UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Title: BRIEFING ON PEER REVIEW AND INTERIM USE OF NUREG-1150

Location: ONE WHITE FLINT NORTH, ROCKVILLE, MARYLAND

Date: MONDAY, DECEMBER 19, 1988

Pages: 1-42

Ann Riley & Associates
Court Reporters
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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BRIEFING ON PEER REVIEW AND INTERIM USE OF NUREG-1150

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PUBLIC MEETING

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Nuclear Regulatory Commission

One White Flint North

Rockville, Maryland

MONDAY, DECEMBER 19, 1988

The Commission met in open session, pursuant to notice, at 10:00 a.m., the Honorable LANDO W. ZECH, Chairman of the Commission, presiding.

COMMISSIONERS PRESENT:

LANDO W. ZECH, Chairman of the Commission

THOMAS M. ROBERTS, Member of the Commission

KENNETH M. CARR, Member of the Commission

KENNETH M. ROGERS, Member of the Commission

JAMES R. CURTISS, Member of the Commission

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

S. CHILK

W. PARLER

V. STELLO, JR.

D. ROSS

J. MURPHY

E. BECKJORD

T. MURLEY

P R O C E E D I N G S

[10:00 a.m.]

CHAIRMAN ZECH: Good morning, ladies and gentlemen.

This is an information briefing this morning in which the staff will discuss a paper before the Commission. SECY 88-337, which provides options for peer review of NUREG-1150 entitled "Reactor Risk Reference Document."

The timing of the report will also be discussed and the interim use by the staff of the report.

NUREG-1150 was published as a draft for comment in February 1987. Extensive public comments were received. In addition, the draft document was subjected to three independent peer reviews. The NRC staff has been in the process of improving the report to address the comments that were received. These improvements will be discussed with the Commission in a subsequent meeting prior to publishing the report. That meeting is now tentatively scheduled for January.

With these improvements, NUREG-1150 is expected to be a major advance in the methodology for examining the risks associated with five specific nuclear power plants as well as the uncertainties associated with those risks.

Copies of the slide presentation should be available at the entrance of the meeting room.

Do any of my fellow Commissioners have any comments to make before we begin?

[No response.]

CHAIRMAN ZECH: If not, Mr. Stello, you may proceed.

MR. STELLO: Thank you, Mr. Chairman.

As you are aware, the first draft of NUREG-1150 was issued for comment in February of last year and as you already pointed out, has had substantial review, both in terms of public comment, the American Nuclear Society, a Kouts Panel and a Kastenberg Panel. Those comments were provided to the Commission and indicated that substantial additional work was required to accommodate these comments. That work has in fact been underway now for nearly a year. We expect to have another version of the report ready to publish early next year, probably February of 1989.

We intend, as you already noted, to come to the Commission and present that report when it is ready. What we need to discuss with the Commission today is the plan that we propose to use, the procedural process, dealing with that report when it is ready in February.

One of the areas for which there has been substantial criticism is the need, and the ACRS made a very significant point of this which we will talk about in the briefing, a need for peer review. We will be talking about how to accomplish peer review.

In the meantime, since the 1150 document represents essentially the state-of-the-art for PRA technology as well as

understanding a severe accident phenomenon, it is necessary for us to establish a basis in the way in which to use that information and that knowledge to assure that we can make the most informed decisions on safety, so we don't bring that part of the process to a halt while we continue with the peer review process, so we will be talking about the interim use pending a peer review.

That is also a very important part of the process but not one for which we are today going to ask the Commission to finalize any of its views on that matter since it will have the benefit of seeing how well we have handled all of the comments that have been made during the past year before it renders a final judgment and a decision on that part of the process.

With that brief introduction, I'll ask Eric Beckjord to give you some additional insights in the report and then get into the briefing itself. We would like if we could have the Commission agree at this particular junction, a process to go forward with the peer review since that will take us at least several months to set up, and we would like to at least start the process of setting up a mechanism for the peer review in advance of having a report come out, so there will be in place a process ready to begin when the report is published.

CHAIRMAN ZECH: All right. Eric, you may begin.

MR. BECKJORD: Thank you, Mr. Chairman.

Could I have the first vu-graph, please?

[Slide.]

MR. BECKJORD: The purpose of the Commission meeting today, as Mr. Stello has outlined, is to describe the process for revision of the NUREG-1150 draft, to state the staff's intention for publication of the revision, to give the reasons for obtaining a peer review of the revision and finally, to describe the principal options for peer review and to give you our recommendation for the preferred option.

[Slide.]

MR. BECKJORD: As background for the discussion, the 1150 revision is nearing completion. The anticipated schedule is as follows; a working draft will be given to Dr. Ross on my left for the review of his committee and Dr. Ross has been principally responsible for the oversight of this work and the document. That will be given to him by the Project Manager, Mr. Joseph Murphy, on the 23rd of December. Dr. Ross' response will come on about the 9th of January.

Then there will be a second working draft for internal review in the Office of Research to be completed on or about the 19th of January. Then whatever corrections come from that will be completed by the 31st of January. There will be a final copy ready the middle of February and ready for presentation to the Commission on or about the 27th of February.

There are extensive modifications coming in the

revision to 1150. They were made to the draft as a result of the three peer reviews already mentioned, Kouts' peer review on the uncertainty methodology; secondly, the review of the panel under the chairmanship of Professor William Kastenberg, and then finally, there was a review committee under Dr. Leo Le Sage in the American Nuclear Society. In addition to those rather formal reviews, there was extensive public comment. There were bilateral meetings with PRA experts in the U.K. and in the Federal Republic of Germany.

There was a two day review under the IAEA at a meeting in Rome in March of 1988, and then there has been full discussion with the ACRS on the report.

Major modifications --

COMMISSIONER ROGERS: Excuse me. Could I just ask a question?

MR. BECKJORD: Yes.

COMMISSIONER ROGERS: When those discussions took place, presumably this all extended over some period of time. Were they based on what the original draft report said or did they take into account anything that had come in from any of the review committees up to that point? In other words, was this a kind of rolling process or did each of these exchanges simply look at the original draft report as it stood or did they take into account ideas and suggestions that had come along?

MR. BECKJORD: The reviews were all done on the original draft 1150.

COMMISSIONER ROGERS: Everyone started from the same basis?

MR. BECKJORD: Yes. That includes those three reviews. In addition to that, the American Nuclear Society Review Committee has also looked at the revisions that have been underway as of about the end of September.

COMMISSIONER ROGERS: I was thinking, for example, of the IAEA workshop in Rome which was quite recent, I believe.

MR. BECKJORD: That was based on the original draft but they also had available to them comments of the Kastenberg Committee. They were aware. There was discussion of the changes.

MR. MURPHY: Yes. Dr. Kastenberg, in fact, attended the meeting in Rome and presented the results of his committee's review. We had fairly extensive discussion of the changes that we were making in the report as of that date.

COMMISSIONER ROGERS: That's what I was trying to get at, that there was some feedback from the results of the other reviews already in that IAEA workshop.

MR. MURPHY: Yes.

CHAIRMAN ZECH: You may proceed.

[Slide.]

MR. BECKJORD: There are major modifications in the

revision which is coming forth, and these include the following and there are some others.

First of all, the analytical results of the study will present the conclusions, the risks in terms of mean, median and the uncertainty range. This was a shortcoming of the draft 1150. Secondly, there is a complete overhaul which has been undertaken for the process of expert opinion elicitation in order to document and make traceable the reasons for the opinion, and to represent accurately the range, the entire range of opinion from the experts.

Then the front end has been re-worked entirely, the core damage frequency calculations, to incorporate actual plant modifications which have been done as a result of the findings in the original draft 1150.

Also, re-work of the containment of entries to incorporate in a systematic way the latest severe accident research data and to rationalize inconsistencies that were discovered in the reviews of the 1150 draft.

Then there has been careful re-work of the source term calculations to improve these, and finally, a review of accident sequences to make sure that no important sequence was omitted in the truncation of these in the original draft.

In summary, extensive re-work and review has been done to respond to all of the comments that were given in the course of the reviews.

[Slide.]

MR. BECKJORD: I want to say something about the peer review and how that depends on the intended use of the revised 1150. The intended uses of 1150 as it will be revised, were described in the Commission paper on the integration plan for closure of severe accident issues on May 25th of this year. That is SECY 88-147. These uses were discussed with you on this subject and they include the following:

[Slide.]

MR. BECKJORD: First, guidance for the uses are as follows. Guidance for preparation of the independent plant examinations by the utilities in response to the IPE generic letter and also for a staff review of the utility analysis and findings. Preparation of the guidance has begun based on the earlier 1150 findings, and this guidance will be brought up to date with a final version.

Likewise, the 1150 results and insights will provide guidance for the development of both accident management requirements and strategies and procedures. It will be one of the tools for gauging the expected success of accident management procedures.

The third use, and I note that 1150 has already played an important role in the analysis of the Mark I containment performance, and you have had a preliminary report on that, and you will be receiving final recommendations in

January on that issue. 1150 has been used in doing that work.

I note that the 1150 methods will also be used in the subsequent analyses of other containments in the containment performance program.

Finally, the results of the five plants in 1150, additional results from evaluations which will be done in 1989 and from later PRA's using 1150 methods, will add to the knowledge of specific plant performance levels and to the PRA insights gained from the many studies. These studies and insights have identified plant design features and operating practices that have adverse impacts on plant safety and also those that have beneficial impacts.

[Slide.]

MR. BECKJORD: Also, the 1150 methods and insights will be used for analysis and evaluation of safety goal implementation strategies and specific measures.

With regard to research, the 1150 methods and insights are being and will increasingly be used for evaluating safety research programs and priorities and as one of the important tools for generic safety issue ranking and resolution.

If I could put it succinctly, the 1150 technology is the best PRA methodology that we have. It is far in advance of the WASH-1400 pioneer study methodology that gained acceptance after extensive and intensive review. The 1150 is not as good

as I would expect to see in another five years time, but it is the best that we have today. The methods in 1150 have sharpened our ability to focus on severe accident phenomena and issues and I believe have improved the judgments that it is possible to make on these issues. Therefore, we should use the 1150 methods in evaluation of plant safety performance and generic issue resolution.

[Slide.]

MR. BECKJORD: This vu-graph deals with the scope of the peer review. There are a number of reasons for peer review, major research efforts, such as 1150. The peer review process provides for critical review and quality assurance in science and engineering and a publicly open and objective review also provides credibility and confidence in the public arena for a tool of such importance for decision making as 1150.

What then should be the scope of the peer review? We propose the following three questions for consideration of the peer review panel. They are concise and yet the questions are robust in their implications.

The first question, does NUREG-1150 represent a major advance in the state-of-the-art of PRA? Our expected uses and confidence in the conclusions clearly hang on the answers to this question.

Second question, does NUREG-1150 as revised

adequately respond to the peer review comments and public comments on the draft? Have the deficiencies identified in those reviews been adequately addressed and corrected?

The importance of this question is obvious. There are deficiencies in the 1150 draft and the reviewers pointed them out in a constructive manner. I can tell you that the project has gone to great lengths to respond. These matters were reviewed at length, I think, in four project review meetings on major questions, and I attended three of these.

In addition, the American Nuclear Society Review Committee has met with our project people to review the revisions to the draft. The overall comment of this committee, the ANS Committee, to the ANS Board, in November of this year, just a little over a month ago, was that the ANS Review Committee is "cautiously optimistic" regarding the revision which is forthcoming.

This is a very significant shift from the ANS Committee's review on the draft version of 1150. Based on their view and on my own sense of what the project has accomplished, I am confident that the 1150 revision will receive high marks in an objective peer review.

The third question, is there agreement on areas where PRA methods should be improved? We anticipate the following five improvements at least, and there may be others.

[Slide.]

MR. BECKJORD: First of all, incorporating plant performance data such as the NPRDS and including performance indicators and human performance research, the performance indicators that will come out of human factors research, in the PRA. The integration of the performance indicators into the PRA has not yet started but it will get underway.

Secondly, incorporation of advanced physical process models such as new severe accident research findings, after they have been validated and verified and benchmarked.

Third, improving the means of quantifying common cause failures, including human error. Work on this aspect is in progress right now.

Fourth, investigating the use of cutoff criteria to eliminate from consideration accident sequences of very low likelihood and risk.

Fifth, optimization of expert opinion elicitation and what we mean by that is essentially to reduce the effort required and the cost, because the expert opinion in the revision to 1150 has been very manpower intensive and very expensive. We would like to find less expensive ways of doing it in the future.

[Slide.]

MR. BECKJORD: This notes the comments of the Advisory Committee on Reactor Safeguards, their comments on the 1150 in two letters. First of all, their letter of July 20th,

there is a partial quote from the letter, and in their August 16th, recommending that peer review be done.

[Slide.]

MR. BECKJORD: This considers the format of the review. The staff has considered a broad range of options relative to Committee membership and structure of the review and so forth. I believe there are two main options to consider. The first is a new committee under the Federal Advisory Committee Act, to contain a consensus opinion, as opposed to reconvening the Kastenberg Panel.

I would point out that the Kastenberg Panel was not a committee under FACA and therefore, the Kastenberg Panel could not and did not deliver a report which was a consensus of all the members. It was essentially a detailed report on the part of each of the 14 members with a summary provided by the chairman.

We do want a consensus report for the final. I think it is very important to have a consensus. The only way we can do that is to have a committee under FACA to do so.

There are two options here regarding the time of release and these are first to withhold publication of the report until a review is completed and the other option is to release the report, this revised version of 1150, and then undertake the review.

[Slide.]

MR. BECKJORD: The recommendation of the staff is indicated here. First of all, to form a new review committee under FACA with strong international representation. Secondly, to issue the report at the time the review is initiated, or I should say it the other way around, to issue the report and get the review going at the same time, and also public comment.

During the time when the report is being reviewed, we would utilize 1150 as revised in accordance with the uses describes in SECY 88-147.

CHAIRMAN ZECH: How much time do you anticipate the review committee would need to complete their review?

MR. BECKJORD: I believe nine months from now, Mr. Chairman, which is roughly say six months from the time the report is released. It takes about two months to get a FACA committee constituted, and I will come back to this later, I would like to go out and collect the panel now at this point, and then they would be ready to go about the first of March. I think it would take six or perhaps seven months to complete that review and give a report.

CHAIRMAN ZECH: Thank you.

MR. BECKJORD: Finally, to publish an addendum to the revised 1150 at a later date, after we have received the peer review report and responded to whatever comments and suggestions the peer review panel would make.

[Slide.]

MR. BECKJORD: The basis for the recommendation, the arguments for, this approach, the recommended approach, will provide a consensus report. As I said before, the product would otherwise be a set of separate comments, one from each member of the peer review panel, and that is not going to be nearly as useful as a consensus report. I believe that only a consensus report can effectively serve the purposes I have already described.

The peer review panel will provide members with strong international representation. International experts in PRA have expressed great interest in the study and the document. They have given much thought to severe accident issues and will help to ensure that the peer review is both searching and robust. This will serve both objectives of quality assurance and credibility.

I note that an integral part of the recommendation is that the 1150 project will make a formal response to the peer review report, and this response together with additional work done on 1150 as a result will be published as an addendum.

Finally, the recommended review can be accomplished sooner with this recommendation than some other options which are discussed in the Commission paper, the December 8th letter, which is SECY 88-337, plans for review of NUREG-1150.

[Slide.]

MR. BECKJORD: This outlines the arguments against

the recommendation. Since the staff intends to use the 1150 revision in the interim, it is possible that reconsideration of interim uses might be needed after the peer review and the response. Personally, I think this is not a major problem because the main uses of the 1150 methodology have to do with insights rather than specific numbers. I don't think that is a major problem.

Secondly, it is true that the Kastenberg Panel, because of the work they did on the first draft review, would be better prepared to undertake a peer review of the revision, but it would not be a consensus report. As I've said already, I think that is very important.

On balance, I strongly support the staff's recommendation. I would like, if there is favorable reflection on your part, to go ahead as soon as possible and get commitments from the members for this peer review panel. These are very able people. They are all very busy. I would like to sign them up for the project so we can get it going on time as soon as the report comes out.

[Slide.]

MR. BECKJORD: The next two vu-graphs show what the additional plans are for review, that is in addition to the peer review panel which I've described.

First, full cooperation with the American Nuclear Society Review Committee. Secondly, distribution of the

revised 1150, wide distribution, requesting advice and comment by Federal Register notice. Third, to solicit comments from the major professional societies. Fourth, to encourage presentation of papers on 1150 at appropriate professional society meetings.

One such meeting has already been held on elicitation in the Operations Research Society of America held in October of this year. There is also a PRA topical meeting under American Nuclear Society on NUREG-1150 in Pittsburgh in April of 1989. There will be papers at that meeting.

To encourage submittal of papers on specific issues and analyses for submission to refereed journals. To hold a public workshop to explain the methods used and the results obtained and to get comments on future directions, and finally, to issue grants to universities to investigate the significant areas of 1150 in depth and to develop suggestions for improved analytical procedures.

That completes what I wanted to present, Mr. Chairman. I'd be glad to answer any questions, also Dr. Ross who has had the responsibility for oversight of the project and Mr. Murphy who is the Project Manager. I believe between us, we can answer questions.

CHAIRMAN ZECH: Thank you very much. Questions from my fellow Commissioners? Commissioner Roberts?

COMMISSIONER ROBERTS: What was the basis of coming

up with this short list in Table 1, the attachment to the SECY paper on suggestion for membership of the peer review group?

MR. BECKJORD: The last page?

COMMISSIONER ROBERTS: Yes.

MR. BECKJORD: We have had a number of discussions over the last couple of months on people who would be appropriate to consider here, both international people and people in the U.S. I think what we concentrated on was expertise and knowledge of the technology on the one hand and then also to get some views from the people in the utility who understand the severe accident issues, and then also to have a person, I think we are looking for one person from outside of the community that knows the technology very closely but a person who has broad knowledge of reactor safety implications, so we could get a view from the outside on 1150 as well.

I think that broadly describes what we are interested in and with those considerations in mind, that is how we came up with the names. The foreign one, the names from overseas, these are experts in PRA, people who have responsibility for research and safety matters in those three countries. We know them. They know the work that has been done on 1150 and I think we would find their comments very valuable.

CHAIRMAN ZECH: Commissioner Carr?

COMMISSIONER CARR: I'm a little puzzled about your statement that the nature of the review depends on intended

use. I'm not sure we know all the intended uses yet. Why would you try to limit the review people, why wouldn't it just be reviewed as a stand alone paper?

MR. BECKJORD: I guess my answer to that would be that if we did not have important uses for it in mind, we would probably not give quite as much thought to the scope of the review and the care of the review, but since we think it is important to use it, we have given a lot of consideration to the scope of the review.

COMMISSIONER CARR: You have also limited the scope of the review, it seems to me.

MR. BECKJORD: You mean to have --

COMMISSIONER CARR: I don't know what your statement means when it says it depends on the intended use. If I change the intended use somehow, would that change the scope of the review?

MR. BECKJORD: I guess what was on my mind was the difference between important use and not as urgent an important use. I think that was on my mind.

MR. MURPHY: I would add a thought. If we were going to use NUREG-1150 directly to make regulatory decisions, where precise numbers would be very important, then perhaps you would want to have a much more detailed review.

COMMISSIONER CARR: It looks to me like that is what you are planning to do.

MR. MURPHY: Even more detailed than we are planning is what I am suggesting, if we were going to rely on specific numbers, if you essentially almost re-do the PRA as part of a review function.

COMMISSIONER CARR: Are you going to change the bottom line that only applies to those five plants and we can't extrapolate it?

MR. MURPHY: No.

COMMISSIONER CARR: I guess I'm concerned about your intended uses.

MR. BECKJORD: I think it is true of PRA in general that it is very plant specific but on the other hand, it is also true that there are very important insights which can be drawn and can be drawn from these studies. Those are much more generally applicable.

COMMISSIONER CARR: I guess my point is I think you are going to use it for far more than you have listed here and I'm concerned that it ought to get a review as a stand-alone piece of paper. I would be interested in the terms of reference you are going to give that committee.

CHAIRMAN ZECH: Thank you very much. Commissioner Rogers?

COMMISSIONER ROGERS: I have a concern somewhat along the same lines, that it is a key part of your integration plan for closure of severe accident issues. If you look at the

options that you are considering for review, the types of committees that might be possible for just 1150 itself, a consensus type of committee versus a committee that does not have to come to consensus, that is still an open option presumably although you have a recommendation, and then if I look at that in the framework of how you want to use 1150, is this focusing a particularly arduous process or restricted process in some way on 1150 to a degree that is not contemplated on a review of your whole integration plan.

In other words, you have a key part of the integration plan that you are subjecting to a certain kind of peer review process.

What about the total integration plan itself? There is no process of that comparable scope, is there, contemplated for overall review of that plan. We are focusing a somewhat different process on part of the plan from what is contemplated for the whole plan; is that right?

MR. STELLO: Yes.

COMMISSIONER ROGERS: I think we ought to be mindful of that in a sense, why we feel it is necessary to draw that distinction. You have a key part of a total plan that you are going to use a review process on that we are talking about and considering in great detail, but the plan itself, we are not.

MR. STELLO: That's right.

COMMISSIONER ROGERS: I am not criticizing that. I

am just saying we ought to keep that in mind in trying to put this into some perspective, as to what is the best way to review it. With that, I guess I still am not quite clear on the pluses and minuses of a committee which can come to a consensus and one which does not or cannot come to a consensus because of its nature, just what the real limitations are.

If we are going to use this as a key part of a process which itself is not subject to that kind of review, then why is it so important to have a consensus on one part of it?

MR. BECKJORD: I think if I look at the Kastenberg report, I would say two things about it. First of all, it served its purpose which was to review the 1150 draft and it gave us a large number of comments and directions on which we should focus improvement, but there were important differences among the people and they could not really sit down to discuss these to arrive at a consensus, just by nature of the method we chose, the non-FACA approach.

I do think it is important now as we approach a final version to have a consensus, because if there is not a consensus and there is disagreement among the reviewers on some point, then we would not be able to come to conclusions effectively that rest on that point.

If the peer review committee can have the power to come to a consensus position, then we will know what the

committee as a whole thinks. I think that will be much more useful to the staff and to you than this kind of report.

COMMISSIONER ROGERS: It is always more convenient, it is neater and tighter and all that sort of thing. That is obvious. We are not insisting on that for the integration plan itself. We are not subjecting that to a peer review panel that has to come to a consensus and decide whether they agree or do not agree on the total plan.

Why do we feel it is so important for an element of that plan?

MR. BECKJORD: One point, if you consider the history on this and go back to WASH-1400 and the Lewis Panel that did the peer review on that document, it was very controversial at the time. The controversy extended over a period of about three years until the Lewis Panel gave its views on the subject. As time went on after that, I think that the Lewis Panel was accepted, that statement was accepted and I think that settled the issue of whether PRA methods along the WASH-1400 lines were going to be used or not used. They have been used.

I think that is a historical argument. It worked in the case of WASH-1400 and the Lewis Panel. I think we have every expectation that it will gain acceptance for 1150.

COMMISSIONER ROGERS: Let me turn the question around a little bit. Does our decision to go with a committee, a FACA

committee for review of 1150 open the door to almost the necessity of subjecting the whole integration plan to that kind of a process?

MR. STELLO: Let me try to answer it maybe the way you asked it the first time. If you look at where is the basic fundamental science that is the underpinning of the entire severe accident integration plan, it is basically in 1150 and its derivatives. It has all of the technology that you need to understand it, the basic nature of source terms and tracking source terms, the PRA methodology itself to the extent it gives you the insights.

Other aspects of the severe accident policy statement and the integration plan derive therefrom. It has to do with a lot of other things that are strictly a part of the routine agency business and resolution of generic issues and unresolved safety issues and those kinds of things, which are well underway.

COMMISSIONER ROGERS: Some of those issues are technical, too.

MR. STELLO: Yes, but they are already part of the routine in terms of the resolution and while you don't have a peer review of them, you have extensive comment on them in the process of resolution, especially in the process of rulemaking.

The other aspect of the integration plan deals with the safety goal policy and that has had enormous public comment

and review of all types.

The one part that is significant and stands out I think is WASH-1150 as it parallels WASH-1400 and history dictates that just takes on a degree of importance far more significant than all the other pieces.

I think if we did not have a peer review of it, we would probably wind up struggling with how you in fact determine or arrive at what the consensus was, what ought the Agency's position be with respect to it. You eventually have to come to grips with answering that question anyway.

I would suggest that it would be better to recognize you need to do that and to do it at the outset knowing you have to do it and the Agency will have to have a view as it had with WASH-1400 at some point. Since the Agency's view will be represented by the final conclusion of the Commission, I would think it would be almost imperative that the Commission would have in front of it then the results of the peer review to help the Commission itself come to grips with that judgment.

COMMISSIONER ROGERS: I am in favor of the peer review question. It is just a question of how you do it and what mechanism you use to do that. I'm a little concerned about whether the requirements on a FACA committee confine it in some way to its membership or its size; there may be there are no specific limitations, I don't know. I know it is neater to have a committee issue a consensus report but if you have a

committee that doesn't have to issue a consensus report and yet the individual reports are consistent with each other, you have a consensus report any how. It is obvious there aren't big disagreements. I think that is just as valuable, too, in some ways. Maybe even more so since you have a common view that doesn't have to be forced by the necessity of a consensus report. Sometimes peoples' differences just somehow get shaved away because the committee knows it has to come to a consensus or as a committee wants to come to a consensus.

It is really -- I'm sure the values are -- I don't see so great a difference there between a committee that has to come to a consensus or expects to come to a consensus and one which does because it has come from a different technical basis to a common point of view that is obvious by the consistency of the individual reports.

In fact, I would be more impressed with that in a sense than a committee that you knew had to come to a consensus and therefore hammered out a consensus even though there may have been some differences among the viewers.

COMMISSIONER CARR: A consensus is not going to give you a warm feeling that there weren't divergent views, I'm sure.

MR. BECKJORD: It seems to me that --

COMMISSIONER CARR: It is more likely you will get some watered down version that everybody can agree on and yield

a little. That is my experience with those groups.

MR. BECKJORD: If I could make one comment on what Commissioner Rogers was saying. If there is a non-consensus report and there is an important point or several points on which the members express a strong difference, then it seems to me that there has to be another step taken after that to attempt to get a resolution of those opposing viewpoints.

It seems to me that a non-consensus committee has the possibility in that it would prolong a review process for the second step.

COMMISSIONER CARR: Are you talking about a consensus committee or a FACA committee that can get together and talk over their differences, which they couldn't do in this particular one?

MR. BECKJORD: Yes.

COMMISSIONER CARR: They may not reach a consensus.

MR. BECKJORD: That's true, they may not, and then they would so state.

COMMISSIONER CARR: I think that causes Commissioner Rogers concern. They can all write their individual opinions and then get together and try to hammer them out and that may not work or it may work.

MR. BECKJORD: I'm sure they would agree on what they felt they could agree on.

CHAIRMAN ZECH: Doesn't the FACA procedures permit

different professional opinions to be offered?

MR. STELLO: Yes.

MR. BECKJORD: It seems to me that our position, we would certainly like a consensus view on the report and we would ask them for it, but if they felt they couldn't give it, then --

CHAIRMAN ZECH: We would expect if there were strong feelings of differences, they might be valuable, too. I think that is important to even let that be known.

COMMISSIONER ROGERS: That is one of my points. The other is you really didn't say anything in your presentation here about the possibility of the National Academy of Sciences' group doing this. What is your feeling on that? Do you feel that is a process which would be more lengthy, more expensive? We are looking for a review but you also have intended use here. I suppose when you set up the review committee, you can write your expectations for the kinds of questions you would like answered certainly.

Do you have that much freedom when you have the National Academy of Sciences' committee review it?

MR. STELLO: Sure.

COMMISSIONER ROGERS: What is your feeling there?

MR. BECKJORD: I think the main point there is the length of time involved on much simpler topics than 1150, the time period for a National Academy review would certainly be a

year by the time they go through their process and select their committee and get a project manager and go through it. On 1150, it could well be substantially longer than that.

The National Academy review of the research program, the result of which was the report for finalizing research, it was about two and a half years, I believe, from the time of request until they issued the report.

I think if we went that way, we would have to plan on a substantially longer period of time.

CHAIRMAN ZECH: Also it is important that we have international comments, because the issue is really one of great international interest. I think that is an important point to consider.

MR. STELLO: I might add for which there is considerable research related directly to this going on in other countries.

CHAIRMAN ZECH: And the capability of making a very important contribution, I believe, internationally, too.

MR. STELLO: Yes.

CHAIRMAN ZECH: Commissioner Curtiss?

COMMISSIONER CURTISS: I would just like to ask a couple of questions on the subject of the intended use of the document, pending peer review, and a couple of questions about how we intend to use it afterwards.

Are you seeking endorsement at this point that the

proposal on the intended use would be part of the action that we take on the peer review or would the subject of the intended use including the scope of that come up at the February 27th briefing and be discussed in more detail?

MR. BECKJORD: It would be discussed in more detail at that meeting.

COMMISSIONER CURTISS: Between now and that point, you don't intend to rely on the document in its current stage until the Commission is --

MR. BECKJORD: No.

MR. STELLO: It also contains information from research programs that give us insight to help us make safety decisions which we use all the time. We are using those now even as we speak.

COMMISSIONER CURTISS: To pick up on that point, because that is the one I guess I was a little bit confused on, and perhaps you can explain the difference between what you called an insight and a specific regulatory action, because it was unclear to me what the distinction is between those two.

MR. MURLEY: I can give you an example.

MR. STELLO: Dr. Murley, were you thinking of the Mark I example?

MR. MURLEY: Yes.

MR. STELLO: That's the one I was going to use.

MR. MURLEY: For example, they analyzed in 1150 in

quite some detail the risks from a BWR Mark I plant. I don't intend to use the absolute values of core melt frequency or anything else for that matter from 1150 in our regulatory posture, but there are some insights that I believe are true.

For example, the importance of being able to vent, to prevent -- there is a certain sequence called TW sequence, which is a loss of decay heat removal, over pressurization of the torus. I believe that is an important sequence. I believe that has to be reduced and there is an easy way to do it.

That is the kind of insight that we are using. We, the staff, the research staff, the NRR staff, come to our own judgments really about the values and the importance of some of the insights, but we wouldn't necessarily be beholden to the absolute numerical values. It is in that sense that we use it, we use the insights from it, filtered through our own experience, our own judgments, but we don't quote the numerical value as the basis for taking a regulatory action.

In fact, I would be very nervous about doing that at any time because there is a lot of -- any PRA has some weaknesses along those lines.

COMMISSIONER CURTISS: I want to pick up on that point, because that is really the question I had that goes to the use of the document after the peer review process.

Is it envisioned that following completion of the peer review process that you have recommended here, option

number one, that at some point, the absolute values represented in the final document would provide the basis for specific regulatory decisions?

MR. MURLEY: I would advise against that personally.

There are limitations that any PRA has, namely, how well is the plant being operated, how well are the operators trained. The people who put those numbers down do not have any particular insight into that. I would remind you that one of the plants that is being studied in 1150, we have shut down today because of poor operator performance. There is just no way that can be reflected in a PRA.

I am always cautious about using bottom line numbers as the basis for regulatory decisions.

MR. ROSS: There is a use without numbers, I think. It has been illustrated on several cases, one in particular, on the Grand Gulf plant, which is one of the five plants. As they were going through it, they perceived as part of the analysis that an alternate water addition strategy made a lot of sense and in fact, it improved the bottom line numbers. The core melt frequency was perceived to be somewhat smaller with this additional way to get water into the vessel.

The benefit is not in getting the number down. The benefit is uncovering the alternate strategy and billing it into the way they run the plant.

Acting on its own, the Susquehanna plant did the same

sort of thing. As these other plants march through their individual plant examination, they will surely uncover these. The number is not important. It is the process. The 1150 process for us is a template, sort of a truth device by which we measure the validity of the IPE's. I don't think anybody is really all that enamored of the bottom line numbers.

COMMISSIONER CURTISS: Let me take a specific example and see which side of the spectrum it falls upon, either the regulatory insights or reliance on the absolute numbers.

The one that I had in mind was the graded response approach to emergency planning. Is that one where we would gain insights from this document in a manner that would permit us to make regulatory decisions or is that one that falls in the absolute values end of the spectrum?

MR. ROSS: In the draft 1150 last year, there was a lot of information on that topic. I think it was chapter ten. It had several pages of text and many figures and the attachments had more. There was a Commission paper, SECY 86-76, I think, that reflected on this topic that said NUREG-1150 might be a technical basis for a rulemaking on that topic.

The final version will have much less on that topic. The theory is if the Commission decides to go out and notice some comment on the topics, such as revising Appendix E, and this is my guess, the final 1150 with all the comments would be a technical basis for that rulemaking, but it would be subject

under the routine notice and comment, is the document sufficient for the purpose. That is a decision that I think is several years away. We are really not working on graded emergency response rulemaking right now. We sort of stopped a year or two ago. That is in abeyance.

COMMISSIONER CURTISS: Pending completion of this?

MR. ROSS: And a decision that it makes good sense to go forward. Certainly, we would want to complete this.

COMMISSIONER CURTISS: I guess that is the question I am trying to get at. Does this document provide or is it conceivable that this document might provide the basis for us saying it does make good sense to go forward --

MR. STELLO: It would clearly be a part of that basis and when it is finished, those are the kinds of uses which were anticipated from this kind of work, to deal with those kinds of questions on rulemaking. There clearly is more to go into it than that issue, but that clearly would be part of it and probably the most important part in technically understanding the pro's and con's of moving forward.

COMMISSIONER CURTISS: Just one more general question. Are we getting a sense at this point from the study that the insights that we draw and perhaps the absolute values are much more highly plant specific, that is to say specific to these five plants, and perhaps further away from permitting us to draw generic conclusions?

MR. ROSS: We tried to put a comprehensive disclaimer in the draft report that the numbers in that report were suitable only for the five plants, and then only if they were operated pursuant to the application and so on. If we need a stronger disclaimer in the final, we will put another one in. The numbers that are in the report are not surrogates for the nuclear industry.

MR. STELLO: To make sure we have the complete answer, there are now, I think, somewhere in the neighborhood of 50 plus PRA's. I will be surprised if taken together they don't start to give you some comprehensive generic understanding of what to do. We are engaged in that task now. I would expect that NUREG-1150 plus the 45 odd PRA's taken together do in fact provide enough to start to draw some generic understandings.

MR. BECKJORD: Just to add one point. To my knowledge, every PRA that has been done, in every PRA, there has been some new finding of a problem or a weakness. It is taking these things altogether which provides the guidance as to what to look for in the next PRA in a plant in which it hasn't been applied. It is that kind of guidance which is very important.

COMMISSIONER CURTISS: Thank you.

CHAIRMAN ZECH: It is my understanding that what the staff is asking the Commission to do is to take action on the

SECY paper, 88-337, which is plans for the future review of 1150.

MR. STELLO: Yes.

CHAIRMAN ZECH: In that paper, as I understand it, you are recommending option one, which is the FACA review, and you are also pointing out that you want to on an interim basis use the 1150 for planning purposes, in other words, the process to proceed; is that correct?

MR. STELLO: That's correct.

CHAIRMAN ZECH: Then you will come back to us in February and tell us the results of 1150 at that time.

MR. STELLO: Yes.

CHAIRMAN ZECH: The peer review, as I understand what you have told us this morning, will continue beyond that point.

COMMISSIONER CARR: It will start about that time.

MR. STELLO: It will start about that time.

CHAIRMAN ZECH: How then are we going to act in February on the whole process when the peer review is not completed?

MR. STELLO: What we would suggest to the Commission at that time is first the Commission hopefully would have decided on peer review, we will provide you with --

CHAIRMAN ZECH: Act on this request you have before us now.

MR. STELLO: Yes.

CHAIRMAN ZECH: Go ahead.

MR. STELLO: We would provide you with a comprehensive briefing of 1150, responding to all the criticisms, to get support that the interim use that we had in mind is justified, even though peer review is not complete.

CHAIRMAN ZECH: I see. What you are going to ask us for is a decision in February --

MR. STELLO: On the interim use.

CHAIRMAN ZECH: And comments that have already been received up to that time.

MR. STELLO: That's correct.

CHAIRMAN ZECH: Then the peer review, if we approve it, will go forward. In the future, I presume, if the peer review comes up with anything significant or insignificant, we would address that?

MR. STELLO: That's correct. We intend to issue an addendum to NUREG-1150 which would include the reports from the peer review group or whatever other group the Commission decides, and our response to any problems, criticisms or comments, as an addendum to the report when that is finished.

CHAIRMAN ZECH: I see.

COMMISSIONER CARR: The February decision will also be a published before review or after review decision?

MR. STELLO: That's correct.

COMMISSIONER CARR: And used before review or after

review decision?

MR. STELLO: Interim use.

CHAIRMAN ZECH: Interim use as of in February?

MR. STELLO: Yes.

CHAIRMAN ZECH: That is what you are going to ask us to do.

MR. STELLO: That's correct.

CHAIRMAN ZECH: I understand. I would ask my colleagues to address SECY 88-337 and provide the staff with the guidance you think is appropriate in the meantime.

COMMISSIONER CARR: Could I also ask that in February, at the same time you are bringing that up, you bring up the terms of reference for the committee, so we can get a look at them?

MR. STELLO: Yes. We would hope --

CHAIRMAN ZECH: Even before that date.

COMMISSIONER CARR: Whenever they are ready, I'd like to look at them.

MR. STELLO: We would like to hopefully have whatever peer review we were going to undertake in place at that time. If we want more on that, I would suggest we ought to do that in advance.

CHAIRMAN ZECH: Fine. We all recognize the importance of this document. I think the staff is handling it responsibly. There is tremendous interest, as we have

mentioned, overseas, internationally. There is also a tremendous confidence, in my view, outside of our country, even in these areas. I think the staff is acting in a responsible way as far as asking for the FACA review, personally.

Because the document is so important, I recognize we should be also able to address it more thoroughly itself in February when you come back to the Commission.

I think the meeting this morning has been very important and very useful. Unless there are any other comments from my fellow Commissioners -- yes, Commissioner Rogers?

COMMISSIONER ROGERS: I just ask you to take a look at that scope of the peer review committee a little more carefully once again. I'm a little uncomfortable with it in that in some ways I don't think it may be useful, goes far enough, but I know you are looking for a review, not a re-do of the whole thing, so you want to avoid that. I think I'd like to see that review a little more thoroughly --

MR. STELLO: I should respond that the thought that I had in trying to frame questions was more in being sure that we had the questions answered to which we feel are there now. The first question, for example, I think is critical. I think everyone does agree that what we have in here is significantly advanced from WASH-1400, but we ought to get that dealt with clearly and unambiguously and up front. Is this really a significant movement in the state-of-the-art.

The other questions are again --

COMMISSIONER ROGERS: I don't think you want a yes or no answer to that. I think you want to know --

MR. STELLO: We want it addressed. We are trying to frame the things that we had on our mind that we felt were important to have addressed. I think it is now being construed that this will somehow limit peer review. I've always had the view that the only thing you can do with peer review is you try to put in front of them the things you would like to have answered but any committee you try to somehow tell they are prohibited from doing anything else, that never works anyway. I suspect you are going to get what Commissioner Carr was after, a comprehensive review, a stand-alone document, to some degree anyway.

CHAIRMAN ZECH: Are there any other comments?

[No response.]

CHAIRMAN ZECH: Thank you very much for a very valuable presentation. We stand adjourned.

[Whereupon, at 11:05 a.m., the briefing was concluded.]

CERTIFICATE OF TRANSCRIBER

This is to certify that the attached events of a meeting of the U.S. Nuclear Regulatory Commission entitled:

TITLE OF MEETING: BRIEFING ON PEER REVIEW AND INTERIM USE OF NUREG-1150
PLACE OF MEETING: Washington, D.C.
DATE OF MEETING: MONDAY, DECEMBER 19, 1988

were transcribed by me. I further certify that said transcription is accurate and complete, to the best of my ability, and that the transcript is a true and accurate record of the foregoing events.

John Trowbridge

Ann Riley & Associates, Ltd.

SEVERE ACCIDENT RISKS: AN ASSESSMENT FOR FIVE U. S. NUCLEAR POWER PLANTS

NUREG-1150

OPTIONS FOR PEER REVIEW

BACKGROUND

- REVISED NUREG-1150 NEARING COMPLETION
- SIGNIFICANT MODIFICATIONS HAVE BEEN MADE IN RESPONSE TO PEER REVIEW.
- EXTENSIVE REVIEW OF DRAFT REPORT
  - UNCERTAINTY METHODOLOGY REVIEW COMMITTEE
    CHAIRED BY H. KOUTS, BNL, NUREG/CR-5000
  - PEER REVIEW COMMITTEE
    CHAIRED BY W. KASTENBERG, UCLA, NUREG/CR-5113
  - AMERICAN NUCLEAR SOCIETY REVIEW COMMITTEE
    CHAIRED BY L. LE SAGE, ANL, AVAILABLE FROM ANS
  - EXTENSIVE PUBLIC COMMENTS
  - INFORMAL INTERCHANGES WITH UK AND FRG
  - IAEA WORKSHOP IN ROME 3/88
  - DISCUSSIONS WITH ACRS

NATURE OF REVIEW OF NUREG-1150 DEPENDS ON INTENDED USE

USE PRESENTED IN SECY-88-147 INTEGRATION PLAN FOR CLOSURE OF SEVERE ACCIDENT ISSUES

INTENDED USE

- GUIDANCE FOR REVIEW AND CONDUCT OF IPEs AND FRAMEWORK FOR CONSIDERATION OF ACCIDENT MANAGEMENT STRATEGIES

- INPUT TO CONTAINMENT PERFORMANCE IMPROVEMENT CONSIDERATIONS

- ADDS TO COMPENDIUM OF PRA INFORMATION ON ACCIDENT FREQUENCY TO ASSIST IN IDENTIFYING FEATURES OR PRACTICES THAT HAVE AN ADVERSE IMPACT ON PLANT SAFETY

INTENDED USE (CONT.)

- TEST BED FOR EVALUATION OF ALTERNATE SAFETY GOAL IMPLEMENTATION STRATEGIES

- ONE ELEMENT IN EVALUATION OF RESEARCH PRIORITIES AND POTENTIAL TOOL TO USE AS ELEMENT IN GENERIC ISSUE RESOLUTION

SCOPE OF PEER REVIEW

- DOES NUREG-1150 REPRESENT A MAJOR ADVANCE IN THE STATE OF THE ART OF PRA?

- DOES NUREG-1150 RESPOND ADEQUATELY TO THE PEER REVIEW COMMENTS AND PUBLIC COMMENTS ON THE DRAFT? HAVE THE DEFICIENCIES IDENTIFIED IN THOSE REVIEWS BEEN ADEQUATELY ADDRESSED AND CORRECTED?

- IS THERE AGREEMENT ON AREAS WHERE PRA METHODS SHOULD BE IMPROVED?

FUTURE IMPROVEMENTS

- INCORPORATING PLANT PERFORMANCE DATA (INCLUDING PERFORMANCE INDICATORS AND AND INFLUENCES ON CREW PERFORMANCE)

- INCORPORATING ADVANCED PHYSICAL PROCESS MODELS AFTER VALIDATION, VERIFICATION, AND BENCHMARKING

- IMPROVED MEANS OF QUANTIFYING COMMON CAUSE FAILURES, INCLUDING HUMAN FAILURES

FUTURE IMPROVEMENTS (CONT.)

- INVESTIGATING THE USE OF CUTOFF CRITERIA TO ELIMINATE FROM CONSIDERATION ACCIDENT SEQUENCES OF VERY LOW LIKELIHOOD AND RISK IN EVALUATING PLANT SAFETY.

- OPTIMIZATION OF THE EXPERT OPINION ELICITATION AND QUANTIFICATION PROCESS.

ACRS COMMENTS

7/20/88 - "...SUBJECTING THE FINAL VERSION OF NUREG-1150 TO A THOROUGH PEER REVIEW IS REQUIRED AS PART OF THE PROCESS OF ESTABLISHING CREDIBILITY."

8/16/88 - "WE RECOMMEND THAT BEFORE PUBLICATION IN FINAL FORM, THE FINAL VERSION OF NUREG-1150 BE SUBJECTED TO A THOROUGH PEER REVIEW."

FORMAT OF REVIEW

BROAD SPECTRUM OF OPTIONS RELATIVE TO COMMITTEE MEMBERSHIP AND STRUCTURE, TIME OF RELEASE TO THE PUBLIC, AND INTERIM USE BY THE STAFF.

- NEW COMMITTEE UNDER FEDERAL ADVISORY COMMITTEE ACT (FACA) TO OBTAIN CONSENSUS VIEW VS.
- RECONVENE KASTENBERG PANEL (NON-FACA).

- WITHHOLD REPORT UNTIL REVIEW COMPLETED VS.
- RELEASE FOLLOWED BY REVIEW.

RECOMMENDATION

- FORMATION OF NEW REVIEW COMMITTEE UNDER FACA WITH STRONG INTERNATIONAL REPRESENTATION. (APPROXIMATELY 7 MEMBERS, U.S. CHAIR, EQUAL DIVISION BETWEEN U.S. AND NON-U.S. MEMBERS).

- ISSUE REPORT AT TIME REVIEW IS INITIATED WITH REQUEST FOR PUBLIC COMMENTS.

- UTILIZE PER SECY-88-147 DURING REVIEW, RECOGNIZING THAT COMMITTEE REPORT MAY SUGGEST SOME RE-ANALYSIS IS NEEDED.

- PUBLISH ADDENDUM AT LATER DATE RESPONDING TO COMMITTEE COMMENTS.

DISCUSSION OF RECOMMENDATION

PRO:

- A CONSENSUS REPORT WILL BE PROVIDED.
- INTERNATIONAL REPRESENTATION WILL REFLECT PERSPECTIVES AND CONSIDERABLE THOUGHT GIVEN TO SEVERE ACCIDENT ISSUES OUTSIDE THE U.S.
- FORMAL RESPONSE TO COMMITTEE COMMENTS WILL BE REQUIRED.
- REVIEW SHOULD BE MORE TIMELY THAN SEVERAL OTHER POSSIBLE OPTIONS.

DISCUSSION (CONT.)

CON:

- EARLY USE OF NUREG-1150 MIGHT REQUIRE LATER RECONSIDERATION AFTER REVIEW COMMENTS ARE OBTAINED.

- BECAUSE OF PRIOR FAMILIARITY, KASTENBERG COMMITTEE COULD BE BETTER PREPARED TO UNDERTAKE A TIMELY (BUT NON-FACA) REVIEW.

ON BALANCE, THE STAFF FAVORS A NEW COMMITTEE FORMED UNDER FACA.

ADDITIONAL PLANS

- COOPERATE FULLY WITH THE AMERICAN NUCLEAR SOCIETY REVIEW COMMITTEE AS THEY REVIEW THE REPORT FOR THE ANS.

- DISTRIBUTE NUREG-1150 WIDELY AND REQUEST ADVICE AND COMMENT BY FEDERAL REGISTER NOTICE.

- SOLICIT COMMENTS FROM MAJOR PROFESSIONAL SOCIETIES.

- ENCOURAGE PRESENTATION OF PAPERS AT APPROPRIATE PROFESSIONAL SOCIETY MEETINGS.

ADDITIONAL PLANS (CONT.)

- ENCOURAGE SUBMITTAL OF PAPERS ON DISCRETE PORTIONS OF THE ANALYSIS TO REFEREED JOURNALS.

- HOLD A PUBLIC WORKSHOP TO EXPLAIN THE METHODS USED AND THE RESULTS OBTAINED, AND SOLICIT COMMENTS ON FUTURE DIRECTIONS.

- ISSUE GRANTS TO UNIVERSITIES TO INVESTIGATE THE MORE SIGNIFICANT AREAS OF NUREG-1150 IN DEPTH, AND TO DEVELOP SUGGESTIONS FOR IMPROVED ANALYTICAL PROCEDURES.