farther out on the reliability and degradation curves with those valves and then as we gain confidence in what those curves look like, apply that to the more risk significant valves, and that makes it a fairly strong program.

DR. UHRIG: Any other questions or comments?

[No response.]

DR. UHRIG: I understand we'll hear more about Reg Guide 1.174 and .175 in the near future?

MR. WESSMAN: I believe the briefings on 1.174 are

complete and of course that document is currently with the Commission for their final review prior to its being issued for public use.

For 1.75 it's the risk informed inservice testing document. You will get about 15 minutes on it tomorrow as part of the one hour session to pick up the application specific Reg Guides that of course we're seeking your and Dr. Apostolakis's approval so that we can pass those to the Commission by the 31st of March and they will then go down the same path towards public use.

DR. POWERS: We probably will not issue a letter from the ACRS and a separate one from Dr. Apostolakis.

MR. WESSMAN: I understand.

DR. POWERS: Not our usual practice.

[Laughter.]

DR. UHRIG: If there are no further questions, thank you very much for your presentation and information and we will look forward to tomorrow's presentation.

MR. WESSMAN: Well, thank you and again the industry folks are back there.

Did the industry folks want to add anything to what we have said? Here is your chance.

CHAIRMAN SEALE: Were my comments on the expert panels more or less on target? I would be interested to know -- in terms of the fact that there was a pretty well

developed knowledge base already there of people who knew about MOVs and so on --

MR. LOEHLEIN: I think I get your point. I can certainly say for our plant that that was true.

My name is Steve Loehlein. I am with the Westinghouse Owners Group from Beaver Valley Power Station, and I would say that for our plant that was certainly true and I think that's pretty typical, that there was onsite people with a long history in the operation of MOVs who were participants on the expert panel and that perspective on the MOVs and where they fail and how they fail and what kind of conditions lead to failure certainly was an input, so I would say truly that was a plus.

I think just the amount of time that was involved in assigning a rank to some of them it was clear that a lot of thought went into that process and expert panel.

DR. UHRIG: Thanks, Steve. Any other comments? Yes.

MR. WARREN: Glenn Warren with the BWR Owners Group in Southern Company's plant, Hatch.

The other thing I wanted to add to that too is one of the thing that industry learned is that you need to try to get it right the first time.

[Laughter.]

MR. WARREN: Some of us spent most of our money

redoing and redoing and redoing. It was not the actual develop a program and go do something -- it was develop a program and get recalibrated, redevelop the program and get recalibrated and redevelop the program, so that was the biggest headaches and money spent in the program for 89-10 and I think the industry is looking real hard at future programs like that, trying to say let's calibrate right the first time. Let's use the right information and let's get it right and save ourselves some headache and some money.

I think that is why you see a joint effort going on periodic verification -- it's trying to do that.

DR. UHRIG: This recalibration then is a result of the incremental additions to the first generic letter?

MR. WARREN: Well, I think what happened is that we were learning just like you were learning, all at the same time, and you know, data is what data is, and if you develop a program on the best available data and then later you find out that that data is not the best available anymore, that it's different, then you have to go back and redo your program.

I think that we found out that maybe as an industry that we weren't as smart on the design assumptions and stuff that were originally given by the valve vendors and stuff early on, and it took awhile for us to start seeing what those true assumptions were and how they ought

to be applied.

Some people learned it faster than others and obviously Tom did a good job of when somebody learned it quicker than I did, he'd come point it out to me and so we thought if that is the case why don't we all try to learn at the same time. Let's put all our resources together and what we learn and get it all in one pot, and come up with the best answer.

MR. WESSMAN: I would supplement Glenn's comment very briefly with pointing out to the committee that I think the industry is learning a lesson and applying it outside the MOV arena and there is work underway by the industry in the area of the AOVs and to do a joint project, to share information, at the same time the Staff, headed by AEOD and Hal Ornstein, with cooperation from the other offices, has been visiting some plants and developing information to see if there is an appropriate area for regulatory action.

But I think both sides are learning and will be more efficient in anything that is done in the AOV arena.

DR. UHRIG: Yes, sir?

MR. WINTER: Frank Winter, Baltimore Gas & Electric. I am the CE Owners Group Chairman.

I want to make also a comment and I think I can say this fairly. The CE Owners Group is a late addition to this JOG and I think it was a very well thought out program

and I think one other aspect of it is in 89-10 a lot of what happened at our plant is not only that relearned lessons but someone else learned a lesson and we didn't know about it, and over the years maybe we stumbled on it or maybe the NRC brought it to our attention or we saw it in some documentation.

I think the real advantage to this Joint Owners Group, both in the MOVs and also in this AOV program that I know we are involved in setting up, is that when there are issues that come up about the margin calculations or other issues we get together as a group. We sit down and we discuss it and everyone in the industry, everyone that is involved in the JOG does it simultaneously and there's not these pockets of people that don't really have that lesson, and you end up reinventing the wheel over and over and over again because you don't realize that some other plant has learned it, and that is a very important aspect of this JOGs group.

DR. UHRIG: Well, thank you very much. Mr. Chairman, I will turn the meeting back to you.

CHAIRMAN SEALE: Very good. It is nice to hear a success story occasionally.

Thank you very much.

MR. WESSMAN: Vigilance must be maintained.

CHAIRMAN SEALE: There you go. Okay, well, we

will take a recess until 2:45.

[Recess.]

CHAIRMAN SEALE: Okay. Gentlemen, ladies, the next item on the agenda is on the mechanism for addressing generic safety issues.

I think I'll just pass this along to John Barton, who is Chairman of the subcommittee.

DR. BARTON: Thank you, Mr. Chairman. To borrow one of your favorite phrases, it is deja view all over again.

Back in '83 ACRS wrote some letters to the Commission on generic issues regarding prioritization and resolution of generic issues at that time. Today we expect the Staff to brief us on the progress on actions in response to an SRM they received in 1996 concerning the mechanisms for addressing generic safety issues.

In going through the material in preparation for this meeting, apparently there are several ACRS issues or concerns that arise and hopefully the Staff will address them in their presentation today.

To briefly review the ACRS issues, one of them has to do with the consistency of prioritization methods for reactor and nonreactor GSIs. This has to do with the discussion of prioritization in NUREG 09-33, which the ACRS commented on in 1983 and subsequently in Policy and

Procedures Letter 1-57, which talks about nonreactor GSIs.

Research should provide some information on the current resolution schedule. There are remaining, best I can determine, 15 GSIs. We would like to hear about the resolution of those 15 GSIs and the effect of funding or lack of funding may have on coming to resolution with them.

Some of these GSIs go back as far as 1982.

On the issue of ACRS receiving generic issues management control system reports and I asked the Staff and apparently the ACRS has not received any reports of this nature for almost a year. I don't know whether the reports still exist, or why we haven't received them but maybe the Staff could address that.

Number of generic issues -- this has to do with duplication tracking systems. A big part of the SRM that the Staff receives had to do with tracking systems and the need for developing a single tracking system.

I'd note that there are in the NRR's Director's Status Report, monthly status report, we note that there are generic issues tracked there also tracked in the GIMCS program, so is there a need for two or is there duplication of tracking systems, or maybe you can talk about that issue.

Research -- planning assumptions call for some two to three generic issues to be prioritized each year. Looking through ACRS records, we haven't seen any issued

prioritized in the past year. Maybe there aren't any but we would like you to talk about that.

Status of progress in how GSIs are being addressed in the IPE and IPEEEs and lastly a concern dealing with GSIs that have been closed, yet AEOD data from operational events shows recurrence of some of these issues in the industry.

That brings us to the concern as to the adequacy of the GSI closure process.

Having said all of that, hopefully Mr. Frank Coffman and Company will enlighten us. Frank?

MR. COFFMAN: Yes, sir, we'll do our best. I think we are prepared on most of these issues, but we were structuring the presentation after SECY paper 98-1.

DR. BARTON: Fine.

MR. COFFMAN: So we are going to follow those items.

In SECY 98-1 it makes reference to a couple of other SECY papers which we are not planning on talking about -- 96-89 and 96-107. We think we can cover the topics without getting into that.

Ron Emrit is the RES contact for SECY 98-1 and so he is going to be covering the background and the roles of each office, the prioritization, tracking, and some status information on the next set of GSIs that will be coming to the ACRS.

In addition, Kevin Ramsey from NMSS will discuss the NMSS programs and prioritization and nonreactor issues.

Because of these other generic communications and compliance activities that are addressed by the program offices, there are people here to help address those questions on those activities.

They are over here in the Staff section. Just so we can get oriented, we've got Seth Copelan and Fred Combs from NMSS, Mark Cunningham from RES, and Frank Cherny from the Generic Safety Issues Branch, and Bob Dennig, Jim Shapaker from NRR, and some specific project managers which are Mike Marshall and Al Serkiz we may get to.

We are not prepared to go through and answer the question -- answer anything you want to ask on any of the GSIs. There are 15 GSIs and we are prepared to address the mechanisms for the GSIs and the status of the ones that you will be seeing next, but to go through each GSI would consume more time than we have here, so I think we are going to address all the questions that you have asked.

The new one that you added in your introductory remarks but I think we can still address is how do closed GSIs compare with new data that is coming up.

I think we can address that as part of the mechanism.

DR. BARTON: Fine.

MR. COFFMAN: Okay, Ron.

MR. EMRIT: Okay. As Frank said, we will focus on the SECY 98-001, which is where I guess most of the questions lie.

Just to give you a little background here, the Commission briefing in December 1995, all offices were present -- NRR, Research, NMSS, AEOD and they all gave the Commission a briefing on how the various offices -- you know, what roles they play in the process.

Out of that Commission briefing the SRM contained three items.

One dealt specifically with the comparison of costs of generic requirements estimated by the NRC with those estimated by the industry. The other dealt with the Staff effort expended on generic activities.

Both of those items were dealt with in a Commission paper, SECY 96-089 in April of 1996.

The third item contained two parts and as we read here, it's verbatim from the SRM. That is to ensure that the respective roles of each office are understood and that close coordination is practiced to eliminate any duplication of effort.

The other part of this third item to have one agency-wide generic issue resolution tracking system coupled with consistency of prioritization between offices.

The initial plan for compliance with this third item that contained these two parts was sent to the Commission in SECY 97-106 in May of 1996, which brings us to this paper, which essentially the plan included in this SECY 97-106 paper required a final paper to be submitted to the Commission by December of 1997.

That is how we get SECY 98-001.

All right. Turn to the next slide.

Okay. In addressing the roles of each office, which was the first part of the item on the previous page, the staff revised management directive 8.5 to more clearly define the roles of all offices in terms of handling of operational data, specifically in the short-term.

We recognize that when issues come to us, they come from operational as well as non-operational sources, as well as now we have -- traditionally, reactor issues, we have been handling. Now, as a result of the Commission briefing, we have been asked by the Commission to look at non-reactor issues and specifically NMSS issues, and Mr. Ramsey is going to deal with that in more detail.

In the short-term, with the cooperation of all the offices involved at the briefing, we were able to revise management directive 8.5 to more clearly define the roles of all offices in handling the operational data.

In doing so, we recognize that in order to

completely answer the Commission's questions, that we needed a more complete process which dealt with non-operational data as well as the new non-reactor issues, and so we told the Commission that we were going to develop a new management directive, 6.4, to address that complete process because 8.5 does not completely do that, it just focuses on how we handle operational data.

So hopefully -- we have a schedule to get that completed by the end of December this year, and hopefully when that's completed, we would have a complete process that will completely address not just reactor as well as non-reactor issues from NMSS, but also one that goes beyond 8.5 in terms of operational data and handle those theoretical generic issues that come to us based on various events or possibilities of events by the staff or the ACRS.

Any questions?

Okay. If I may go into the prioritization process, as we have briefed the ACRS many times over the years, NUREG-0933 has essentially been the -- contains the methodology for the reactor GSIs, and if I may just refresh your memory a little, I think in 0933, you will see this diagram which goes into the various stages. I think most of the members are familiar with this. And identification -- essentially issues have come from the ACRS or anybody on the staff outside the NRC, the industry.

Issues come to us, they are basically given a number, we go through a prioritization process. Those that end up being high or medium move on to the resolution process, and then if there is a requirement somewhere down the line, it gets imposed with a letter to the licensees and, of course, the licensees have to implement, and then there is a verification process by the regions.

So essentially, this is what the process as described in 0933 looks like, and if I may say a little more, the numerical process that goes into the priority, and I will refresh your memory. This was approved by the ACRS both times, I guess, on its way to the Commission in 1983 and then again in 1993. I think essentially we determine the priority of issues based on this chart which is a qualitative assessment.

The recently approved criteria $2,000 per man/rem, which was reviewed by the ACRS, is factored into this, as you can see, and high, medium, low or drop are based on the potential core damage frequency associated with the issue.

So from the outset, since I guess the early 1980s, '91, we've bene using a qualitative approach risk method totally consistent with where the Commission would like us to go today, and --

DR. POWERS: How do you do that?

MR. EMRIT: Okay. You mean just --

DR. POWERS: Yeah. You've got an issue, you want to know what its potential for causing core damage is, how do you get an estimate?

MR. EMRIT: Okay. We go in -- here again, going back to 0933, if you look at the frequency estimate of -- you know, it could be -- we could have data out here based on events, LERs or whatever, and essentially when an issue comes to us, somebody would have identified a particular concern. We try to get as much data as possible based on the frequency of the event, and usually that gets -- you know, if it's a sequence in some PRA that's out here, we get a feel for what the, you know, core damage frequency potentially is based on existing PRAs.

At the outset, we use the Oconee 3 and Grand Gulf 1 PRAs to sort of be the models for, you know, PWR and BWR.

DR. POWERS: See, Oconee has an external events analysis. Does Grand Gulf?

MR. EMRIT: I'm not that familiar. Maybe Frank --

MR. COFFMAN: Mark, do you know if Grand Gulf has an external events model? I don't.

MR. CUNNINGHAM: Mark Cunningham from Research.

The Grand Gulf model, as I recall, has the fire -- I don't recall the seismic, but I believe it has the fire risk analysis model built into it.

DR. POWERS: And we need not go into the other

particular omission from that PRA?

MR. CUNNINGHAM: In the case of Grant Gulf, that omission has been filled at least to some degree. In Oconee --

DR. POWERS: It's less egregious than the other.

MR. CUNNINGHAM: Yes. Yes.

DR. POWERS: Okay.

MR. CUNNINGHAM: Oconee --

DR. POWERS: But it's still an omission. So what we end up with is not a CDF, but a delta CDF prime.

MR. EMRIT: Delta CDF.

DR. POWERS: A delta CDF prime.

MR. EMRIT: Yes.

DR. POWERS: Because it's not a real CDF.

MR. CUNNINGHAM: It's not a CDF associated with the total core damage frequency associated with the plant, yes.

MR. EMRIT: May I continue?

Okay. And usually when the issue comes to us, just to continue the process on the frequency estimate, usually there is a potential solution associated. When somebody comes to us with an issue, generally that person has an idea of what the solution can be. If not, we try to get some feel for it, because we need to be able to calculate what the change in core damage frequency would be

if we made things better -- in other words, if we, you know, imposed some solution that contained, you know, recommended solution or possible solution -- and then we assume a certain success.

Usually, you know, it's not -- we don't usually assume 100 percent correction of the problem. Usually you can get a delta CDF based on the assumed improvement imposed in the solution, so usually we would use that as our frequency estimate and then assuming that we can have a change in core damage frequency, we go to -- we have a list of -- I didn't bring it with me -- consequences associated with certain events. These were initially I guess out of WASH 1400 where we had certain man-rem calculations based on some computer runs back in the early '80s, and updated, you know, once or twice since then.

By using our frequency and consequence, a very simple formula, we come up with our man-rem total based on, you know, certain risk information that is tabulated in 0933 for each event.

DR. POWERS: I'm not sure which risk calculations that -- or consequence calculations that you're talking about.

MR. EMRIT: Okay.

DR. POWERS: But let me make a guess that they were done with either the CRAC or the MACCS code.

MR. EMRIT: CRAC 2.

DR. POWERS: Okay. Recently, it seems to me that the staff has completed an uncertainty analysis of the consequence modeling, and what they come back with is -- they get together an expert panel, people that are experts in how radiation distributes itself in the environment and how it affects people when they are exposed to that radiation, and they find that the default parameters that one would use in these -- I don't think they looked at CRAC, but I think they looked at MACCS, which is a future generation, the next generation on from CRAC, and they find that those default parameters in comparison to what the experts would suggest are quite different.

Are your estimates of the consequences very sensitive to that kind of thing or are they relatively insensitive?

MR. EMRIT: I think at this point, you would like to turn to Mark since I guess the whole MACCS effort was undertaken by his staff.

MR. CUNNINGHAM: I'm going to guess, hazard a guess, if you will, at this point that when you're looking at person-rem calculations, a number of the parameters that were varied in the uncertainty analysis would probably not lead to much of a variability or uncertainty in these person-rem calculations. There's a couple of them that

might come into play, but they're not necessarily the parameters that we studied -- they're not necessarily the most technical of the uncertainties. There are questions here on what values do you choose for interdiction and that sort of thing in calculating person-rem.

DR. POWERS: I think what you're saying is -- at least what I've seen of those studies -- I have to admit, I have not seen very much, but we have hopes for the future of seeing more on it -- that one of the big uncertainties was how far is the plume, how wide does it get by the time it gets to the site boundary, and for person rems, it didn't make any difference.

MR. CUNNINGHAM: That's correct.

DR. POWERS: If one person gets 100 rems versus 100 people getting one rem, the number is the same here.

MR. CUNNINGHAM: For purposes of this, that's the same.

DR. POWERS: So you're saying it's relatively insensitive to those kinds of uncertainties?

MR. CUNNINGHAM: Yes. I think so. And I should note that the types of calculations that will give us a better idea on these sensitivities, the types of MACCS calculations is something that's going on now and over the next -- well, I think about the next year or so to fold all of the uncertainty information into a set of MACCS

calculations to give you a better idea on the uncertainty in the off-site consequences and the sensitivity to those uncertainties.

DR. POWERS: It's going to be an interesting result there, because, I mean, the trouble with the uncertainty analysis that was done, very good though it was from what I can tell, is you come away saying, what do I do now?

MR. CUNNINGHAM: Yes. Exactly.

DR. POWERS: And you're telling me we're going to find out what we do now.

MR. CUNNINGHAM: Yes. That's correct.

MR. EMRIT: I'll just proceed with the chart here and how it is used as part of the generic safety issues.

We get our risk, like I said, from just a simple computation, the product of the frequency and consequences both for the base case and for the adjusted base case, meaning the case that comes to us with some assumed failure, and then assuming that the possible solution is going to bring about some change for the better, then that becomes our adjusted case, and the difference becomes, I guess, the potential reduction in risk that one can see from the issue.

We go out and we try to estimate the cost of imposing the solution, whether it's in the case of a pump problem, you know, whether it's more piping, more pump, more

valves, equipment, technical, you know, help, engineering expertise, whatever it takes, we try to get a good feel for the real cost to the NRC as well as the industry, and at that point, we are ready for impact value statement, which is just a dollars per man-rem calculation.

Depending on where it falls here, we initially --of course, the dividing line is the $2,000 per man rem, you know, depending on where the issue falls here and consideration of other parameters here. We don't just use the impact value score; sometimes other parameters are much more critical. So if there is a secondary parameter to be used -- and cost is not always the primary consideration.

DR. POWERS: What do you do in your decision process when you have conflicting indicators? That is, let's just look at it costs us less than $2,000 per man-rem, and all of the items down the secondary list argue for a medium category except one that argues for a high category, and that one just barely high?

MR. EMRIT: We always take the worst case.

DR. POWERS: You take the worst case.

MR. EMRIT: The high one, yes. We did that in -- I can -- you know, if I had my NUREG 0933 --

DR. POWERS: It's a min/max cut, a decision --

MR. EMRIT: Yes. We always take the maximum in terms of the boxes touch by -- understanding that it's not

cut and dry, but it's built in with enough safety mechanism that if the cost is high but the risk reduction potential is also high, then it's risk first, and I think we have detailed that in the NUREG 0933 procedure of the years, that it's based primarily on risk even though we are required to use impact value methods in the way we regulate. If something came in with a high risk reduction that clearly was high, if I were doing the analysis, I wouldn't even go to cost because I'm just wasting my time.

DR. UHRIG: What determines whether you use greater than 2,000 or less than 2,000?

MR. EMRIT: That's tied to the safety goal criteria, which has been reviewed and approved for the last decade and a half by the ACRS and the Commission. The 2,000 is a specific number that, I guess -- it used to be 1,000 and I was not involved with the deliberative process. The ACRS -- I do have letters where the Commission and the ACRS reviewed and approved that two years ago, if I stand corrected.

DR. KRESS: Yes. It was in relation to the regulatory analysis.

MR. EMRIT: That's correct. And so it's -- see, this chart is totally consistent with other regulatory analysis approaches, safety goal --

DR. UHRIG: Do yo you distinguish between exposure

to in-plant personnel versus outside the plant, or do you just consider it all the same?

MR. EMRIT: Usually, we deal with the potential risk to the public.

DR. UHRIG: To the public.

MR. EMRIT: However, if there is a particular issue on -- you know, I'm going back -- we don't have as many today, but I'm going back to examples in the past where you're talking about a high risk from a maintenance, you know, person or standpoint, then that becomes a part of the consideration. Radiation effects on reactor vessel supports might have been one of those issues where you have to use people to put certain pieces of -- testing equipment or something to determine what the radiation levels were.

DR. UHRIG: Steam generator channels.

MR. EMRIT: Yes. You know, whatever -- the closer you get to the source of the risk -- those are secondary considerations that are not excluded from the prioritization process.

In other words, I may go through and get a number, but I don't use that raw number until I consider certain things that may be glaring, like -- those are -- those are part of the prioritization process, like other considerations would include personnel exposure, and that could raise the --

DR. UHRIG: I know that there have been advocates who said that if you're exposing the highly technical personnel in the plant, that the value ought to be higher than it is in general.

DR. POWERS: I bet I can find people that would argue the other side.

[Laughter.]

DR. POWERS: Go ahead.

And faculty members, no count at all.

[Laughter.]

DR. UHRIG: That's right.

DR. POWERS: I'm sure the Board of Regents would agree with you.

MR. EMRIT: Okay. Essentially I would like to break off at this point because I think this was a refresher course for the ACRS based on how many times we've presented this slide down here, but for the new members -- but Kevin Ramsey from NMSS is now going to tell you all about the NMSS procedure for addressing the GSIs in the safety and safeguards area.

MR. RAMSEY: I prepared a little bit of background information since I don't have a lot of experience in front of this committee and I don't know that materials issues come up very often other than perhaps spent fuel issues and things like that from time to time.

Just as a background, NMSS regulates a lot of different licensees in conducting a wide range of operation, and we have never really defined many of these in terms of a risk analysis over the years. So initial efforts, for example, to try to categorize all these different things that all these different licensees are doing, just looking at byproduct material licensees alone, broke them down into 8 different systems, and as efforts go on, that's liable to go up, and that doesn't even include source material and special nuclear material.

When you fold in the fuel cycle facilities and different things, the number for NMSS could easily exceed 50 different systems that need to be analyzed.

On top of that, in the byproduct material area, we have actually relinquished our authority in 30 different states to those states where they issue the licenses and regulate those licensees and they don't report to us anymore.

So that complicates matters in terms of collecting the operational data to analyze, and in resolving issues that come up, you have to coordinate with those states. It makes life very complicated. On top of that, at the federal level, we even share regulatory authority with some other federal agencies. For example, in the medical device area, FDA regulates the design of a lot of medical devices and how

they're used and what they're used for even though we regulate the source if there's a source in the device.

So if there's a problem with medical misadministrations or something going wrong and we identify a generic issue with the hardware or the software of a device, we would have to coordinate that with FDA, and we have an MOU with FDA and sometimes we take the lead on the resolution and sometimes they do. So it's a very complicated picture and we have to work with a lot of other regulatory agencies to try to get the job done.

Now, several years ago, it was noted that with regard to generic issues, even though we were doing a pretty good job of addressing the issues, we weren't doing a very good job of implementing management directive 8.5 in terms of documenting our decisions and tracking them, and we were told that we needed to do a better job of implementing management directive 8.5.

So we prepared this office letter in order to accomplish that goal and this office letter has only been in existence now for a couple of years. So we're going through a whole learning process here where we're delving into a much more formal program that we haven't had before.

For the office, the Division of Industrial and Medical Nuclear Safety was tasked with coordinating the program across the office. So as an initial screening

process, we have established regional coordinators that call the regions each morning and obtain information on events and other issues that are going on in the regions, and then each day, those regional coordinators will brief the division director.

That basically serves as an initial assessment of what the regions are doing in the way of follow-up actions, all the various events that come in.

If there are generic issues or potential generic issues that headquarters needs to get involved with, because typically in the materials area, since the licensing and inspection is mostly done out of the regions, with site-specific issues, we pretty much let the regions take the lead on following up on those site-specific issues, and we're trying to sit back and identify those other generic issues that we need to be addressing here at the headquarters level.

Beyond that, there is a second screening. We established a generic assessment panel which meets weekly and goes over the operational events and any other data that may have come in through technical assistance request from the regions or other issues.

At this point, this is where IMNS acts as a clearinghouse. We identify items that are not in our program area. If they're an industrial medical issue, we

pretty much take the lead on it, but if it's a fuel cycle issue, we just refer it to the Fuel Cycle Division, if it's a spent fuel or transportation issue, it goes to the Spent Fuel Project Office, and if it's a waste management issue of some kind or a decommissioning issue, then it would get referred to the Division of Waste Management.

At that point, that division who had the lead would conduct the assessment. So you have four different divisions at any one time that have the lead assessing different issues that come up. They would be assessing the safety significance of the event, determine if there is a need to brief the director of NMSS -- each month, we have a briefing of operational events -- identify if there is a generic safety issue involved here, and would be involved with the prioritization of that issue, and, of course, identify any generic follow-up actions, whether it be a generic communication or some other type of generic action.

DR. BARTON: What is your prioritization process?

MR. RAMSEY: Well, I'm glad you asked.

When we first got into this and we looked at what was being done for reactors we realized well, the procedure -- the quantitative procedures in 0933 were written entirely in terms of reactor systems, and could not be used for our facilities. But historically we didn't have the risk analysis to do that type of quantitative analysis

anyways.

We were told we had to do some type or prioritization in order to work ourselves into the GIMCS tracking system. So we came up with this qualitative procedure to try to at least get something going in the interim in terms of trying to fit into that system.

Basically the struggle that we've been up against is that in terms of risk you're talking about probability versus the consequences, and we have a good handle on consequences. We can tell you what the worst-case scenario is. But historically we have -- in most areas we have not gathered the information to do any kind of probability estimate. We can tell you how many times things have gone wrong, but we usually can't tell you how many times it's gone right, because in most cases we don't require licensees to call us if they didn't have a problem.

DR. POWERS: Can you use the -- it seems to me that when things go wrong, 70, 80 percent of the time in this area it's a human error associated with -- that led to this mistake. It may be a little higher than that.

Can you utilize methods developed for human error to look at the circumstances surrounding the error and establish some estimate on what's called performance-shaping factors or a variety of different terms and characterize the error in terms of those probabilities?

MR. RAMSEY: Well, what's being done at this point, and it's not just in the generic issues area, it's in everything that we do in NMSS, is that based on Commission direction under DSI 12 and other mechanisms we've been asked to look at applying risk assessment to all the things that we do and get more into what you just said, making estimates and trying to identify where it can be applied.

I don't know -- the answer basically to your question is we don't know. We believe there are areas where it can be applied and estimates can be made. And what we're doing under our response to DSI 12 is basically to look at all the things we do in NMSS in terms of licensing and inspection, generic issues and other things, and identify areas where it could be applied and estimates could be made without a cost, you know, a resource-prohibitive effort.

And once those areas are identified, then I'm sure there will be directions to proceed to do that. But the process of just trying to identify where efforts should be made is still ongoing at this point.

CHAIRMAN SEALE: You have this panel that meets once a week, you said, to review events.

MR. RAMSEY: Um-hum.

CHAIRMAN SEALE: Could you give me a couple of examples of something in the recent past that would qualify as a high-priority event?

MR. RAMSEY: We had an incident -- this wasn't real recent -- we had an event back in 1996 where we had a medical device, a nucleotron high-dose-rate remote afterloader. And it lost power to the treatment console. And it was discovered that the interlock, the door and the interlock that was supposed to keep the door locked when the sources were exposed, when they had lost power to the treatment console, the interlock wasn't functional anymore. It didn't fail to a safe position. And even though nobody got seriously injured as a result of this power failure, it raised a lot of concerns that --

CHAIRMAN SEALE: Sure.

MR. RAMSEY: You know, if this happened in another instance somebody could walk in to help the patient out and there would be serious exposures. This was -- again this illustrates the complication, because the manufacturer was in the State of Maryland, and Maryland is an agreement State. So this was a Maryland State licensee, didn't report to us. We had to work with the State of Maryland to follow up with the vendor to determine what needed to be fixed in terms of hardware and software changes.

This vendor had sold devices all across the United States, Puerto Rico, Canada, Mexico. We had to coordinate with all those regulatory agencies on the fixes. The State of Maryland worked with the vendor in tracking their plans

for getting design changes approved and then going around and making sure those design changes were implemented with all their customers. But that was an example of a pretty resource-intensive effort, and it took a couple years to complete, and we had to coordinate with a lot of different agencies to get it done.

CHAIRMAN SEALE: This panel meets once a week. How often do you -- how many priority -- high-priority issues have you identified in the last year?

MR. RAMSEY: We really don't prioritize anything other than the big generic safety issues that we refer to GIMCS, and over the couple years that we've been doing this as a formal program, we've only referred a half-dozen issues. And I believe in that time maybe only one or two of those were considered high priority.

CHAIRMAN SEALE: Go ahead.

MR. RAMSEY: That's all I had.

CHAIRMAN SEALE: Are you going to say anything about the resolution process, Ron?

MR. EMRIT: Not specifically. As pertains to the 15 issues that we have, the 15 reactor generic safety issues that we've been tracking in GIMCS, that's all I can speak to in terms of resolution.

CHAIRMAN SEALE: You know, we've had some discussions in the past, about I think two years ago we

discussed some things having to do with addressing priority issues, and I think at that time I expressed some concern for what you might call the silo effect, namely, you have a fairly broad generic issue, there's an effort that's expended in a relatively narrow area, and I won't argue that some resolution to that issue was arrived at, and reasonably so, within that narrow definition of the issue, and we had concerns for the fact that there may be other aspects of that issue that have not been covered. And so the resolution was based on a rather -- that is, the judgment that the generic issue had been resolved was based on what appeared to be a fairly narrow treatment of the overall problem.

Have you thought any more about that?

MR. EMRIT: Not in the sense that we have changed our procedures to specifically address those kinds of situations where issues get resolved. I mean, since we've talked I guess maybe a year and a half ago --

CHAIRMAN SEALE: Yes.

MR. EMRIT: We were down here. We haven't really resolved a whole lot. So we haven't had any real test cases as to how we address -- but as you well remember, the documentation in 0933 pretty much tells the whole story relative to how we've resolved the issues, and those are, you know, reviewed by the ACRS. A lot of them got kicked

into the IPE and the IPEEE, and I can't really speak for how that process -- I know you've voiced concern in the past.

CHAIRMAN SEALE: That's the other problem.

MR. EMRIT: I know where you're going, and I can't speak to that. When we resolve an issue and we say hey, we send a memo to the EDU and say this is what we've done for this part and the rest of the part of this issue, the parts go see the IPE or the IPEEE. I think Mark Cunningham probably can address that better than I can.

We hope at some point in time to come back and tie all of that together in 0933 that somewhere down the line how these things are addressed can be well documented.

CHAIRMAN SEALE: It's been a long time since we've heard.

MR. EMRIT: Maybe Mark might want to --

MR. CUNNINGHAM: I'm not sure what -- talk about a number of topics?

CHAIRMAN SEALE: Well, there were two problems. One was the silo effect.

MR. CUNNINGHAM: Yes.

CHAIRMAN SEALE: And the other was that there were a large number of generic issues that were I'll say wafted away on the -- with the idea that they would be, quote, addressed in the IPEs. And then we'd look at IPEs and it would be difficult to find where that particular generic

issue had received any particular special treatment. And so either it wasn't addressed in the IPEs or it wasn't all that generic in the first place. And I guess we would like to have some understanding of which was the case.

MR. CUNNINGHAM: I guess I would first of all agree with your general description of how things came into the IPEs. There were some generic issues such as A-45 that were explicitly part of the guidance that went out to licensees on -- that said that as part of the IPE they should address the issue on a plant-specific basis of resolving A-45. There were a small number of those. There were a larger number or another set which were associated with the IPEs after the guidance went out.

CHAIRMAN SEALE: Yes. Those are the ones that bothered us.

MR. CUNNINGHAM: Yes. Those are -- what we found in the IPEs with respect to those issues -- there's a variety of outcomes, I guess, what you see. In some cases you just -- there is nothing specifically in the IPE that would help you decide that that issue is resolved. In other cases there is enough of an information base in the IPEs that you could at least try to come to some decision that there's a technical basis there.

What we're trying to do now is given basically that the IPE reviews -- or the IPEs have all been submitted

and the reviews are basically done with a couple of exceptions is at this point go back and lay out what issues came up, what issues were explicitly called out, what issues were brought into the IPE process to some degree after the fact of at least after Generic Letter 88-20 went out, and just compile the information of where these things are, what's happened to them --

CHAIRMAN SEALE: So you're going to prepare a matrix like that?

MR. CUNNINGHAM: In effect a matrix of --

CHAIRMAN SEALE: Yes.

MR. CUNNINGHAM: Yes. And in some cases the matrix -- the end of the matrix may be the IPEs don't resolve this issue.

CHAIRMAN SEALE: So there may be a low-density matrix in some areas.

MR. CUNNINGHAM: Yes, that's correct.

CHAIRMAN SEALE: Okay.

MR. CUNNINGHAM: That's correct.

CHAIRMAN SEALE: Okay.

MR. CUNNINGHAM: And a similar type of situation for the IPEEEs. We're a little bit better off in that sense in that earlier in the process of our reviews of the IPEEEs are we starting to look at for generic issue resolution.

CHAIRMAN SEALE: Okay.

MR. CUNNINGHAM: So we're a little bit ahead of the game on IPEEEs, but it's still -- it's -- there may be cases of a low density in parts of the matrix.

CHAIRMAN SEALE: Well, we look forward to seeing that, Mark, because that's something that has been a nagging --

MR. CUNNINGHAM: Yes.

CHAIRMAN SEALE: Concern for quite some time.

MR. CUNNINGHAM: Yes.

MR. EMRIT: Any further questions?

DR. BARTON: Yes. Let me see if I understand this. NMSS will categorize issues, high priority, those are the ones that go over to and get looked at for an overall priority so that you have the single prioritization of all generic issues? Do I understand that right, or what? How do you get to a single prioritization? In your power reactor issues and NSS issues how do you get to one priority list?

MR. EMRIT: We hope to get there -- I guess the input that we got for this particular paper that we're discussing here today, the 98-001, we -- I think the NMSS input to that paper said that in the interim they will use this qualitative method that they have outlined in their PPL.

DR. BARTON: But that gets them to a high, medium,

low, right?

MR. EMRIT: Yes, but --

DR. BARTON: Right.

MR. EMRIT: That's just a qualitative -- how does that get married to the existing process?

DR. BARTON: How does that get married into the power reactor process, you end up with one prioritization of all generic-type issues? Which I think is what you've been asked to do. Right?

MR. EMRIT: Good question. That's correct. I guess the results of the DSI 12, their risk-informed approach that they're pursuing in that arena, hopefully whenever that gets finalized we could sit down with them and try to bring into 09-331 a process that would probably have a different template for their kinds of issues as opposed to the one I just showed you earlier. But certainly in one document clear and concise in NUREG 09-33 a methodology that outlines for reactor issues what we have and for nonreactor issues both qualitative methods. That would be my dream, to meet the DSI 12. But the NMSS, it's entirely up to NMSS.

MR. RAMSEY: Even though the Commission, I mean, suggested that we should have a consistent prioritization scheme. We don't have that at this point.

DR. BARTON: Understand that.

DR. POWERS: Well, maybe the Commission is just

off base when they ask you for a consistent --

MR. RAMSEY: We may have -- the unresolved --

DR. BARTON: Tell them you can't do it.

MR. RAMSEY: These are apples and oranges and they're going to continue to be apples and oranges no matter what we do. But in terms of at least having everything being more risk-based, as this effort goes forward in DSI-12 and whatever goes along with it, the systems get better to find, we identify where we can apply risk-based methodology, and at least come up in some areas at least with a risk basis that's more in tune with the quantitative assessment that's being done for reactors, then we would be more consistent. I don't now if we'll ever reach the point where we're completely consistent.

DR. POWERS: It looks to me that if you go back in and look up what the reactors have done in their prioritization, they're not prioritizing on risk. They are roughly prioritizing based on core damage frequency and roughly prioritizing based on consequences. You don't see risk numbers in there. And it's -- I think you just have to acknowledge for the Commission the deficiencies of the field and say look, I can prioritize based on consequences. I know what the consequences are. Okay? Or something like that. And not look for perfection here.

I mean, I think you just have to tell the

Commission you haven't got a lifetime long enough and I don't have money enough to do this perfectly. I can only do it imperfectly. And here's what we can get right away. I mean, after all, we're looking at a prioritization. We're not looking at a resolution here. And what we want to do is resolve the issues. Prioritizing them is just a way of marshaling our manpower. It's almost a feat in that respect.

CHAIRMAN SEALE: That's particularly true in those cases where you're talking about the activities in agreement States, and I'll tell you why I say that. As Dr. Powers has mentioned, a lot of these devices have been engineered based on a set of assumptions with regard to training, behavior, and so on, and then they're distributed, sold in various places, and what happens to these things 5, 10, 20 years down the road depends very much on the climate that exists within the State.

And so, for example, within California I can't imagine anybody cutting up and sending to the scrap heap a cobalt-60-loaded irradiator. We know it happened in Mexico. And lawn furniture wound up with cobalt-60 in it. Okay? Now how in the bloody blue blazes can you go through and put a risk frequency kind of assessment on that when that depends on whether or not -- or let's say on the kind of regulatory presence you have which is overseeing the user?

It's very clear you can assess the consequences if somebody is crazy enough to do that, but there is no way in the world that you can do a frequency analysis that takes into account the distribution of regulatory alertness that this device is used under. And you ought to just say that.

MR. RAMSEY: I believe in a number of different ways NMSS management has attempted to say that and sometimes has met favorably and sometimes --

CHAIRMAN SEALE: So then you close the issue or you close the loop on that by just saying, hey, these are two different categories of activities. One of them may be amenable to risk assessment, the other one must be limited to consequence assessment.

MR. RAMSEY: I think to a large extent the Commission recognizes that. I mean a lot of the direction we have gotten in this area the Commission has said we recognize what you are up against but we want you to go look at where it is practical to apply this methodology and then we'll decide what we want to pursue, and that is the exercise we are going through now.

There are certainly going to be areas where we decide it just isn't practical to try to go through this exercise.

DR. BARTON: A couple of things that I didn't think we talked about. The generic issues management

control system quarterly report that we have been routinely receiving and having had any in a year -- is there an explanation for that?

MR. COFFMAN: It's the next item.

MR. EMRIT: Yes, we were just getting ready to move into page 3 of the presentation and after I give you a brief -- GIMCS. You know, we have been putting it out over the years to inform the ACRS and everybody as we put in the Public Document Room and keep the public informed as to where these issues have been going over the years.

That includes in some cases nonsafety issues where they existed because one of the things about the process is that we not only focus on safety but there are some other issues that come out of the process which we keep track of.

I think one of the open questions you had might have been what are the processes we have right now relative to the tracking, and I think there are people from NRR who are here who can explain what they do in their reporting as well as NMSS, but the GIMCS focuses on the generic safety issues that fall out in the methodology that I explained earlier, the -0933 process, while the other things that are going on I think are being tracked by each office.

If you have any questions relative to those, I think people from NRR and NMSS can answer those questions.

The question that you had relative to the GIMCS

and its production or lack thereof -- Frank?

MR. COFFMAN: Yes, let me see if I can answer the question cleanly.

Obviously a quarterly report if you get behind on the schedule then it can be cumulative on its impact on missing the schedule, and that has been the case.

Because of back in the July timeframe because of concern about a new issue, the report was slightly delayed getting out and slightly on the order of a couple weeks.

That led to a delay in getting the request for the updates out so we got the updates in for GIMCS, for -- let's see. That puts us third quarter, the third quarter of '97. We got those in and were able to fold them into the GIMCS report in September and then we had a delay.

We had a delay from early October to last November that was primarily due to discovering some inaccuracies in the input. It was based upon we were making comparison to other sources of information.

We had raised a bunch of questions and then we had to correct those inaccuracies and because we found a substantial amount it led to concern about what did we find.

Then from late November until just recently on the last part of February, we were looking for, we were exploring ways to be more efficient in the use of Staff time because it takes a lot -- consumes a lot of Ron's time and

others' -- other people's time.

We gained some efficiencies in trying to get accurate information on a timely basis and so we're exploring different approaches so we have -- I think that is where we are on it and you have not seen it because it hasn't been updated, even though the request is now out for an update and one of the things we changed was to make the update go from office level to office because part of the problem in getting mixed quality on the input, mixed timing on the input was we were going in at lower levels for information.

We should be receiving that back about the end of March and then it will take some time to fold that information in the GIMCS report and I wouldn't want to estimate a schedule right now but I would -- but you could guess about the time we would expect to get an updated GIMCS.

We are also considering some other changes to the GIMCS reports.

DR. BARTON: Well, from here now do you feel you've got a handle on it? Was this an isolated case or do you think you have got a handle on being able to get them out per your requirements in the future?

MR. COFFMAN: I think we have got a handle on it, yes, and I think we are going to make it.

What we have got to watch though is that we don't swing back the other way because we are adding some layers to get centralization into the clearing of the information, the accuracy of the information. We have added a layer and we have got to be careful that that doesn't take time, but I think we have got a handle on what the problems are and we're trying the most effective fix that we can identify at this time.

DR. BARTON: Okay. The other question was whether duplication of tracking systems -- does NRR have one and GIMCS another one or is there an intent to be one tracking system but in reality there are two and you may need NRR to answer that since some of the issues are tracked in the NRR Director's status report as well as in GIMCS.

Can anybody address that one?

MR. COFFMAN: Well, the simple answer to the first part we need to build upon is that there is one agency-wide tracking system which is GIMCS and then there are program activities or there are activities that are generic addressing generic issues in the program offices and they have their own needs for that, but does anybody want to volunteer from NRR? Thanks.

MR. WU: Let me try to answer this question. My name is Peter Wu from PGEB.

At the NRR Director's Status Report, primarily it

is to provide a concise status of progress on all ongoing NRR generic activity. This is different form from the GIMCS purpose. We feed some stuff based on this tracking but its independent from GIMCS stuff.

DR. BARTON: I am not sure I understood what you told me.

Is there duplication of tracking? You asked to develop a single tracking system for these issues and I am still not sure whether I have got a single tracking system or duplication or what.

MR. WU: This is not a duplication of the tracking. NRR side is used for NRR management's use so we are talking NRR's activity.

DR. BARTON: Okay. And other questions from members of the committee?

[No response.]

MR. EMRIT: The last slide here --

DR. BARTON: Go ahead. I just wanted to see if there was any other questions that the people, members of the committee, had at this time.

MR. EMRIT: Okay. Since we have not sent you GIMCS for some time and like Frank said we are in the process of getting better information, hopefully you can get a copy soon.

We were prepared to let you know what you can

expect in the short term -- at least draft resolutions are underway on these two issues and hopefully there will be some communication that is part of the process to send you or to discuss with you, draft resolutions and I think in two of these issues you are probably familiar with -- reactor coolant pump seal failures, the Issue 23 and Issue 171, ESF failure from loop subsequent to a LOCA.

Both of these are high priority issues and in the case of 171 I think Al Serkiz is here if you need any more input, but the schedule calls for a draft resolution to be available some time this month so you could be getting a copy of something from the Staff soon.

The other issue on reactor coolant pump seal failures is the insights from the IP. We have a resolution memo that is really undergoing some editing right now so although we don't have a date to give you as to when you can expect a copy of that, we expect that to be very soon, within the next month or so, so these two were the ones that are within our division, our branch, specifically ones that we felt that we could come to you with some kind of good estimate as to when you can expect correspondence and so the other issues, if you need any more input, I guess we can discuss them individually if you have any specific question.

We don't have firm schedules but, you know, here again, getting the information from GIMCS requires a very

extensive collection process, rather than just any number out of the air, any date out of the air. So we have -- and it is a formalized process. We didn't have that kind of information coming here today.

DR. BARTON: Well, fine. Maybe we need to have a follow-up meeting to discuss some of the older issues. I noticed the reactor cooling pump seal failure is a relatively old issue and ESF is a relatively recent issue. But there are several older issues that you weren't prepared to address today, but I think maybe in the future we will set up a Subcommittee meeting or have another presentation before the Committee on what is the plan to resolve some of the older issues.

Can you explain to me what nearly resolved means?

MR. EMRIT: Yeah. That's -- that is --

DR. BARTON: I see there's an awful lot of things nearly resolved.

MR. EMERSON: Yeah.

CHAIRMAN SEALE: Pretty helps.

DR. BARTON: When they didn't get resolved. What does it take to get them fully resolved?

MR. EMRIT: Initially, when we go back to the post-TMI time frame, where we had hundreds of issues, that question sort of answered itself. Because when we were asked to prioritize issues back in accordance with the

program developed under the amendment to the Energy Reorganization Act, when we developed this qualitative process, we already had issues that were in the process of resolution. So rather than create a special category, or prioritize those that were near their completion, we coined the expression nearly resolved, and it pretty much was accepted at that time. Of course, I am going back 15 years ago.

Today, you know, the fact that some issues stay nearly resolved -- or unresolved in the nearly resolved category for many years, you know, I cannot explain the status of those.

DR. BARTON: That is why I asked the question. There's on issue on 45 from 1992. It says nearly resolved.

MR. EMERSON: Yeah.

DR. BARTON: Almost to final resolution.

MR. EMRIT: Based -- here, again, you know, in later years, when issues came to us late in the process, in other words, after it was brought to our attention as a potential issue to be prioritized, when we looked at it and made an initial assessment, we found out that in these specific cases, that the staff already had an action plan. And so, therefore, we didn't waste the time prioritizing the issue and spending resources when resources had already been committed to the particular issue. So we just put it in the

nearly resolved category. With the hope that in a short time, issues with that categorization would get resolved very shortly. It didn't turn out that way.

Having said all of that, we recognize that it provokes a lot of laughter when you say nearly resolved for ten years, and we are in the process of trying to come up with a better definition for issues in that category. That even if they stay there for many years, that they will be characterized by some different way, either by, you know, directed by management or something, and try to get away from using the nearly resolved category.

DR. BARTON: I think that might help.

Do you have anything else, Frank?

MR. COFFMAN: You had a couple of other items on your list, I think, that we hadn't got to yet. Perhaps now is the time to address those. For example, there was a comment about the rate at which GSIs are identified and resolved and prioritized.

I can't speak for the long history, but at the current rate, two to three per year appears to be still a good estimate for budget planning. As far as prioritization, we have got Generic Issue 107 on main transformer failures, and Generic Issue 169 on common cause failures, MSIVs that are in the process of being prioritized, or re-prioritized.

DR. BARTON: And the other part of the question is when can we expect to see them?

MR. COFFMAN: When can you expect to see them? 169, plan on this month and 107, I am not sure. I would have to get back to you on 107.

Then the question of how do you close -- what do you do when you close, or have a closed GSI?

DR. BARTON: This is the adequacy of the closure process, when you see, you know, operational data coming in after it is closed?

MR. COFFMAN: Yes, sir. That's a tough one. There is in the process, in the mechanisms for treating GSIs, there is a systematic look for new information every year. There is a memo that goes out to the offices and the regions requesting that they review their past year's experience in the light of the GSIs that are low, that were prioritized low.

That is not focused on closed GSIs. It opens -- okay, so it asks for looking at low, it does not focus on closed, and it does open the option that if they have any dropped GSI -- information on dropped GSIs that would change the priority. So that is part of the existing mechanisms and procedures, is to look for new information or specifically look for new information on old prioritized GSIs.

We can reopen an issue and there are considerations that go into reopening the issue, and those are identified in RES Office Letter 7, Appendix A, and I don't recall all of them, but there are about a half dozen items, the scope of the issue, the nature of the new information, the safety significance of the new information, that type of thing.

DR. BARTON: Do you know if any of them have been reopened recently?

MR. COFFMAN: No, I don't.

MR. EMRIT: Yeah. Main transformer failures, 107.

DR. BARTON: Which one.

MR. EMRIT: Main transformer failures, it was based on new information that was initially prioritized. The process that Frank just referred to is something that we do annually and it was based Commissioner Rogers' consent for low priority issues. And with the passage of time, new information, that could change that priority.

I suspect that you are talking about issues closed meaning drop or low, but not necessarily closed from -- resolved with no new requirements.

DR. BARTON: I am talking about both really. Those that have really been closed, because everybody feels that the issue is behind us, and then you start seeing --

MR. EMERSON: Yeah. We are at the mercy of the

staff. We don't - this question came up before, who is responsible for reviewing events? And I think there was an IG audit of this a couple of years ago. And I think that's one of the reasons why we revised Management Directive 8.5, so that every office would clearly understand its role.

We don't, in Research, don't have the resources to be looking at events from that standpoint. But we certainly expect the staff to be looking with that kind of Generic Issue eye towards, hey, where does this new information fit in? Are there enough events to reopen like they did -- they did bring to our attention new information on a periodic review on low priority issues, NRR data on 107, based on their observance of a high rate of failure that had occurred over -- certainly, within the past years, leading up to about a year ago.

I don't think it has changed the priority necessarily, but at least we are -- we do have some kind of process for looking at --

CHAIRMAN SEALE: There are two -- there are two inquiries, I think would be appropriate, and I don't think -- I can't imagine how they would violate any guidelines, cutting up turf or anything like that. One is to broaden your inquiry to the regions regarding events of the past year to include issues that have been judged to be resolved which were high. I mean this is the silo problem that I

mentioned earlier.

And the other is when AEOD goes through and looks at new issues to determine whether or not they are, in fact, appropriate for their more detailed analysis, again, you could look at past, quote, "resolved generic issues" that seem to be rearing their ugly heads again.

MR. EMRIT: Yeah. When you talk AEOD, if you go back historically to the early '80s, you will find that a lot of the new issues raised were in fact based on AEOD key studies.

CHAIRMAN SEALE: I appreciate that. But what I am saying is that a lot of those dead, so-called dead issues aren't really dead out there.

MR. EMRIT: I think your question is probably, more probably addressed to AEOD and exactly what they do in terms of using the Generic Issues.

CHAIRMAN SEALE: But you could address an inquiry to them.

MR. EMRIT: Yes, we could, I guess.

CHAIRMAN SEALE: And ask them what process would be appropriate to do a review of events to identify supposedly resolved generic issues which are recurring and, hence, perhaps the resolution of those issues wasn't as global as it might -- should have been.

MR. EMRIT: Yeah. The only reason I said that is

because I cannot sit here and tell you exactly how they function or what, you know, what exactly they do. But, certainly, the expectation is that, as they review events, and if I may give you an example, a current example, the Issue 43, on air systems reliability was raised about a decade ago, and I think it was a high priority issue. It was resolved, I think, with an information notice, no requirements that I remember. Or I could be wrong about that.

But recently it came back again with further AEOD studies. So, you know, -- so I think that the -- that is a hot item from an AEOD standpoint. Now, has that issue come to us officially as a new issue? I just know about it, because, you know, I get telephone calls or people share information with me. But, legitimately, that should be raised again as a revisit of Issue 43, and I agree with you.

CHAIRMAN SEALE: You know their phone numbers.

MR. COFFMAN: Let me pursue that.

MR. DENNIG: This is Bob Dennig. We've been quiet over here. This is Bob Dennig from Events Assessment NRR.

Just on the topic of revisiting issues that were previously closed vis-a-vis operating and looking at operating experience. Just thinking, I think three examples where something's going on or has happened. One I think water hammer --

CHAIRMAN SEALE: Um-hum.

MR. DENNIG: Is an issue that was resolved. I know in NRR there's a group of guys that keep an eye on water hammer.

CHAIRMAN SEALE: Yes.

MR. DENNIG: And periodically put together a story. NIN will go out. And they do think about well, have we done enough or is there more we can do.

The issue of sump blockage, PWRs and BWRs, a long time ago the issue was closed. It didn't make the cost-benefit analysis. Barsebec occurred. Wolfing got reopened. We wind up with requirements to put new equipment into BWRs, and I think we're looking at the PWR stuff now.

And there was one other example that has just escaped my memory. But I can't say that people are sitting with NUREG 09-33 on their desks and every time an event comes in systematically combing through that. But the ones that stand out in most people's minds, the things that have come along in the past 10 or 15 years, people are plugged into those things, and they do bang the new stuff against that when it comes in to see if this pushes you in one direction or the other. And I already mentioned the process of polling the staff on the low-priority issues, and we do send back real stuff. We do take that exercise seriously.

CHAIRMAN SEALE: Thank you.

DR. BARTON: Thanks.

MR. COFFMAN: We could maybe mention the ongoing GSIs, the ones that are being resolved, because there's an ingredient of this there also. The examples -- it's -- the air systems touches on GSI-158, which is power-operated valves, which air operation is one of the power sources.

And then there's also the fatigue, 190, the fatigue issue. What I think we're seeing is --

CHAIRMAN SEALE: We're getting tired of that one, by the say.

I'm sorry, I couldn't help it. I couldn't help it. Yes, there was a pun intended.

[Laughter.]

MR. COFFMAN: The conflict in my mind is, just to philosophize just a second, deals with this silo effect, I guess we've referred to it as stovepipe effects, different metaphor, same concept.

CHAIRMAN SEALE: Okay.

MR. COFFMAN: In order to resolve the issue you have to really define the problem exactly, define the issue exactly, and you can't just resolve a topic like fatigue.

CHAIRMAN SEALE: I agree completely.

MR. COFFMAN: And so that's the head-knocking that takes place on -- particularly on active issues that we're working on a resolution, and 158 and 190 are ones that we're

talking to each other. Yes, we know -- we even know where AEOD's offices are, and we spent some time there.

CHAIRMAN SEALE: I'm sorry. I was perhaps unfair.

MR. COFFMAN: It keeps us honest, I guess.

I think that's all that we could address at this point.

DR. BARTON: We appreciate your time and the briefing. It looks like you've got a lot of work ahead of you. Hopefully when you complete your tests some of these concerns that we've got will also be resolved.

Any other comments?

Any comments from the Committee?

Well, thanks again.

Dr. Larkins?

DR. LARKINS: Yes, I think you probably need to get a status on those 15 issues that were referenced in the letter to Congress, because you may want to follow up on it in the letter to the Commission.

DR. BARTON: Yes, we will do that. And I think we mentioned earlier we probably have to scnedule another meeting or something to get a status from -- on those issues.

Thank you.

Thanks, John.

CHAIRMAN SEALE: Have you got a copy of that

letter to Congress?

MR. COFFMAN: Yes, sir.

CHAIRMAN SEALE: Okay. So you can find the issues. Very good.

DR. BARTON: I'll turn it back to you.

CHAIRMAN SEALE: Okay. Any -- I think we're at a time when we will no longer need the reporter today, so we'll see you, and we're going to take about a 15-minute walk around here and get back together at 4:30.

[Whereupon, at 4:15 p.m., the public meeting was recessed, to reconvene at 8:30 p.m., Tuesday, March 3, 1998.]

REPORTER'S CERTIFICATE

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

NAME OF PROCEEDING: 449TH ADVISORY COMMITTEE ON REACTOR SAFEGUARDS RELIABILITY AND PROBABILISTIC RISK ASSESSMENT

DOCKET NUMBER:

PLACE OF PROCEEDING: Rockville, MD

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

Jon Hundley

Official Reporter

Ann Riley & Associates, Ltd.

SECY-98-001: SRM 951219A - BRIEFING ON

MECHANISMS FOR ADDRESSING GENERIC SAFETY ISSUES

Presentation to
Advisory Committee on Reactor Safeguards

by
Ronald C. Emrit
Generic Safety Issues Branch
Division of Engineering Technology
Office of Nuclear Regulatory Research

March 2, 1998

BACKGROUND

- SECY ISSUED IN RESPONSE TO SRM 951219A (3 ITEMS):
  - TWO COVERED BY SECY-96-089 (COMPARISON OF COSTS OF GENERIC REQUIREMENTS ESTIMATED BY THE NRC WITH THOSE ESTIMATED BY INDUSTRY & STAFF EFFORT EXPENDED ON GENERIC ACTIVITIES)
  - THIRD ITEM CONTAINED TWO PARTS:
    - ENSURE THAT THE RESPECTIVE ROLES OF EACH OFFICE ARE UNDERSTOOD AND THAT CLOSE COORDINATION IS PRACTICED TO ELIMINATE ANY DUPLICATION OF EFFORT
    - ONE AGENCY-WIDE GENERIC ISSUE RESOLUTION TRACKING SYSTEM, COUPLED WITH CONSISTENCY OF PRIORITIZATION BETWEEN OFFICES

ROLES OF EACH OFFICE

- MD 8.5, REV. 1 ISSUED ON 12-23-97 TO DEFINE ROLES OF ALL OFFICES (ACRS, OIP, EDO, CIO, AEOD, NRR, NMSS, RES, REGIONS, OSP, ADM, & OE) IN REVIEW OF OPERATIONAL SAFETY DATA

- MD 6.4 TO BE ISSUED 12/98 TO DEFINE ROLE OF ALL OFFICES IN THE TREATMENT OF GSIs (OPERATIONAL/NON-OPERATIONAL, REACTOR/NON-REACTOR) CONSISTENT WITH DSI-22

PRIORITIZATION

- NUREG-0933 FOR REACTOR GSIs

- NMSS PPL 1-57 FOR SAFETY AND SAFEGUARDS GSIs

TRACKING

- AGENCY-WIDE GENERIC ISSUE RESOLUTION TRACKING SYSTEM - GIMCS

UNRESOLVED GSIs TO ACRS IN FY-98

- 23, REACTOR COOLANT PUMP SEAL FAILURES (HIGH PRIORITY)
  - RESOLUTION MEMO UNDERGOING EDITING; CONTAINS INSIGHTS FROM IPE
- 171, ESF FAILURE FROM LOOP SUBSEQUENT TO A LOCA (HIGH PRIORITY)
  - DRAFT TECHNICAL RESOLUTION FOR COMMENT IN 03/98

ACRS MEETING

MARCH 2, 1998

SECY-98-001: SRM 951219A - BRIEFING ON MECHANISMS

FOR ADDRESSING GENERIC SAFETY ISSUES

NMSS PROGRAMS

NMSS PROGRAMS

- NMSS regulates thousands of licensees conducting a wide range of operations. Initial efforts by a risk review group identified 38 different systems for byproduct material licensees alone.

- Regulatory authority over approximately 2/3 of the byproduct material licensees in the U.S. has been relinquished to 30 Agreement States. The collection of operational data, and the resolution of many generic issues, must be coordinated with the regulatory agencies in each Agreement State.

- Regulatory authority in some areas is shared with other Federal agencies. For example, the U.S. Food and Drug Administration (FDA) has jurisdiction over the design and use of medical devices. The resolution of generic issues involving software or hardware deficiencies in medical devices must be coordinated with FDA.

PPL 1-57, NMSS GENERIC ISSUES PROGRAM

- The Division of Industrial and Medical Nuclear Safety (IMNS) coordinates the generic issues program in NMSS.

- Initial Screening - Regional Coordinators call the regions each morning and brief the Director, IMNS on operational events. Initial assessment of issues and followup actions is performed at these daily briefings.

- Second Screening - IMNS Generic Assessment Panel meets weekly to review operational events and other data. Items outside of IMNS program areas are referred to the appropriate NMSS division for assessment. The assessment includes the following:
  - Safety significance of the event
  - Need to brief Director, NMSS
  - Identification and prioritization of generic safety issues
  - Identification of generic followup actions

PRIORITIZATION OF NMSS GENERIC SAFETY ISSUES

- High Priority
  - Issues which could cause abnormal occurrence criteria to be exceeded.
  - Issues where resulting events require immediate or 24-hour notification.
  - Issues which could cause safety limits to be exceeded for multiple individuals or a substantial release to the environment.

- Medium Priority
  - Issues where resulting events require 30-day notification.
  - Issues which could cause safety limits to be exceeded for an individual or a release to the environment.

- Low Priority
  - All other safety issues.

JOG PV Program Status (2/25/98)

- Topical report revised to address NRC comments and submitted to NRC by all 3 Owners Groups.
- Training on in-plant test specification conducted.
- In-plant test matrix fully assigned.
  - <97 participating units
  - <195 test valves (146 gate, 29 butterfly, 20 globe)
- 23 JOG test data packages received (19 gate, 4 globe).
  - <Procedures to inspect and review data implemented.
  - <"Lessons learned" from initial packages to be published.
- First JOG Meeting to review data (February 1998) - no information on degradation from initial data.

NRC AND INDUSTRY ACTIVITIES TO IMPROVE AND MAINTAIN PERFORMANCE OF SAFETY-RELATED MOTOR-OPERATED VALVES

ACRS Briefing
March 2, 1998

Thomas G. Scarbrough

Mechanical Engineering Branch
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

BACKGROUND

IN 1980s, OPERATING EXPERIENCE REVEALED WEAKNESSES IN MANY ACTIVITIES ASSOCIATED WITH MOV PERFORMANCE.

THESE ACTIVITIES INCLUDED DESIGN, OPERATING PROCEDURES, TRAINING, AND INSERVICE TESTING.

RESEARCH PROGRAMS SPONSORED BY INDUSTRY AND NRC CONFIRMED WEAKNESSES IN DESIGN AND QUALIFICATION OF MOVs.

TYPICAL MOV INSERVICE TESTING CONSISTING OF STROKE-TIME TESTING UNDER ZERO DIFFERENTIAL-PRESSURE AND NO FLOW CONDITIONS WAS SHOWN NOT TO DETECT CERTAIN DEFICIENCIES.

NRC AND INDUSTRY INITIATED ACTIVITIES TO IMPROVE AND MAINTAIN THE PERFORMANCE OF SAFETY-RELATED MOVs.

RELATIONSHIP OF IST INITIATIVES FOR MOVs

Traditional	Improved Traditional	Risk Considered	Risk-Informed
Existing ASME Code	GL 89-10	BWROG - MOV Ranking	RG 1.174
- Prescriptive	GL 96-05	JOG - Periodic Reverification	RG 1.175
- Quarterly Tests Where Practical	EPRI MOV PPM	WOG - MOV Ranking	- PRA Application
- Deterministic Criteria	OMN-1	ASME OM Risk-Informed Code Cases	- Integrated Decisionmaking
- Little Component Differentiation			- Test Strategies
			- Performance Monitoring

ASME INSERVICE TESTING REQUIREMENTS FOR MOTOR-OPERATED VALVES

ASME CODE CURRENTLY REQUIRES QUARTERLY STROKE-TIME TESTING OF MOVs WHERE PRACTICAL.

AT SOME PLANTS, MANY MOVs ARE NOT TESTABLE DURING OPERATIONS AND ARE TESTED AT COLD SHUTDOWN CONDITIONS.

FOR EXAMPLE, APPROXIMATELY HALF OF MOVs IN COMANCHE PEAK IST PROGRAM ARE TESTED ON A COLD SHUTDOWN INTERVAL.

ASME CODE ALSO REQUIRES LEAKAGE TESTING FOR MOVs WITH SPECIFIC LEAKAGE LIMITATIONS.

GENERIC LETTER 89-10

IN JUNE 1989, NRC ISSUED GL 89-10, "SAFETY-RELATED MOTOR-OPERATED VALVE TESTING AND SURVEILLANCE," TO REQUEST THAT LICENSEES DEVELOP PROGRAMS TO VERIFY DESIGN-BASIS CAPABILITY OF SAFETY-RELATED MOVs.

GL 89-10 PROGRAMS INCLUDED

REVIEWING MOV DESIGN BASES,

VERIFYING SWITCH SETTINGS,

TESTING MOVs UNDER DESIGN-BASIS CONDITIONS WHERE PRACTICABLE,

IMPROVING EVALUATIONS OF MOV FAILURES, AND

TRENDING MOV PROBLEMS.

NRC ISSUED 7 GL 89-10 SUPPLEMENTS WITH ADDITIONAL GUIDANCE AND INFORMATION ON GL 89-10 PROGRAM SCOPE, DESIGN-BASIS REVIEWS, SWITCH SETTINGS, TESTING, PERIODIC VERIFICATION, TRENDING, AND SCHEDULE EXTENSIONS.

LICENSEES OF ALL ACTIVE REACTOR UNITS HAVE NOTIFIED NRC OF COMPLETION OF THEIR GL 89-10 PROGRAMS.

SINCE 1991, NRC STAFF HAS CONDUCTED INSPECTIONS AT EACH PLANT TO EVALUATE DEVELOPMENT, IMPLEMENTATION, AND COMPLETION OF GL 89-10 PROGRAMS.

NRC STAFF HAS COMPLETED ITS GL 89-10 REVIEW AT 88 REACTOR UNITS.

MOST REMAINING REVIEWS TO BE COMPLETED SOON.

NRC RESEARCH ACTIVITIES ON MOV PERFORMANCE

NRC OFFICE OF NUCLEAR REGULATORY RESEARCH HAS CONDUCTED SIGNIFICANT STUDIES AND TESTS TO ASSIST IN THE EVALUATION OF LICENSEE IMPLEMENTATION OF GL 89-10.

THESE STUDIES AND TESTS HAVE ADDRESSED

- THRUST AND TORQUE CALCULATIONS;
- VALVE AND STEM FRICTION COEFFICIENTS; AND
- PRESSURE LOCKING AND THERMAL BINDING.

MOST RECENTLY, NRC RESEARCH HAS BEEN STUDYING

- AGING EFFECTS ON VALVE THRUST REQUIREMENTS, AND
- MOTOR ACTUATOR PERFORMANCE UNDER DEGRADED VOLTAGE, TEMPERATURE, AND LOAD CONDITIONS.

GENERIC LETTER 96-05

IN SEPTEMBER 1996, NRC ISSUED GENERIC LETTER 96-05, "PERIODIC VERIFICATION OF DESIGN-BASIS CAPABILITY OF SAFETY-RELATED MOTOR-OPERATED VALVES," TO REQUEST THAT LICENSEES ESTABLISH PROGRAMS TO VERIFY ON A PERIODIC BASIS THAT SAFETY-RELATED MOVs CONTINUE TO BE CAPABLE OF PERFORMING THEIR SAFETY FUNCTIONS WITHIN CURRENT LICENSING BASIS OF THE FACILITY.

GL 96-05 LISTS EXAMPLE ATTRIBUTES OF AN EFFECTIVE PROGRAM FOR MOV PERIODIC VERIFICATION.

GL 96-05 REFERENCES INDUSTRY ACTIVITIES INCLUDING EPRI MOV PERFORMANCE PREDICTION PROGRAM, ASME CODE CASE OMN-1, AND BWR OWNERS GROUP MOV RISK RANKING METHODOLOGY.

GL 96-05 ALSO REFERENCES ONGOING NRC-SPONSORED RESEARCH ON VALVE AGING.

GL 96-05 NOTES THAT LICENSEES ARE BOUND BY CODE OF RECORD FOR STROKE-TIME TESTING REQUIREMENTS.

INDUSTRY DEVELOPED JOINT OWNERS GROUP (JOG) PROGRAM IN RESPONSE TO GL 96-05.

LICENSEES SUBMITTED A SUMMARY DESCRIPTION OF GL 96-05 PROGRAM OR AN ALTERNATIVE COURSE OF ACTION.

NRC STAFF WILL BE REVIEWING LICENSEE RESPONSES TO GL 96-05 AND PREPARING SAFETY EVALUATIONS FOR EACH RESPONSE.

NRC STAFF WILL CONDUCT SAMPLE INSPECTIONS TO REVIEW GL 96-05 PROGRAMS.

ATTRIBUTES OF AN EFFECTIVE PROGRAM FOR MOV PERIODIC VERIFICATION LISTED IN GL 96-05

RISK INSIGHTS MAY BE USED TO PRIORITIZE VALVE TEST ACTIVITIES.

VALVE TESTING SHOULD PROVIDE ADEQUATE CONFIDENCE THAT SAFETY-RELATED MOVs WILL REMAIN OPERABLE UNTIL NEXT SCHEDULED TEST.

IMPORTANCE OF VALVE SHOULD BE CONSIDERED IN DETERMINING APPROPRIATE MIX OF EXERCISING AND DIAGNOSTIC TESTING. LICENSEE SHOULD CONSIDER BENEFITS AND POTENTIAL ADVERSE EFFECTS WHEN DETERMINING APPROPRIATE TESTING FOR EACH MOV.

ALL SAFETY-RELATED MOVs COVERED BY GL 89-10 SHOULD BE CONSIDERED IN DEVELOPING PROGRAM. INCLUDE SAFETY-RELATED MOVs ASSUMED TO BE CAPABLE OF RETURNING TO SAFETY POSITION WHEN PLACED IN POSITION THAT PREVENTS TRAIN FROM PERFORMING ITS FUNCTION BUT NOT DECLARED INOPERABLE.

LICENSEES SHOULD EVALUATE AND MONITOR VALVE PERFORMANCE AND MAINTENANCE, AND PERIODICALLY ADJUST PERIODIC VERIFICATION PROGRAM, AS APPROPRIATE.

EPRI MOV PERFORMANCE PREDICTION PROGRAM

EPRI PROGRAM DEVELOPED METHODOLOGY THAT ALLOWS LICENSEES TO PREDICT THRUST/TORQUE REQUIRED TO OPERATE GATE, GLOBE AND BUTTERFLY VALVES.

IN NOVEMBER 1994, NEI SUBMITTED TOPICAL REPORT DESCRIBING EPRI MOV PERFORMANCE PREDICTION METHODOLOGY. NUMEROUS SUPPORTING REPORTS ALSO SUBMITTED.

ON SEPTEMBER 27, 1995, NEI PROVIDED LIST OF SIGNIFICANT EPRI FINDINGS BUT STATED THAT PART 21 NOTIFICATION NOT REQUIRED BECAUSE NRC AND INDUSTRY AWARE OF FINDINGS.

RES AND INEEL PROVIDED EXTENSIVE SUPPORT TO NRR IN THE REVIEW OF THE EPRI METHODOLOGY.

NRC ISSUED SAFETY EVALUATION ON MARCH 15, 1996, THAT ENDORSES EPRI METHODOLOGY WITH CERTAIN LIMITATIONS AND CONDITIONS.

SE SUPPLEMENT ISSUED ON FEBRUARY 20, 1997, TO DISCUSS GENERAL ISSUES AND HAND-CALCULATION MODELS FOR ALOYCO AND WKM GATE VALVES.

NRC ISSUED INFORMATION NOTICE 96-48 TO ALERT LICENSEES TO LESSONS LEARNED FROM EPRI MOV PROGRAM.

ASME CODE CASE OMN-1 ALTERNATIVE RULES FOR PRESERVICE AND INSERVICE TESTING OF CERTAIN ELECTRIC MOV ASSEMBLIES IN LWR POWER PLANTS

OMN-1 CODE CASE ALLOWS ASME CODE QUARTERLY STROKE-TIME PROVISIONS TO BE REPLACED BY THE FOLLOWING:

(1) EXERCISING ONCE PER OPERATING CYCLE, UNLESS CONDITIONS OR SAFETY SIGNIFICANCE SUGGEST MORE FREQUENT EXERCISING; AND

(2) DIAGNOSTIC TESTING ON A FREQUENCY TO BE DETERMINED BY THE OUTPUT MARGIN AND DEGRADATION RATE, WHERE DIAGNOSTIC TESTING FREQUENCY CANNOT EXCEED 10 YEARS.

IN GL 96-05, NRC STAFF STATED THAT METHOD DESCRIBED IN OMN-1 MEETS INTENT OF GL 96-05 WITH CERTAIN LIMITATIONS:

(1) PRECAUTION ON BENEFITS AND POTENTIAL ADVERSE EFFECTS WHEN DETERMINING APPROPRIATE TESTING.

(2) WHERE APPLYING OMN-1 MAXIMUM TEST INTERVAL OF 10 YEARS, LICENSEE SHOULD EVALUATE INFORMATION DURING FIRST 5-YEAR (OR 3 RFO) INTERVAL TO VALIDATE ASSUMPTIONS.

(3) LICENSEES INVOLVED WITH IST PROGRAMS EMPLOYING RISK INSIGHTS NEED TO ADDRESS RELATIONSHIP BETWEEN PILOT PROGRAM AND OMN-1.

NRC STAFF HAS PROPOSED ENDORSEMENT OF OMN-1 WITH SIMILAR CONDITIONS IN THE PROPOSED RULEMAKING THAT HAS BEEN ISSUED FOR PUBLIC COMMENT.

BWR OWNERS' GROUP METHODOLOGY FOR RANKING MOVs BY APPLYING PROBABILISTIC RISK ASSESSMENT

BWROG DEVELOPED METHODOLOGY FOR RISK-BASED PRIORITIZATION OF MOVs WITHIN SCOPE OF GL 89-10.

BWROG SUBMITTED TOPICAL REPORT FOR STAFF REVIEW IN JANUARY 1994 WITH REVISION 1 ON SEPTEMBER 10, 1994, AND REVISION 2 ON SEPTEMBER 8, 1995.

METHODOLOGY PLACES EACH MOV INTO CATEGORY OF HIGH, MEDIUM, OR LOW SAFETY SIGNIFICANCE.

RANKING BASED ON RISK-IMPORTANCE METHODOLOGY AND EXPERT PANEL CONSIDERATIONS, AND REPRESENTS DISCRETE CONTRIBUTIONS TO OVERALL PLANT RISK.

NRC ISSUED SAFETY EVALUATION ON FEBRUARY 27, 1996, THAT PROVIDED NRC ENDORSEMENT OF BWROG METHODOLOGY WITH CERTAIN LIMITATIONS AND CONDITIONS.

NRC SAFETY EVALUATION ON BWROG MOV RANKING METHODOLOGY

WITHIN CERTAIN CONDITIONS AND LIMITATIONS, STAFF BELIEVES THAT BWROG METHODOLOGY CAN EFFECTIVELY RANK SAFETY-RELATED MOVs BY THEIR RELATIVE SAFETY SIGNIFICANCE.

CONDITION:

APPROACH ONLY APPLIES TO SPECIFIC APPLICATION DESCRIBED IN BWROG MOV RANKING TOPICAL REPORT.

LIMITATIONS:

1. AS BWROG EMPHASIZED IN REVISION 2 TO TOPICAL REPORT, EXPERT PANEL NEEDED TO SUPPLEMENT RISK-RANKING METHODOLOGY.

2. BWROG METHODOLOGY HELPFUL FOR PRIORITIZING MOVs FOR INITIAL TESTING, BUT SUPPLEMENT 6 TO GL 89-10 PROVIDES GUIDANCE ON EXTENSIONS OF INITIAL TEST SCHEDULES.

3. AS BWROG SPECIFIES IN REVISION 2, VERIFICATION FREQUENCY MUST BE BASED ON BOTH RISK AND DETERMINISTIC (MARGIN) CONSIDERATIONS SUCH THAT MOV IS CAPABLE OVER ENTIRE TEST INTERVAL.

4. IF LICENSEE USES MAXIMUM 10-YEAR TEST INTERVAL, INFORMATION OBTAINED FROM VALVE TESTING IN FIRST 5-YEAR TIME PERIOD NEEDS TO BE USED TO VALIDATE ASSUMPTIONS MADE IN JUSTIFYING LONGER INTERVALS.

5. LICENSEES REMAIN BOUND BY THEIR "CODE OF RECORD" REQUIREMENTS FOR INSERVICE TESTING AS SUPPLEMENTED BY COMMITMENTS IN RESPONSE TO GL 89-10.

JOINT OWNERS GROUP PROGRAM ON MOV PERIODIC VERIFICATION

IN RESPONSE TO GL 96-05, WESTINGHOUSE AND BWR OWNERS GROUPS SUBMITTED TOPICAL REPORTS ON JOG MOV PERIODIC VERIFICATION PROGRAM IN MARCH 1997.

COMBUSTION ENGINEERING OWNERS GROUP ALSO JOINED THE JOG PROGRAM.

JOG MOV PERIODIC VERIFICATION PROGRAM INCLUDES

1. INTERIM MOV PERIODIC VERIFICATION PROGRAM WITH SPECIFIC AGE-RELATED DEGRADATION MARGIN AND STATIC DIAGNOSTIC TEST FREQUENCIES.

2. DYNAMIC TESTING PROGRAM OVER A FIVE-YEAR PERIOD TO IDENTIFY POSSIBLE AGE-RELATED DEGRADATION.

3. EVALUATION OF INFORMATION FROM DYNAMIC TESTING PROGRAM TO ESTABLISH FINAL MOV PERIODIC VERIFICATION TEST CRITERIA.

93 REACTOR UNITS PARTICIPATING IN THE JOG PROGRAM.

JOG SUBMITTED RESPONSES TO NRC COMMENTS AND REVISED TOPICAL REPORT IN EARLY AUGUST 1997.

NRC ISSUED SAFETY EVALUATION ON REVISION 2 TO THE JOG TOPICAL REPORT ON OCTOBER 30, 1997.

JOG INTERIM PERIODIC TEST PROGRAM

LICENSEE WILL TEST EACH MOV IN ITS GL 96-05 PROGRAM UNDER STATIC CONDITIONS USING DIAGNOSTIC EQUIPMENT.

FREQUENCY OF STATIC DIAGNOSTIC TESTING DETERMINED BY MARGIN AND RISK SIGNIFICANCE OF SPECIFIC MOV.

MOV STATIC TEST FREQUENCY MAY NOT EXCEED 10 YEARS.

BWR LICENSEES MAY USE BWR OWNERS GROUP METHOD OF MOV RISK RANKING APPROVED IN SE DATED FEBRUARY 27, 1996.

OTHER LICENSEES WILL NEED TO JUSTIFY THEIR MOV RISK RANKING APPROACH. WESTINGHOUSE OWNERS GROUP ENGINEERING REPORT ON MOV RISK RANKING IS UNDERGOING STAFF REVIEW.

LICENSEES WILL CONTINUE TO MEET ASME CODE TESTING REQUIREMENTS AND SCHEDULE.

JOG INTERIM MATRIX FOR STATIC DIAGNOSTIC TESTING

RISK AND MARGIN CATEGORIES	LOW MARGIN MOVs	MEDIUM MARGIN MOVs	HIGH MARGIN MOVs
HIGH RISK	1 CYCLE	2 CYCLES	3 CYCLES
MEDIUM RISK	2 CYCLE	4 CYCLES	6 CYCLES*
LOW RISK	3 CYCLES	6 CYCLES*	6 CYCLES*

* NOT TO EXCEED 10 YEARS

AS DEFINED BY JOG:

LOW MARGIN IS LESS THAN 5 PERCENT.

MEDIUM MARGIN IS EQUAL TO OR GREATER THAN 5 PERCENT BUT LESS THAN 10 PERCENT.

HIGH MARGIN IS EQUAL TO OR GREATER THAN 10 PERCENT.

JOG DYNAMIC TEST PROGRAM

JOG DYNAMIC TEST PROGRAM CONSISTS OF A SERIES OF IN-PLANT MOV TESTS PERFORMED UNDER DYNAMIC CONDITIONS WITH DIAGNOSTIC EQUIPMENT OVER A 5-YEAR PERIOD.

JOG DEVELOPED A TEST MATRIX ON THE BASIS OF VALVE TYPES AND SERVICE CONDITIONS IN NUCLEAR PLANTS, AND TEST AVAILABILITY.

100 GATE VALVES, 30 BUTTERFLY VALVES, 10 UNBALANCED DISK GLOBE VALVES, AND 10 BALANCED DISK GLOBE VALVES INCLUDED IN JOG DYNAMIC TEST PROGRAM.

EACH VALVE TO BE TESTED A MINIMUM OF 3 TIMES UNDER NOMINALLY IDENTICAL DYNAMIC CONDITIONS WITH AT LEAST A 1-YEAR INTERVAL BETWEEN TESTS.

ANALYSIS AND EVALUATION OF DYNAMIC TEST DATA CONSIST OF: (1) PLANT EVALUATION, (2) JOG RECEIPT EVALUATION, AND (3) JOG FORMAL PERIODIC EVALUATION.

JOG WILL ADDRESS ANY ADVERSE TEST RESULTS AND COMMUNICATE THESE RESULTS TO THE INDUSTRY.

JOG AND NRC STAFF WILL MEET PERIODICALLY TO DISCUSS PROGRESS AND FINDINGS OF DYNAMIC TEST PROGRAM.

JOG LONG-TERM PERIODIC TEST PROGRAM

ON BASIS OF DYNAMIC TEST RESULTS, JOG WILL ESTABLISH THE FINAL TEST CRITERIA FOR MOV PERIODIC VERIFICATION.

JOG WILL PREPARE REVISION TO (OR A REPLACEMENT REPORT FOR) THE JOG TOPICAL REPORT.

NRC STAFF WILL REVIEW FINAL TEST CRITERIA FOR LONG-TERM MOV PERIODIC VERIFICATION PROGRAM AND THEIR JUSTIFICATION WHEN INCORPORATED INTO THE TOPICAL REPORT.

NRC SAFETY EVALUATION ON JOG MOV PERIODIC VERIFICATION PROGRAM

WITH THE CONDITIONS AND LIMITATIONS IN THE SE, NRC STAFF CONCLUDES THAT THE JOG PROGRAM PROVIDES AN ACCEPTABLE INDUSTRY-WIDE RESPONSE TO GL 96-05 FOR VALVE AGE-RELATED DEGRADATION.

MOST SIGNIFICANT CONDITIONS AND LIMITATIONS INCLUDE THE FOLLOWING:

A. JOG MUST SUBMIT FOR NRC REVIEW AND APPROVAL A REVISION TO THE REPORT FOLLOWING JOG DYNAMIC TEST PROGRAM.

B. LICENSEES THAT DID NOT PARTICIPATE IN BWROG MOV RISK RANKING MUST JUSTIFY THEIR METHODOLOGY. STAFF NOTES ONGOING REVIEW OF WOG METHODOLOGY.

C. LICENSEES IMPLEMENTING JOG PROGRAM MUST ADDRESS SE.

D. LICENSEES MUST DETERMINE VALVES OUTSIDE OF JOG PROGRAM AND JUSTIFY A PROGRAM FOR THOSE VALVES.

E. LICENSEES MUST ADDRESS INFORMATION OBTAINED DURING JOG DYNAMIC TEST PROGRAM.

F. LICENSEES MUST ENSURE THAT MOVs HAVE ADEQUATE MARGIN TO REMAIN OPERABLE UNTIL THE NEXT SCHEDULED TEST.

G. LICENSEES MUST APPLY UNCERTAINTIES AS APPROPRIATE IN CALCULATING ACTUATOR OUTPUT OR VALVE REQUIRED THRUST/TORQUE WHEN ESTABLISHING JOG TEST FREQUENCIES.

NRC SAFETY EVALUATION ON JOG MOV PERIODIC VERIFICATION PROGRAM

(CONTINUED)

H. LICENSEES MUST ADDRESS ACTUATOR OUTPUT APART FROM THE JOG PROGRAM WHICH FOCUSES ON THRUST REQUIREMENTS.

I. JOG WILL EVALUATE TEST SEQUENCE FOR EFFECTS ON AGING INFORMATION.

J. MOVs WITH SCHEDULED TEST FREQUENCIES BEYOND 5 YEARS NEED TO BE GROUPED WITH OTHER MOVs THAT WILL BE TESTED ON FREQUENCIES LESS THAN 5 YEARS IN ORDER TO VALIDATE ASSUMPTIONS.

WESTINGHOUSE OWNERS GROUP MOV RISK RANKING METHODOLOGY

ON JUNE 2, 1997, WESTINGHOUSE OWNERS GROUP SUBMITTED AN ENGINEERING REPORT FOR NRC REVIEW DESCRIBING AN MOV RISK-RANKING APPROACH IN RESPONSE TO GL 96-05.

ON OCTOBER 30, 1997, NRC STAFF HELD A PUBLIC MEETING WITH WOG REPRESENTATIVES TO DISCUSS THE ENGINEERING REPORT.

ON DECEMBER 19, 1997, WOG SUBMITTED REVISION 1 TO THE REPORT TO REFLECT NRC STAFF COMMENTS.

WOG REPORT DESCRIBES A 6-STEP PROCESS TO RANK MOVs ACCORDING TO THEIR SAFETY SIGNIFICANCE:

STEP 1 REFERS USERS TO THE JOG REPORT ON MOV PERIODIC VERIFICATION TO IDENTIFY MOVs TO BE INCLUDED IN THE PROGRAM.

STEP 2 DETERMINES THE AT-POWER RISK IMPORTANCE OF EACH MOV BY USING THE PLANT PSA MODEL TO CALCULATE MOV RELATIVE IMPORTANCE TO A PRE-DEFINED CONSEQUENCE MEASURE.

STEP 3 ASSESSES THE COMPLETENESS OF THE PSA BY ADDRESSING THE LIMITATIONS OF THE PSA MODEL THAT COULD AFFECT THE IMPORTANCE MEASURE CALCULATIONS.

STEP 4 EVALUATES CONSIDERATIONS OTHER THAN THE OCCURRENCE OF INTERNAL EVENTS DURING OPERATION IN THE AT-POWER MODE.

WESTINGHOUSE OWNERS GROUP
MOV RISK RANKING METHODOLOGY
(CONTINUED)

STEP 5 PREPARES MOV INFORMATION WORKSHEETS FOR THE EXPERT PANEL MEETING TO FACILITATE THE RISK CATEGORIZATION PROCESS.

STEP 6 CONDUCTS THE EXPERT PANEL SESSION TO DETERMINE MOV RISK IMPORTANCE BY EXPERT ENGINEERING JUDGMENT.

IN ADDITION, WOG PROVIDES A GENERAL LIST OF MOVs THAT SHOULD BE COMPARED AGAINST MOVs RANKED AS EITHER MEDIUM OR HIGH SAFETY SIGNIFICANCE FOR EACH PLANT.

FINAL RESULTS OF WOG MOV RISK-RANKING APPROACH ARE THE SAFETY-SIGNIFICANCE RANKINGS OF MOVs BASED ON

(1) EXPERT PANEL PROCESS INCLUDING PANEL'S EXPERIENCE AND JUDGMENT;

(2) COMPONENT RISK IMPORTANCE RANKINGS FROM THE PSA; AND

(3) INDUSTRY-ESTABLISHED THRESHOLD VALUES FOR RISK IMPORTANCE.

NRC STAFF PREPARING SAFETY EVALUATION ON WOG REPORT.

MOV RISK-INFORMED IST

REGULATORY GUIDE 1.175

FOUR-ELEMENT APPROACH TO RISK-INFORMED DECISION MAKING FOR IST PROGRAMS:

ELEMENT 1 DEFINES PROPOSED CHANGES TO THE IST PROGRAM.

ELEMENT 2 USES TRADITIONAL ENGINEERING AND PRA METHODS TO CATEGORIZE COMPONENTS AS LOW SAFETY SIGNIFICANT OR HIGH SAFETY SIGNIFICANT.

ELEMENT 3 DETERMINES TEST METHODS TO BE USED AND FREQUENCY OF TESTING.

ELEMENT 4 PREPARES DOCUMENTATION TO BE SUBMITTED AND MAINTAINED.

PROPOSED TEST INTERVAL SHOULD BE LESS THAN EXPECTED TIME TO FAILURE.

LICENSEE SHOULD DEMONSTRATE THAT ADEQUATE COMPONENT CAPABILITY (MARGIN) EXISTS TO ACCOMMODATE DEGRADATION UNTIL THE NEXT TEST.

MOV RISK-INFORMED IST
(CONTINUED)

COMANCHE PEAK PILOT APPLICATION

LICENSEE WILL CATEGORIZE MOVs AS HIGH SAFETY SIGNIFICANT COMPONENTS (HSSCs) OR LOW SAFETY SIGNIFICANT COMPONENTS (LSSCs) USING PRA TECHNIQUES AND ENGINEERING JUDGMENT.

LICENSEE WILL USE PRA INSIGHTS TO IDENTIFY ANY HSSC MOVs NOT INCLUDED IN THE EXISTING IST PROGRAM.

FOR LSSC AND HSSC MOVs, TESTING WILL BE PERFORMED IN ACCORDANCE WITH OMN-1 (EXCEPT MAXIMUM TEST INTERVAL WILL BE 6 YEARS), AND GL 89-10 AND 96-05 COMMITMENTS.

LSSC MOVs WILL BE GROUPED AND TESTED ON A STAGGERED BASIS TO ENSURE COMPONENT CAPABILITY OVER THE 6-YEAR TEST INTERVAL.

LICENSEE WILL PERIODICALLY REASSESS THE PROGRAM.

CONCLUSIONS

SIGNIFICANT WEAKNESSES IN MOV DESIGN, QUALIFICATION AND MAINTENANCE IDENTIFIED AND RESOLVED BY THE IMPLEMENTATION OF RESOURCE-INTENSIVE GL 89-10 PROGRAMS.

STUDIES AND TESTS SPONSORED BY THE NRC OFFICE OF RESEARCH HAVE PROVIDED IMPORTANT INFORMATION TO ENSURE THE PROPER CONSIDERATION OF MOV PERFORMANCE ISSUES.

LICENSEES OF ALL ACTIVE PLANTS HAVE NOTIFIED NRC OF COMPLETION OF THEIR GL 89-10 PROGRAMS.

NRC STAFF HAS CLOSED GL 89-10 REVIEW FOR 88 REACTOR UNITS.

NRC ISSUED GL 96-05 TO REQUEST THAT LICENSEES ESTABLISH LONG-TERM PROGRAMS FOR MOV PERIODIC VERIFICATION.

BWR, CE AND WESTINGHOUSE OWNERS GROUPS ARE SPONSORING JOG MOV PERIODIC VERIFICATION PROGRAM FOR GL 96-05.

NRC STAFF ISSUED SAFETY EVALUATION ON JOG PROGRAM ON OCTOBER 30, 1997.

NRC STAFF PREPARED SE ON BWROG MOV RISK RANKING METHODOLOGY IN 1996. NRC STAFF IS REVIEWING WOG ENGINEERING REPORT ON MOV RISK RANKING.

LICENSEES RESOLVING PRESSURE LOCKING AND THERMAL BINDING IN RESPONSE TO GL 95-07. NRC REVIEW ONGOING.

NRC STAFF WILL PREPARE SAFETY EVALUATIONS ON LICENSEE RESPONSES TO GL 96-05 AND CONDUCT SAMPLE INSPECTIONS OF GL 96-05 PROGRAMS.

NRC STAFF WILL CONTINUE COOPERATION WITH JOG AND ASME.

Presentation by the National Fire Protection Association to the Nuclear Regulatory Commission

March 2, 1998

Rockville, MD

Anthony R. O'Neill

Richard P. Bielen

NFPA

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Introduction

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ACRS Concerns for NFPA 805

- Performance-based only. Will not address a risk-informed approach
- Inspectability and Enforceability
- Performance Indicators

NFPA response is as follows:

Performance-Based Only?

- Last draft was a performance-based standard
- Very early stages of development
- Will address risk-informed approach at our April 30-May 1, 1998 meeting

Expert Elicitation

- NFPA Staff expertise-John Hall, Ph.D.
  - B.A. Mathematics
  - Ph.D. Operations Research
- NFPA process allows recruiting of experts as needed.
- Technical Committee (T/C) on Nuclear Facilities will recruit experts as needed.

Inspectability/Enforceability in Performance-Based Standards

- Performance-based (P-B) standards allows for a close working relationship between the NRC and the users.
- NRC would be involved throughout the fire protection design process,validation process and final approval.
- NRC can inspect the components of the approved fire protection design (sprinklers, detection, fire walls, penetration seals, etc.)
- Inspectability leads to enforceability

Performance Indicators

- Very early stages of development
- T/C can address performance indicators.
- Expect the NRC staff on NFPA T/C will assist with identifying acceptable performance indicators.

Conclusions

- NFPA 805 is still in drafting stage.
- The T/C can still make modifications and additions (i.e. risk informed)
- Desire to have NFPA 805 suit the NRC needs.
- Welcome and expect input from the NRC in the development of NFPA 805.

RISK RANKING APPROACH FOR MOTOR OPERATED VALVES

NRC GENERIC LETTER 96-05.
PERIODIC VERIFICATION OF DESIGN-BASIS CAPABILITY OF SAFETY-RELATED MOTOR-OPERATED VALVES

ISSUED SEPTEMBER 18, 1996

REQUESTED LICENSEES TO ESTABLISH A PROGRAM, OR ENSURE THE EFFECTIVENESS OF THE CURRENT PROGRAM

TO VERIFY ON A PERIODIC BASIS THAT SAFETY-RELATED MOTOR-OPERATED VALVES (MOVs) CONTINUE TO BE CAPABLE OF PERFORMING THEIR SAFETY FUNCTIONS WITHIN THE CURRENT LICENSING BASES OF THE FACILITY

REQUIRED THAT LICENSEES PROVIDE A WRITTEN RESPONSE RELATING TO IMPLEMENTATION OF THE REQUESTED PROGRAM

NRC REGULATIONS REQUIRE THAT COMPONENTS THAT ARE IMPORTANT TO THE SAFE OPERATION OF NUCLEAR POWER PLANT (NPPs), INCLUDING MOVs, BE TREATED IN A MANNER THAT PROVIDES ASSURANCE OF THEIR PERFORMANCE

APPENDIX A, "GENERAL DESIGN CRITERIA FOR NPPs"
AND
APPENDIX B, "QUALITY ASSURANCE CRITERIA FOR NPPs"
TO
PART 50 OF TITLE 10 OF THE CODE OF FEDERAL REGULATIONS (10 CFR 50) INCLUDE SUCH BROAD BASED REQUIREMENT

IN 10 CFR 50.55a(f) REQUIRES LICENSEES TO COMPLY WITH SECTION XI OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE (ASME CODE)

OPERATING EXPERIENCE, PERFORMANCE PROBLEMS AND RESEARCH SHOW THAT THE FOCUS OF THE ASME CODE ON STROKE TIME AND LEAK-RATE TESTING FOR MOVs WAS NOT SUFFICIENT IN LIGHT OF THE DESIGN OF THE VALVES AND CONDITIONS UNDER WHICH THEY MUST FUNCTION

HENCE NRC ISSUED GENERIC LETTER 89-10

"SAFETY-RELATED MOTOR-OPERATED VALVE TESTING AND SURVEILLANCE" ON JUNE 28, 1989

REQUESTED THAT LICENSEES

1) ENSURE THE CAPABILITY OF MOVs IN SAFETY-RELATED SYSTEMS TO PERFORM THEIR INTENDED FUNCTIONS BY REVIEWING MOV DESIGN BASES

2) VERIFY MOV SWITCH SETTINGS INITIALLY AND PERIODICALLY

3) IMPROVE EVALUATIONS OF MOV FAILURES AND NECESSARY CORRECTIVE ACTIONS

4) TREND MOV PROBLEMS

NRC REQUESTED THAT LICENSEES COMPLETE THE GL 89-10 PROGRAM WITHIN THREE REFUELING OUTAGES OR 5 YEARS

SPECIFIC REQUIREMENTS INCLUDED

1) LICENSEES PREPARE PROCEDURES TO ENSURE THAT CORRECT MOV SWITCH SETTINGS ARE MAINTAINED DURING LIFE OF PLANT

2) LICENSEES SHOULD PERIODICALLY VERIFY MOV CAPABILITY EVERY 5 YEARS OR EVERY 3 REFUELING OUTAGES

3) LICENSEES EVALUATE TRENDS IN MOV PERFORMANCE EVERY 2 YEARS OR AT EACH REFUELING OUTAGE

SEVEN SUPPLEMENTS WERE ISSUED TO GL 89-10 PROVIDING ADDITIONAL GUIDANCE AND INFORMATION ON

1) PROGRAM SCOPE
2) SWITCH SETTINGS
3) TESTING
4) PERIODIC VERIFICATION
5) TRENDING
6) SCHEDULE EXTENSIONS

96-05

IN RESPONSE TO GL 96-10, THE WESTINGHOUSE OWNERS GROUP (WOG) ISSUED ENGINEERING REPORT V-EC-1658, "RISK RANKING APPROACH TO MOTOR=OPERATED VALVES

TO PROVIDE ASSISTANCE TO INDIVIDUAL LICENSEES IN RANKING MOVs ACCORDING TO THEIR RISK SIGNIFICANCE AND SUBMITTED IT TO THE NRC STAFF FOR REVIEW

IN THIS REPORT, THE TEST INTERVALS FOR MOVs WERE TO BE ESTABLISHED BASED ON THE MOVs RISK SIGNIFICANCE AND FUNCTIONAL MARGIN

THE NRC STAFF ISSUED A SAFETY EVALUATION REPORT (SER) ON THE JOINT OWNERS GROUP (JOG) PROGRAM ACCEPTING THE CONCEPT BUT REQUIRING CHANGES IN THE METHODOLOGY

NRC HELD A PUBLIC MEETING WITH THE WOG TO DISCUSSED THE PROPOSED CHANGES TO THE V-EC-1658 REPORT

NRC ALSO ACCEPTED, WITH CERTAIN CONDITIONS AND LIMITATIONS, A METHOD DEVELOPED BY THE BOILING WATER REACTOR OWNERS GROUP (BWROG) TO RISK RANK MOVS IN BWR PLANTS AND ISSUED A SER

Further Industry Perspectives on Fire Protection Rulemaking

Fred Emerson
Nuclear Energy Institute

Advisory Committee on Reactor Safeguards
March 2, 1998



Purpose of Presentation

- Provide supplemental industry views on rulemaking
  - Comment on rulemaking options being considered by NRC staff
  - Clarify certain industry positions further



Industry Activities

- Industry survey and position development
- Briefed NRC staff on November 5, 1997
- Briefed ACRS on November 7, 1997 and January 22, 1998
- Letter to EDO December 11, 1997

NRC Staff Options for Rulemaking

- Develop PB/RI rule on an expedited schedule IAW 9/11/97 SRM direction
- Defer PB/RI rulemaking
  - Develop comprehensive Reg Guide
  - Continue participation in NFPA standard development
  - Maintain exemptions
  - Consider valid PB/RI methods through exemptions
- Maintain status quo

Industry View of NRC Options

- Option 2 appears to be the most productive path
  - Support cancellation of rulemaking, not just deferral for 18 months
    - Industry maturity and experience with Appendix R will be greater
    - Exemption process will be even more useful (and difficult to eliminate) once allowance for RI/PB methods included
    - Objection to costly rebaselining of plant programs against new rule provisions remains unchanged

NEI

Industry View of NRC Options

- Elements of Option 2 should be pursued with industry input
  - Support comprehensive Reg Guide to clarify compliance methods and provide for resolution of new generic issues
    - Address IPEEE, FPFI safety issues
  - Support NFPA Standard 805 development
  - Maintain existing exemptions and process for approval, but expand process to include clear criteria for application of RI/PB methods

NEI

Clarification of Industry Positions

- Comfort with current rule
  - Industry not comfortable with current rule, but is accustomed to working with it
  - Exemption process, especially with allowance for use of RI/PB methods, allows sufficient flexibility
  - Cost of complying with a new rule is a concern, especially if a safety benefit is not clear

NEI

Clarification of Industry Positions

- Maturity of RI/PB methods
  - Some existing methods can be useful now for more efficient compliance or safety improvements
  - Need framework which allows for development and increased use of methods
  - Concern with uncertainty of regulatory acceptance (no clear criteria)
  - Need to address issue of maintaining fire PSAs

Industry Direction

- Support NRC staff's Option 2 with provision for:
  - Cancellation of rulemaking
  - Clarification of compliance methods and provision for generic issue resolution
  - Development of clear criteria for use of PB/RI methods
- Provide extensive industry input to Reg Guide and PB/RI tool development
- Support NFPA Standard 805 process