UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

OFFICE OF THE SECRETARY

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ADVISORY COMMITTEE ON NUCLEAR WASTE

MEETING WITH THE U.S. NUCLEAR REGULATORY COMMISSION

Commissioner's Conference Room
White Flint Building 1
11555 Rockville Pike
Rockville, Maryland

Wednesday, December 15, 1999

COMMISSIONERS PRESENT:

RICHARD A. MESERVE, Chairman
GRETA J. DICUS, Commissioner
NILS J. DIAZ, Commissioner
EDWARD McGAFFIGAN, Commissioner
JEFFREY S. MERRIFIELD, Commissioner

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

KAREN D. CYR, General Counsel
ANNETTE L. VIETTI-COOK, Secretary
DR. B. JOHN GARRICK, ACNW Chairman
DR. GEORGE M. HORNBERGER, ACNW Vice-Chairman
DR. RAYMOND G. WYMER, ACNW Member
MR. MILTON LEVENSON, ACNW Consultant
DR. JOHN T. LARKINS, Executive Director - ACRS/ACNW

P R O C E E D I N G S

[9:36 a.m.]

CHAIRMAN MESERVE: Let me turn now to the way we are going to spend the rest of our morning, which is to -- a meeting with the Advisory Committee on Nuclear Waste.

I am particularly pleased to do this, in part because I am -- across the table from me are two individuals with whom I have spent a lot of time over the past several years on waste-related matters, and I'm very pleased to have the opportunity to deal with both John Garrick and George Hornberger in this context as well as the others in which we

have worked over the years.

I'm also looking forward to getting to know other members of the advisory committee.

I understand that the committee did brief the Commission in March on issues relating to its work, that since that time it has had a -- meetings with regard to the DOE's examination of Yucca Mountain and had meetings in Las Vegas and met with a variety of stakeholders, and we welcome the opportunity to hear from you about that and the other work that you have underway.

Mr. Chairman, before I turn the matter over to you, why don't I inquire as to whether my fellow Commissioners would like to make a opening statement?

If not, why don't we proceed?

DR. GARRICK: Thanks, Chairman Meserve. It's a pleasure to be here. The committee is anxious to get back on a more frequent schedule of interacting with the Commission, because the feedback is always extremely valuable in inspiring us to be on target on some of the issues.

Today we're going to cover five items, one on the business of risk communication. We're going to discuss a white paper that a committee -- a former committee member prepared on the repository design. We're going to talk about Part 63, a special category of decommissioning called rubblization, and then we're going to end the meeting with some discussion about our planning process and how we conduct that.

So, our first item is something called risk communication.

As is generally known, the field of risk has kind of matured into three major components -- risk assessment, risk communication, and risk management -- whereby, in risk assessment, we try to quantify what the risk is, and by risk communication, we try to improve the processes and the methods by which we communicate the results of risk assessments, and then risk management is basically the issue of taking action and implementation.

So, let me start with my first exhibit on page 2,

with an overview.

The committee identified risk communication as a first-tier priority in its 1999 action plan, and I'll come back to that in a little while as to why.

In the course of dealing with this subject, we have met with a lot of organizations, agencies, and institutions, including the Nuclear Energy Institute, the Environmental Protection Agency, and the NRC.

In order to be in a better position to appreciate the discipline of risk communication, we also subjected ourselves to a little training by a professional risk communicator, and then, perhaps the highlight of the year with respect to risk communication was our one-day roundtable meeting and evening meeting with stakeholders and the public in Las Vegas, and I need to point out that we are in the process of developing our observations and recommendations, so this is basically a work-in-progress report.

View-graph number three -- as to why we identified risk communication as a first-tier priority -- and I should point out that we do this every year.

So, what we're talking about here is basically the calendar year 1999, but we make a strong tie between risk

communication and public involvement and participation in the regulatory process, and so, in a sense, we have tried to

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let the NRC strategic plan be one of the guidelines for establishing priorities, and NRC states in its strategic plan that building and maintaining public confidence is critical for achieving its mission and vision and that fundamental to that process, of course, is the involvement of the stakeholders.

As far as the international experience is concerned, the committee spent some time in Germany in 1998 learning about the German program, the Swiss program, the French program, and the program in Sweden, and while the approaches taken by the different nations have differences, there was one thing in common with all of them and that is the issue of public participation and involvement in the process and that if you were to ask any of them what was the major obstacle, most of them would probably answer it was winning public confidence in what we're doing.

Also a highlight in 1998 as far as this issue was concerned -- and maybe the meeting that really captured our interest and imagination about it -- was a meeting we had at Yucca Mountain with stakeholders in Amargosa Valley, and one of the things that we attempted to do in this meeting was to try to, after we listened to the public, feed back to them what we thought we heard, and there seemed to be a great deal of appreciation for that, that we (a) took the time to do that and (b) that apparently our feedback was pretty much

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on target with what they had identified as their principle concerns, and then, of course, the committee has always tried to be active in outside meetings such as the Technical Review Board and the academies on this topic, as especially the academies have done a tremendous amount of work in trying to define and give body and substance to the issue of risk, including risk communication.

Now, on slide four, let me turn to one of the highlights of our addressing of this issue this year.

We had a roundtable meeting on safety assessment and a public meeting with the stakeholders.

The daytime meeting was kind of set up to get into some of the issues of how the safety assessment process works. The public was involved. And then the evening meeting to allow those who perhaps could not make the daytime meeting to attend was devoted essentially exclusively to public discussion.

Our objectives were to enhance our ability to communicate technical issues.

If risk communication is fundamental in winning public confidence, then it's kind of important, it seemed to us, for the technical community to understand what it meant and whether there were some lessons to be learned in a more formal way about how to communicate the subject of risk, develop ideas about how to improve public participation in

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NRC's regulatory process, and third, to clarify the roles of the ACNW and NRC, which we will come to a little later in a little more detail.

The participants, we were pleased to see, represented diverse points of view. They included representatives from the State of Nevada, the counties that are involved, and then a number of government institutions, as well as the American Indians, the Nevada Nuclear Waste

Task Force, and the Yucca Mountain Study Committee, and of course members of the public that were not necessarily affiliated with a particular group.

We are preparing a letter. We are hopeful of getting that letter out in the course of this meeting today and tomorrow, and we'll detail some of these things that we're sharing with you now.

But to give you a little heads-up on some of the observations -- and our attempt here was to be as direct as possible in communicating to you what we heard, and here are some of the observations.

When we talk about risk communication, what we're talking about principally is the matter of exchanging information about risk with the public, and that process is very much dependent on listening to them and creating opportunities for their participation, and they have great interest, of course, in the NRC decision-making process, how

it works and how they might contribute.

It was obvious that some members of the public and some stakeholders perceive risk communication as disingenuous because of a lack of real opportunity to influence NRC's options and decisions.

Now, as I say, what we're doing here is providing you with observations, not necessarily the committee's opinions.

Some members of the public, on slide seven, and some stakeholders perceive transportation, for example -- this is just picking out a very specific issue -- as an afterthought rather than a well-understood component of overall safety assessment, and there is obvious a great deal of concern about transportation of high-level waste to Yucca Mountain over the operational period of the mountain, which is now talked about in kind of 24-year periods.

Most members of the public and some stakeholders have little or no experience with the NRC and its method of doing business.

They do have experience with nuclear activities but not with activities that have involved interacting with the Nuclear Regulatory Commission, and they are anxious to have a better understanding of how it works, and there appears to us to be a great opportunity.

Some additional and selected perceptions of some

stakeholders and members of the public are delineated on slides eight and nine.

NRC, they're fearful, will not be tough on the DOE. This came especially from the State and counties representatives.

NRC is perceived by some as having relaxed the high-level waste regulations to ensure that Yucca Mountain will comply.

Also, NRC has not justified its position against groundwater protection and that conflict between the Nuclear Regulatory Commission and the Environmental Protection Agency undermines public interest in the agency.

And then there was a lot of discussion about the decision-making process, how the reasonable assurance finding evolves, and I don't think that most of them were particularly satisfied by just referring to the regulations and generally compliance with the regulations.

They seemed to be looking for a clear indicator of what constitutes the conditions under which a decision is made, and that came not only from the public but from

representatives of the press at the meeting.

We're still architecting the recommendations, but to give you a little insight on what we probably will be recommending, we have summarized some of those on page 10.

First, to evaluate the feasibility of involving

stakeholders and interested members of the public in conducting some of the more specific activities associated with the licensing process, such as performance assessment.

The often-heard comment made is that the public are not just interested in reviewing and seeing what you've done and sort of passing on it, but we think that the real effective avenue of participation is to be able to be involved in scoping, setting up the conditions, and perhaps some of the assumptions underlying the analyses, such as the performance assessment.

Another recommendation is to establish transparency in the NRC decision-making process to facilitate public involvement, and of course, here, we need to provide some assistance in tying in the concept of risk communication and how it's used in that transparency process, and this is a logical extension of the whole concept of risk-informed, performance-based regulation.

That is to say, if we are transitioning to a new era of decision-making based on the risk-informed processes, we need to work especially hard to manifest what that mechanism is, and the opportunity exists, given that we are making changes and we are writing new regulations, especially in the case of Yucca Mountain -- we have an opportunity to demonstrate what that process is.

NRC should take the lead in clarifying the role of

various agencies involved in transportation of high-level waste.

This keeps coming up because there are so many agencies involved -- Transportation, the DOE, the NRC, the EPA -- that the public is a bit confused on who really is in charge here when it comes to convincing them what the transportation risk is.

Transportation seemed to be something that they really latched onto, because it was almost a personal thing in the sense that many of the local people feel they are directly involved in that, given that so much of the transportation will be through their neighborhoods.

So, that's we have to say at the moment on risk communication. It will come up in the context of some of the other presentations, but if there are any questions before we move to the next --

CHAIRMAN MESERVE: Thank you very much, Dr. Garrick.

This is -- risk communication is obviously an enormously important subject for us, as it cuts across the entirety of our activities, and it's an area which I'm sure we need to work on, and we very much weigh your considered recommendations.

I appreciate that you've tried to give us a glimpse of what's coming.

I would be interested in knowing whether you have some specific points that you would like to make with us as to how we could be more transparent in our decision-making.

Obviously we try to do things in the public and with Federal Register notices and using processes that are

really quite standard in the Federal Government, and I recognize that they may not be understood in other areas, and exactly how one might participate and how the decisions are made may not be understood.

Do you have any suggestions as to things we might do different that are more concrete?

DR. GARRICK: Well, some thoughts on it.

One of the things that -- when you start getting questions on decision-making and you try to reduce it to fundamentals, most people that are the point of a decision like to have alternatives.

They like to be able to be presented with different alternatives to address a specific problem, and they also like to understand what the measures are for each of the -- for these alternatives and that those measures should be a consistent set, and usually there is some variation on the three fundamental attributes of risk, cost, and benefits, and so, I think that, when I talk to people, what they're looking for is, well, what alternatives do we have and what attributes did they assign as a basis for

decision-making and what was the form of the results for each of those attributes?

Now, you're caught in a position here of being quite far downstream in the decision-making process, and so, you have to accommodate that, but I think that they have questions about, well, is risk assessment a decision analysis and, if so, how was it performed, and of course, our general observations to them on this is that a risk assessment is an important component of a decision analysis but usually a decision analysis involves other issues having to do with such things as costs and benefits.

On the other hand, even there, the principles of risk assessment have elevated the quality of the decision analysis considerably, especially in the area of how you address such things as uncertainty, and there is uncertainty in costs and there is uncertainty in benefits and what have you.

So, the whole notion of performance assessment, as it's called in the waste field -- the whole notion of risk assessment and what it can contribute to the decision-making process is rather substantial, but we do try to draw a distinction between a decision analysis and a risk assessment, and I think those are some of the things that could put it on a more definitive basis, and we realize that the regulations bound what can be done, but we also realize

that the NRC is in a position to bring into the decision-making process things like cost-benefit and issues beyond what one might normally associate with the results of a performance assessment.

CHAIRMAN MESERVE: Thank you.

Let me turn to my fellow Commissioners and see if they have any questions.

COMMISSIONER DICUS: Thank you.

I'd like to bring up one thing.

The findings that you had from some of your public meetings with stakeholders -- now, are these from meetings you had in '98 or '99?

DR. GARRICK: Oh, I should have made that a little clearer. Actually, it's both, but most of this is from the '99.

COMMISSIONER DICUS: Okay. When did you meet in '99?

DR. GARRICK: Was it October? Yes, it was in October of this year.

COMMISSIONER DICUS: I'm curious about that, and what I'm going to bring into this is this risk communication but, more importantly, how we communicate with the public and how the public sees the NRC.

I had the opportunity in April -- I spent a day -- I went out to Yucca Mountain, toured it. I spent a day and

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made it aware I'd meet with anyone who wanted to meet with me, and we spent a day. We started about 8:30 in the morning to about 5:30 in the meeting.

DR. GARRICK: By the way, we heard about that.

COMMISSIONER DICUS: It was a good meeting. I meet with State and local officials. I met with public interest groups. I met with Native American tribes, anyone. I met with the press, which is unusual. I usually don't do that.

And I learned the same things you learned. I learned some things beyond that.

I learned that the public didn't quite know how to deal -- how could they be part of the process. They didn't know who we were. We weren't communicating who we were. We weren't telling people -- we were not DOE. Some felt we were actually part of DOE.

And so, I came back and I met with the staff, and I've told them what I had learned. I had a lot of people of the staff with our Yucca Mountain group with me, so they heard the same things I Heard.

And we talked about it, and changes were made in how we're going to communicate with the public and some of the things that we were doing that maybe were not as effective as they should have been, and we had a series of meetings with the public in the summer, and my feedback was

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things had changed, we were communicating better.

So, that's why I bring up the question. If you met in October and you had these findings, where are we in getting this change-around, because I think we're doing a better job of communicating.

DR. GARRICK: Well I think you're absolutely correct, and I think that, in talking to the staff and in their public meetings, they had similarly positive experiences, and I think the number one issue here is the public would like to see a much stronger presence of the NRC, because they really don't know the agency.

COMMISSIONER DICUS: And I think that's what we're trying to do.

DR. GARRICK: Right. And I think that, in '99, we probably made our first real attempts to expose them to the agency and its advisory process,and I don't see anything but positives that have come out of that, and I think that your meeting, the staff's meetings, coming before our meeting, and ours from last year, were all building blocks, and they just want -- some of these observations, they just want to make sure that they got out and that they weren't forgotten, because they were extremely appreciative that we didn't forget them.

Most of the people that were in our meeting were also in our 1998 meeting, and they thought, I'm sure, that

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we might just forget about it, but the fact that we came back and the fact that we tried to respond and show

continuity between the two meetings seemed to be very appreciated, and we plan to go back.

COMMISSIONER DICUS: I think that's extremely important and we keep this message going forward, because it's clear that -- the point is not to try to, quote/unquote, "win people over." The point is be sure they understand the role, understand who we are, and understand they do have a part in the process and know how to participate in that process.

Mr. Chairman, if I could just ask one more quick question -- I have two or three, but let me stop at this, and we can come back if there's additional time.

You say the NRC should take lead in clarifying the role of various agencies involved in transportation of high-level waste, but clearly the lead agency is DOT. So, how are you dealing with DOT on this?

DR. GARRICK: Well, this is a continuing subject of some confusion.

It's true that the NRC's role is principally with respect to the shipping cask and the certification of those casks and that DOT's role is principally with the transportation issues, but our understanding is that, as far as the -- taking over the waste at the reactor site, once

it's taken over, that DOE becomes responsible as far as safe delivery of that waste, and so, I think the fact that we have had to discuss this issue of who's in charge -- and it seems to be different for WIPP, for example, in New Mexico than what we're hearing it is for Yucca Mountain, and I think this is still kind of an open question, but our discussions of late on this have led us to believe that, as far as safety of the process of moving the fuel, that's a DOE responsibility in terms of making sure that the DOT, the NRC, and all other requirements are met.

But as far as the safety of the process, we have been recently led to believe that it's principally in the hands of the Department of Energy

So, I think just the very fact that there's some question about that is another opportunity for us to provide clarification on just exactly --

COMMISSIONER DICUS: So, do we have a pathway to go forward on that?

DR. GARRICK: Yes.

COMMISSIONER DICUS: I mean the transportation, I think we might all agree, is not really necessarily a public health and safety issue, but it is a public policy issue, and we do need to address it.

DR. GARRICK: Yes. And the public does not seem to be aware of the extensive amount of work that's been done

on such things as the testing of fuel casks and the Sandia experiments of years ago, when they crashed these things into walls and 70-mile-an-hour trains and what have you.

So, there seems to be a real gap here of understanding the difference between death that might come from an accident, a truck or automobile accident, and deaths that might come or injuries that might come from radiological effects, and I think we really need to do some work there.

CHAIRMAN MESERVE: Commissioner Diaz, do you have any questions?

COMMISSIONER DIAZ: Yes.

I have been very pleased seeing that you are casting risk a tripod of assessment, communication, and

management, because I think that's a very important issue, and you have spent now one year in an effort of trying to communicate risk? Is that correct?

DR. GARRICK: Well, I've spent a lot more than one year.

COMMISSIONER DIAZ: I know you have. I think that is a fascinating issue, and I was wondering if you could define for us, when you are trying to portray how you would be able to accept a risk, how do you define risk?

DR. GARRICK: Well, it's interesting you'd ask. I was delighted to see the Commission white paper of a couple

of years ago adopt what we refer to in the business as the triplet definition of risk.

When you ask the question, what is the risk, you're really asking three questions in the judgement of those who have accepted the triplet, and that is what can go wrong, how likely is it, and what are the consequences, and we've been very encouraged by the results of adopting that point of view of what we mean by risk, because we answer the question of what can go wrong in the context of a structured set of scenarios, and of course, the consequences question is something this agency has a lot of experience with, what are the end states of these scenarios, and usually what happens there is you decide on what those are and then you look for scenarios that can get you to those end states.

In the reactor field, an end state might be core melt or it might be a release fraction of a certain mix of fission products, or it might be dose, or it might even be health effects, but the point being is that it's not -- it's important to define what the end state is or what the risk measure is and then deal with the question of how can you get there, and then, of course, you have to look at whatever supporting evidence that's available to you to deal with the question of likelihood, and the important thing to recognize in that part of the question is that there's uncertainty, and you've got two choices with uncertainty.

One is you can ignore it, which unfortunately is often done, or you can embrace it as best you can and recognize that the uncertainties have to be supported by whatever evidence you can develop, but if you don't have much evidence, then your uncertainty curves are very broad, but that communicates a very important aspect of risk, because in the minds of many, the uncertainty is the risk.

COMMISSIONER DIAZ: That brings up -- you know, the immediate point is that, when you're trying to communicate risk -- at least my own experience is, when you start talking about probabilities, consequences, and uncertainties, you immediately get glazy eyes.

People want something that is more precise and more specific, and you know, once you start, you know, going in what we will call a very complete scientific analysis or definition, the immediate question is what does it mean to me, and my question is have we made progress to answer that question, what does it mean to me?

DR. GARRICK: I think it will take time. I suspect, when pressure parameters involving pounds per square inch first came out, that it was an abstract concept for many, or miles per hour, or any of these parameters, and I think, with usage, that the notion of expressing things in terms of probabilities will become more comfortable.

I think it's a convenient issue to pick on by

people who do not support the quantification movement, but I just have confidence that, with time -- and it will take time -- it will be increasingly accepted.

I don't think there's anything that will do it except experience with it.

DR. HORNBERGER: The Weather Channel is going to help us, because people are understanding, when they say a 10-percent chance of rain, as to whether they really want to carry their umbrella or not.

COMMISSIONER DIAZ: All right. Thank you.

CHAIRMAN MESERVE: Commissioner McGaffigan.

COMMISSIONER McGAFFIGAN: You referred to the WIPP experience, and from one of your draft observations, NRC lacks a clear bottom line and basis for decision-making, would the public in New Mexico have said the same thing about EPA when it was dealing with whether it would certify WIPP?

DR. GARRICK: Well, early in the time of the WIPP performance assessment work, they were clearly saying the same thing, and I think that the performance assessment was relatively unscrutable or inscrutable during its early drafts, and I think that there was a lot of confusion.

The technical community was a bit unhappy with the 40 CFR 191 and the released table -- released fraction tables associated with that regulation, partly because it

was not so much a real measure of risk, or putting it another way, the risk measure was based on release fractions, not on health effect or dose or something more directly translatable.

So, I think they went through the same process.

COMMISSIONER McGAFFIGAN: Did they ever succeed? How important was this Environmental Evaluation Group that New Mexico had?

DR. GARRICK: I think it was very important.

I think that they -- and it's regrettable, in my opinion, that there's no real effective counterpart to that in connection with Yucca Mountain, because these people, while they were extremely critical and raised very difficult issues, they were also scientists and engineers that attempted to understand the technical merits of the issue, and I think it was a tremendous bridge-gapper between the regulator and the licensee in this case in terms of gaining understanding of what was taking place, and they had an enormous impact.

COMMISSIONER McGAFFIGAN: For my fellow Commissioners, the Environmental Evaluation Group, my recollection, was created in '81 or '82, very, very early in the process, as part of a settlement between the State, I think then-Attorney General Bingaman was part of, and the DOE, and it was there for that entire 17-year period between

'81 and '98 while DOE worked on things, it's been, particularly for the last seven years, when EPA had a clearly established role as the party, and it does strike me, oftentimes, as we deal with Nevada, that the equivalent to the Environmental Evaluation Group, you know, isn't there.

It was funded by DOE. It was based at a university initially, at New Mexico Institute of Mining Technology, and had competent scientists there who spoke the same language, and they, in turn, struggled at risk communication with the broader public. So, they almost had

a shared issue.

DR. GARRICK: Exactly.

COMMISSIONER McGAFFIGAN: So, I think that would help if Nevada would consider that.

But in terms of bottom line, in some sense, our Part 63 is an expression of our bottom line. Is this observation that they don't like our Part 63 which comes across in others, the 25 millirems, all pathway, 10,000 year -- over the first 10,000 years of the repository's existence, or is it something else?

DR. GARRICK: Well, I don't know that you could say they don't like 63. Sixty-three has some changes in it that are really fundamental as far as the regulatory process is concerned. Maybe most notably is the elimination of the

sub-system requirements.

And I think inherent in human nature is that, when you make changes of such a fundamental nature, you know, there is some concern that you're possibly removing some protection, but I also see in the public comments the other view, that it's very much a move in the right direction, that it's less dependent on surrogate measures of risk, it's more focused on bottom-line issues having to do with safety and risk.

COMMISSIONER McGAFFIGAN: The Nevada public may not be giving us a lot of comments.

DR. GARRICK: Right.

COMMISSIONER McGAFFIGAN: There's one other issue -- in terms of how we're going to communicate and how the Commission performs -- and we may well look at it -- we've said we're going to look at it, but when the license application comes in, if it comes in, in 2002, we get into a very different mode of communicating with the public, just as Calvert Cliffs -- I have met with the Calvert Cliffs licensee for a long time, because there's a pending proceeding or whatever.

If there is a pending proceeding and there are parties and people have standing and all that, then we, the five of us, get quite removed.

The staff can continue to have public meetings.

With PFS in Utah at the moment, the staff has a large number of public meetings, but Commissioners -- I think SECY has a standard letter, you know, the Commissioners appreciate your views, I've shared it with all of them, it's in the file, but you can understand why they aren't going to respond, because this is a matter pending before the Commission.

So, we get quite distant at that point, and that may be an impediment to communication at a critical time. I don't know what the answer is.

You will be able to communicate, the staff will still be able to communicate, but we're going to have to be, with our judicial robes on, more sphinx-like during a fairly critical time period.

DR. GARRICK: Maybe that's an additional opportunity for the advisory committees.

COMMISSIONER McGAFFIGAN: It wasn't the case with WIPP, because EPA doesn't have a formal adjudicatory hearing process.

DR. GARRICK: Right.

COMMISSIONER McGAFFIGAN: They had numerous public meetings, including some that very high-level officials

attended in New Mexico, but they weren't hearings, and so, there's a question in my mind as to whether you get more public confidence through something less formal than you do

through something as formal as we've chosen to do over the years.

CHAIRMAN MESERVE: Commissioner Merrifield?

COMMISSIONER MERRIFIELD: Thank you.

Former Chairman Dicus, Commissioner Dicus, had raised an issue relative to transportation casks and some of the information currently out there on that, and there has been a lot of rhetoric thrown around about mobile Chernobyls and the dangers associated with those casks.

When one talks about public communication -- you mentioned some of the films that are out there, some of the research that's been done -- I've seen some of those films -- and our ability to communicate our thoughts about those casks and their safety, it raises an issue and a tension that we've had in the 25 years since we became the Nuclear Regulatory Commission, and that is the tension between our providing information to the public and being promotional, and I think there has been some reservation on the part of staff and previous commissions to provide a greater level of information about some of these issues for fear that we would be cast in the light of being promotional, and so, as it relates to an example such as this, how can we -- have you thought -- how can we better serve the public by providing more information, whether it's the films, whether it's detail, whether it's our response to how safe those

casks are, without compromising the need for ourselves not to be promotional?

How do we get that balance and provide greater information and, to some degree, comfort to people who have fears about the use of these casks or other issues associated with Yucca Mountain.

DR. GARRICK: Well, I'm not sure I have an answer, but if I were sitting in the position of being the regulator, I guess the way I would attempt to address it would be to, during the licensing process, be darn sure that the case for transportation was visible and an important part of that application.

I think, if there's one issue we ought to be able to do a very thorough and comprehensive analysis of, it's transportation risk, and I think the burden for doing that ought to be on the applicant.

So, at least one approach here would be to make darn sure that the applicant does that.

Now, I don't think this is the kind of thing that's going to require long periods of time and extensive research and analysis.

I think it's more a matter of taking what we know, the experience we have -- we're much more advanced now in the analytical process on characterizing the risk of systems than we've ever been before, and bringing it together in the

context of a risk analysis that's compatible with the way in which they're doing their performance assessment.

So, I think, from NRC's perspective -- I'm not a regulatory expert, but it's more a matter of being satisfied that the license has done the job that the NRC thinks is required to enhance public confidence and understanding.

It just strikes me that this an issue that is out of control and absolutely unnecessary, because this not one

where we don't have technologies, we don't have information. We have a tremendous amount of information, but we've just not put the story together in a way that allows the public to distinguish between routine transportation accidents and fatalities and the shipment of fuel and the associated radiological risk associated with it.

COMMISSIONER MERRIFIELD: You sort of go both ways on that.

In part, you're saying we ought to require that the applicant provide sufficient information to demonstrate all these things, but at the same time, you seem to be saying but there's still a need out there -- we have a lot of information that's available, we need to make that more readily available.

Is there a mechanism or a way in which we can say, okay, this is what we know about cask designs, this is how we would evaluate the cask, this is what we know about

transportation issues, this is how we would evaluate them?

Is there a better way for us to articulate the thought processes -- you talk about transparency -- the thought processes that we're going to through in evaluating that and making sure that they're safe?

DR. GARRICK: Well, I think there surely must be.

I happen to be a believer in the white paper concept. I think it would not be inappropriate for the Commission to say to its advisory committees give us some thought about this subject and perhaps it could be a candidate for preparing something like has been prepared by this committee in the past on selective topics, and the ACRS, as well.

So, I think that there's probably some things that could be done by the NRC that would better prepare them for addressing it in the license application that would begin to pull these pieces and parts together.

That's partly why, if we get to it, that's partly why we poked our nose into the design arena and wrote a white paper by our former member on the matter of repository design, because we think that it's very important, in order to ask the right questions, to stretch our limits of understanding of what's going on way beyond what we expect will probably be in the application.

CHAIRMAN MESERVE: We do need to move on to

another subject. Commissioner Diaz has assured me he has a very short question, and I'll hold him to that.

DR. GARRICK: It's a question of whether I have a short answer.

CHAIRMAN MESERVE: And I'll hold you to one.

COMMISSIONER DIAZ: Same issue. You know, we realize that this is a multi-layer system from the scientific issues to the technical issues and how you communicate risk, and we're all very aware of the disclaimers that are put every time something is finished, like you know, this is our conclusions, however additional work is needed to narrow down the uncertainties, and when you put that disclaimer in, you know, you throw the whole ball of wax.

My question is have you been able to gauge the importance of credible and accountable convergence and simplification of scientific and technical facts prior to the time that you disclose that you actually, you know, do your risk communication?

How important is a credible and accountable process of simplifying convergence so you will not have that many disclaimers, you will not have that many issues, which essentially reopen the issue?

DR. GARRICK: Well, I will try to give a short response to that.

I think part of what you're asking, Commissioner Diaz, is -- has to do with how you present the evidence that supports your analysis, and I think there is a lot more creative opportunities there than sometimes we employ in how we present the supporting information for our analysis, and this is why I really like uncertainty analysis, because if you admit to the uncertainty and present your state of knowledge in your parameter measurements, then you have a basis to say, okay, here is my supporting evidence and this is why those curves have the shape that they have, and I think there's got to be a better connection between the results we present and the supporting evidence, and that we just have to keep working on.

COMMISSIONER DIAZ: Okay. Thank you.

COMMISSIONER McGAFFIGAN: Just very briefly, this follows up Commissioner Merrifield and Commissioner Dicus.

Yesterday you got briefed by DOE, or the day before, on their DEIS, and one of the issues is, of course, transportation, and they present an analysis for the mostly truck case, the mostly rail case, with statistics that would lead one to believe this is not a big issue.

It's not dissimilar from the Part 51 rule-making we did earlier this year, where NRR, for the purposes of license renewal, had to look at transportation in the vicinity of Yucca Mountain and it had very, very

conservative analysis, really piling conservative assumption on conservative assumption, not the sort of thing you generally like, but it still found very low numbers in terms of latent cancer fatalities for any member of the public.

Is there something wrong with the way both we and DOE, when we're doing our EIS's, are presenting this? What are you looking for in the way of improved risk communication?

In some sense, DOE is trying to justify the transportation case right now in its draft EIS, and I'd be interested in whether you had any comments on how they could make that -- what they need to do to improve that case, what comments we maybe should make to them as to how they should improve that case.

DR. GARRICK: I think there's a couple of questions here.

One is the believability of the results by the public, and again, I say the answer to that is the same one I gave to Commissioner Diaz, and that is that I think part of our problem in getting the public to believe our results is the abstractness of our analyses.

They're very esoteric, they're very difficult to comprehend, and where we can improve things is to tighten the connection between the results we have and the supporting information.

Now, yesterday, when we heard all of this, it prompted a lot of the kind of questions you're asking, and we haven't had a chance to look in the details nearly as much as we'd like, questions about, well, how did you factor into your analysis the details of the integrity of the cask

and what kind of basis did you use to decide what the impact forces were and so on and so forth, and it's going to require a little more digging than we've had an opportunity for us to establish a connection between what they, in fact, did, and what can be supported by the information base.

I really believe that the answer is in the evidence package, how you put the story together to support your analyses, and that's difficult to do, but where it's been done, it's been very effective.

COMMISSIONER McGAFFIGAN: My only comment is I know that the people of New Mexico, dealing with the WIPP containers and the WIPP transportation routes, you know, to this day continue to raise issues, because it tends to be bumper-sticker sort of stuff.

I mean I think that the EPA and the DOE and most of the folks don't believe there's a big issue there anymore and a lot of money is going to flow to improve local fire departments and that sort of thing, but -- so, partly, again, going back to the WIPP example, this is still not a fully resolved issue in the case of WIPP.

DR. GARRICK: That's right.

COMMISSIONER McGAFFIGAN: Yet, most people don't -- including the Environmental Evaluation Group, I think -- don't think there's a big transportation issue here.

DR. GARRICK: That's why it's all the more important to deal with it in a convincing and reasonably coped fashion, because the evidence is pretty strong that it's not a big issue, and yet, in the minds of the public, it's perhaps the biggest issue, especially during the operating phase.

CHAIRMAN MESERVE: I think that the extent of the questions reflected both the importance of the general subject and the interest, in particular, in its application to Yucca Mountain. Why don't we proceed?

DR. GARRICK: Okay.

One thing I did want to say -- as you know, the committee is only 75-percent complete right now, and so, what we've done to help us is bring in a consultant to work with us in a few meetings, and in order to make the consultant feel very comfortable -- and he's not on next -- we've given him one of the toughest subjects to talk about, Part 63, and he'll have a chance to do that in a little while, but first George.

DR. HORNBERGER: Thanks.

My topic, as you know, is to discuss with you a

little bit the white paper and the cover letter that the ACNW sent.

The white paper was prepared by our former member, Charles Fairhurst, and I guess, of our presentations, this is the only on that you already have in hand. Everything else is a work in progress.

Just as a little background, we have had an interest -- and this was enhanced when Charles joined the ACNW -- we have had an interest in engineering aspects of the repository.

It's our perception, was our perception starting even several years ago, that it's a geological repository. There was an awful lot of emphasis put on natural processes, geological aspects, site characterization, but in moving forward, it was pretty clear that DOE was focusing evermore on design aspects of the repository, and we thought that it

was incumbent on NRC staff and on us to really keep up to date on what was going on, and Charles, in particular, had a very strong interest in the engineering aspects, and therefore, we thought that it would be a good opportunity for him to prepare a white paper that would certainly educate us and raise the level of our discussion on engineering aspects and provide some useful information to NRC staff, as well as others outside the NRC.

The point of the white paper, looking at page 12,

that slide, is that -- the whole issue is that there might be innovative engineering designs that would lead to two things: first of all, enhanced safety and, second of all, reduced costs.

This is the best applications of engineering analysis, and the intent of Charles' white paper wasn't to promote a specific design but, rather, to just stimulate thinking.

The next slide, on page 13 -- this is the piece de resistance of my presentation.

My colleague, Ray Wymer, told me this was a terrible slide and that it was a typical engineering slide with no title, with little dots, it was obscure, and I was warned that I would get bogged down for 10 minutes trying to explain this.

Nevertheless, pushing right on, this is just an illustration of one of the analyses that Charles undertook, just as an example.

Again, I stress it's just an example, and the issue is that, in looking at the performance assessments that are done for Yucca Mountain, it is clear that water contacting the waste is really important, and anything that can be done to avoid water contacting the waste package could lead to very significant improvements, and so, Charles was thinking, well, isn't there some way that we could use

aspects of the natural system to our advantage, and so, one of the things that this show is a three-level repository -- that's what those little dots are.

They're drifts, and you see that one -- there are three in a line, one above the other, and at the very top, he shows a slot with what's referred to as a Richards barrier to deflect water from the general direction, and then he goes through a fairly simple analysis that shows that, particularly for the lower two drifts, the water entering the drifts is very much reduced, it essentially goes to zero, so that with -- perhaps -- I underline perhaps -- with some very modest design changes, one could reap pretty large, significant benefits in terms of safety without much at all.

So, on page 14, the -- to tie this together, then, in terms of the white paper, I just wanted to recall that, in the past, we have recommended to NRC staff that, because of the increasing emphasis on engineering aspects of the Yucca Mountain design, we encourage the development and enhancement, if you will, of expertise and engineering aspects of repository design and really a systems engineering approach.

By that, we really mean an overall, a holistic view of the Yucca Mountain as a system, and we have recommended that in several letters over the past two years,

I think, and we did visit the center this past -- I think it was June, and we held a meeting down there, and we have seen

that, in fact, there is a movement to really improve on the expertise available in engineering aspects.

The next slide -- as you will recall in the letter that we sent, we recommended that the NRC staff actually explore innovative designs for the repository, and our idea is that these could allow furtherance of the NRC mission of enabling safe and efficient use of nuclear materials, as well as to enhance the engineering capabilities of the staff in preparation for a design, and the enabling language -- I suppose, in large part, we are somewhat frustrated, as technical people tend to be when we deal with the Department of Energy and see what they're doing and say, well, we would like to advise them on what they should doing, even though that's not our job at all, and I think that, to the extent that the NRC staff, the NRC, could somehow encourage DOE to look at more innovative designs -- and of course, if NRC staff took it on themselves to do that -- that this actually might move the whole field forward, and that was the thrust of it.

Page 16, having said that, we fully recognized when we sent the letter forward that the most likely response would be, well, it's not NRC's job to design the repository, and we recognize that. That's straight up. We

know that it's not NRC's job to design the repository, and again, I think that our whole intent was to stimulate thinking, and it's our belief that, by looking at new ideas and looking for new ideas, that one will automatically be put in a better position to evaluate whatever does come forward.

Milt Levenson mentioned today that the idea can be expressed as, if you like, confirmatory engineering, in much the same way that NRC does confirmatory research, they don't do primary research for looking -- defining new things for Yucca Mountain, but they do confirmatory research, and at any rate, that's the idea that we came forward with.

Okay.

Finally, in terms of repository monitoring, we know that repository monitoring is included in Part 63, both pre-closure and post-closure, and the thrust of our recommendation here in terms of considering guidance that NRC may give to DOE on monitoring was really seconding, if you will, a USGS position that you may have seen that the ideas for monitoring have not really been expressed very clearly by DOE, they have not expended much energy on that, and we think that it is an important issue and that it's timely, that this really should be done, that the department needs to think about what both the pre-closure and the post-closure monitoring schemes will look like so that

evaluation can begin.

CHAIRMAN MESERVE: Thank you, Dr. Hornberger.

Has the ACNW forwarded the white paper to DOE, and have you had any reaction or response from them on that?

DR. HORNBERGER: I don't know that we officially forwarded it, but we do know that it has been seen and read, and one of the ways that we know this is that you see that Charles Fairhurst is no longer with us. He has been tempted by DOE to actually look at innovative designs. So, of course, he had to resign.

Has it been officially forwarded, John?

DR. LARKINS: No.

DR. HORNBERGER: No, but it's been picked up.

COMMISSIONER DICUS: I wonder if they've responded to it.

I have a couple of things, but I'm watching the time here, so let me get in the first one. If time allows, I'll get into the second one.

This has to do with the issue of the NRC being involved in whatever extent we do in design activities for the facility.

We're walking on, as you mentioned, thin ice, egg shells, however you want to place it, and I go back to the issue of public perception and how the public perceives us and DOE, and we're nudging over the line, in my view, on

this.

Now, I understand what you're saying. I understand that, well, we need to deal a little bit in this, in trying to put it in terms of confirmatory research, but the public will not understand that, and I'm really concerned that we're sending a dual message here, and I guess my question -- you know, we're obviously not funded to do this, it won't make a cost-effectiveness question -- is there another way for us to ensure that, should we get a license application -- and I think this is another message we need to be very clear on, because we talk so often in terms as though the decision has already been made, we will have a license application.

There is no decision. We don't know that we will. Let's be clear in our communications. That's another thing the public comes to us at. You talk about what you're going to do when you get the license application. We don't know that we will get one.

But is there another way for us to demonstrate that we do have the engineering expertise, if we get a license application, to deal with this without nudging into this field of facility design?

I'm worried. I think we're a little more into it than we should be.

I know what you're trying to do, and I appreciate

that, but I am concerned. Is there another avenue to success here?

DR. HORNBERGER: I'm not sure that the ACNW really thinks that the NRC should undertake -- the NRC staff should undertake a new program to really figure out what the optimal design should be.

I think that it was more being prepared to evaluate what might come forward as innovative designs, and in doing that, I think that the idea is that, by just thinking creatively about what such designs might look like and then being prepared to do the analysis, it's not really bringing new designs forward. I think that we're sensitive to that.

Part 60, of course, required alternate designs, and I think that, in draft 63, that's still carried over. Whether or not it will be in the final, I don't know, but the whole idea there, I think, is that, again, in terms of public confidence, one wants to see alternative designs, and if, in fact, there's a low-cost option that somehow adds a lot of safety, we want to make sure that the department would look at that.

I recognize it's a very dicey situation.

DR. GARRICK: Let me give another spin on this.

I think that one of the things we want to be very sure of, putting my public hat on, is that the NRC is

qualified to do the job they're asked to do.

We want as good a design capability, good analysis capability, as good a research capability on the things we're trying to license as we possibly can have, and a direct experience with the ACNW members is the experience we have when we come onto an issue and we make the decision that we need to burrow in on that issue more, and the way we do that is with a workshop, our working group session, and we had a working group session about the time when it was clear that it looked as though that Yucca Mountain was going to have to depend much more than anybody had envisioned on engineered systems, and so, we have a workshop on that, on multiple barriers, on engineered systems, and these workshops are the most satisfying, in many respects, activity that the advisory committee does, and it really is kind of the exciting part of our business, because it nurtures our own ability to do a better job of this, and it somewhat offers us a chance to be unbounded in our inquiries and our investigations, and it equips us, in our judgement, as George has already said, much more effectively to do our job, and that's exactly what happened here.

When we had the workshop, Charles Fairhurst really got stimulated about some of the design issues, and how can we make the repository less dependent upon engineered systems and take greater advantage of the natural system?

So, it sort of had -- and part of it's probably my fault, because I pushed Fairhurst to do a dump on us, on the committee, on matters of design, so that it could be used in this regard, but we recognize exactly what you're saying and the absolute importance of us not to send out the wrong message here, but I did want to make the point that it's these kinds of pursuits that makes, I think, the advisory committees more effective and allows us to attract the best possible people.

COMMISSIONER DICUS: Thank you.

COMMISSIONER DIAZ: My question has been answered.

COMMISSIONER McGAFFIGAN: It's sort of in the same ball park, but it strikes me that it isn't as clear-cut in some respects.

We just happened to affirm AP-600 earlier today. There's a famous issue on which the Commission was not unanimous with regard to the additional spray system that your fellow advisory committee, ACRS, ultimately advised us to go along with the staff and add.

Is that adding a safety feature -- it was added for severe management issues. It was the strongly-held view of the staff. As I said, ACRS, because of uncertainty, on balance, said, you know, let's do it. It was not very high-cost.

But we added a design feature to the AP-600 as a

result of the review process.

So, the question is really, you know, if we get an application -- and I don't know what a Richards barrier is -- I saw the chart, but -- and say it isn't in there and the staff asks DOE a question, you know, would safety been enhanced by having a Richards barrier and DOE hems and haws and the staff, over time, convinces itself it really would be better and we put in a license condition that says you do -- ultimately the staff proposes and we ratify through the adjudicatory process -- this is all hypothetical -- then

we've changed the design by adding an additional safety feature, but it is not without precedent, and I'm sure Commissioner Diaz would say unhappy precedent.

COMMISSIONER DIAZ: In case you don't know, I am totally opposed to adding a system that is not safety-related to fulfill a safety function on the passive system.

COMMISSIONER McGAFFIGAN: Okay.

I'm not sure it's as cut and dried, because in reviewing an application and asking questions and thinking about -- clearly, in reactor space, we have said we'll approve it subject to the following conditions, and those conditions involve a design change.

So, I'm not sure -- we shouldn't be designing the repository, but we should be in a position, as I think you

all are saying, our staff should be asked hard questions about the design and asked questions, you know, would there be a benefit to a delta here and put the applicant through -- if there is an application -- through their paces as to whether that additional safety feature, that additional use of the mountain would provide a substantial increase in safety or not.

I think it's a path we have to walk, but it's maybe not quite as clear-cut, because we do get involved in the design issues in the license space.

CHAIRMAN MESERVE: Commissioner Merrifield.

COMMISSIONER MERRIFIELD: Two quick questions.

How do we -- given the presentation on the Richards barrier and these issues, you raise the notion that we need to keep considering some alternative theories out there.

How do you reconcile that with the need to try to get DOE to finalize a design so that we can move forward with the work that we need to do? I mean those seem to be two very different criteria.

DR. HORNBERGER: Yes. To a certain extent, they are, and I think our advice would, in fact -- we're always leery of the idea of finalizing a design and casting it in concrete and saying it shall evermore be thus.

At the same time, we recognize that the staff

faces this huge problem of analyzing the design du jour, and you have to get away from that.

I don't know how you resolve that, but I do think that maintaining flexibility is extraordinarily important, because it's clear, I think, to everyone that what we know 10 years from now is going to be different from what we know today, and we simply have to be prepared to accept changes as one goes.

COMMISSIONER McGAFFIGAN: That's fair enough.

My associated question is this: We rely quite heavily on the Center for Nuclear Waste Regulatory Analysis to do a lot of that work for us. I had an opportunity to visit there earlier this year, and I've said very complimentary things about what I refer to as our NRC extended family down there.

Are we looking at the right things there? Are we committing the right level of resources to that facility to do the kind of work that you're talking about?

DR. GARRICK: Good question.

DR. HORNBERGER: Oh. Well, you answer it.

CHAIRMAN MESERVE: You may want to consider that before answering.

DR. HORNBERGER: It's certainly something that we have considered over the years.

As I said, we held a meeting down at the center.

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We have looked pretty carefully at their whole program, and we have expressed our ideas on how they might set their priorities by looking at the performance assessments and doing things that way.

I would say that -- my personal opinion from our latest visit and from other visits down there is that we are all quite impressed with the quality of work being done, that the people are not only doing good work but that they are approaching the work that they're doing in a structured way and that they really are doing the important things.

The question of level of resources needs some more consideration, I think.

COMMISSIONER MERRIFIELD: You've answered the most significant part of the question I wanted, so we can leave it at that.

CHAIRMAN MESERVE: Why don't we proceed?

DR. GARRICK: Okay.

Mr. Levenson.

MR. LEVENSON: Thank you, John, including the introduction that told me why you asked me to speak here, so you could avoid the tough questions.

I am not a member of the committee. I have read the ACNW letters on the topics I will cover, but I did not participate in the discussions leading up to those letters, and as a result, some of my comments and responses to

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questions really should be considered as my opinions, not necessarily those of the ACNW.

The two areas I've been asked to address is the EPA high-level waste standard issue and the technical issues regarding 10 CFR Part 63.

My perception is that Part 63 is not just an update on the regulations. I think it's very special in that it represents a transition from prescriptive regulation to risk-informed, performance-based regulation, and therefore, it needs to be viewed a little differently than just another regulation.

On slide 20, from reading the letters, I observed that the ACNW concurs with the staff's comments on Part 197 and in the past has supported the 25-MR all-pathways standard, and I personally concur with that, too.

The next bullet is a little different matter. The overly restrictive standards, if accepted, become the norm, and I think that's very important, and the wording of that bullet is very specific to the second point I want to make.

I have not said overly conservative standards. I've said overly restrictive, because it's my personal opinion that overly restrictive standards are almost never conservative.

If you are overly restrictive and you can't do that consistently, you distort what are the real risks.

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Something that is of relatively low risk gets distorted into high risk. You divert resources to address that, and something that isn't nearly so important rises up and catches the attention. I think it's extremely important to recognize that overly restrictive is very seldom conservative.

Once accepted -- I can give a specific example.

For instance, like John, I've been involved with WIPP. An over-restrictive estimate of how much hydrogen there might be in a barrel in order to conform to the NRC license requirements is leading DOE to dump about 15,000 barrels of true waste into glove boxes -- this is heterogenous waste, broken glass, tools -- paw over it with gloves in glove boxes and sort it so they can repackage it into 150,000 barrels, 10 times as much increase.

So, because their computer model over-predicts the hydrogen generation, there is this very large program of expenditure to people and 150,000 additional barrels will have to be shipped across the country to WIPP.

The basis of saying their estimate is overly restrictive is when they randomly sampled 150-some barrels, none of them came within an order of magnitude of what the model predicted, but the model is what's in the license.

Standards, once accepted, tend to receive widespread application, and like the WIPP case, they lead

to, in fact, near-term exposure and cost very large amounts of money.

One of the things which impresses me is, unlike the financial community -- I, for one, seldom point to things they do as being the right things, but they have learned to cope with addressing the difference between an expenditure today and an expenditure in the future by discount.

We haven't done that with risks or public health. So, what we may be doing here is doing something that exposes people this year, and clearly, if you ship 150,000 barrels, the accident rate is going to kill some people for possible saving two or three lives 10,000 years from now, and that's something we don't know how to cope with, but we aren't going to.

The conflict between EPA and NRC must be resolved, and I realize that, by putting that down, I'm setting myself up for a question of how.

CHAIRMAN MESERVE: You can just answer it now.

MR. LEVENSON: Well, I should say that, obviously, it's not a technical question, but I will make a side comment, which is very strictly my own personal opinion, and that is that the agency and the commissions have a continuing battle on credibility not only with the public but with licensees and with the technical community, and you

may be legally obligated to accept a standard that has no basis in health and safety, and you may have to do that, but I, for one, think your credibility would be aided if it was possible for the Commission to say, from everything that's been done and our analysis in health and safety, our previous standard was -- did protect the health and safety of the public, for legal reasons we have to impose this, and retain the basis that what you're doing is because you have to.

A question came up about what did people mean by transparency in decision-making, and there was some discussion about standards and so forth.

I think the part of the decision-making which is not very transparent to the public, even more so than reading specs, standards, is the fact that the ultimate decision is not tied entirely to the technical language of the standards.

There is legal aspects, there's administrative aspects, there's safety aspects, and there's political

aspects, and I know, when we -- I accompanied the committee, the ACNW, to Nevada for their meeting with the public, and that was one of the things the public didn't really understand, that there are a number of things that go into decision-making, and that, I think, is one of the things that can be addressed and separated.

The next slide, 21, multiple barriers and defense-in-depth -- in the letters I've written, it's clear that the ACNW has endorsed the staff's approach to Part 63, and that's still the case, but I think we need to be careful that it's not intended that it be a prescriptive set of quantifications in the new case.

In its previous letters, the ACNW has made recommendations on viability assessment, including the PA requirements. I think primarily those recommendations include urging more transparency and clear supporting evidence for the decisions that are made and that the licensing steps, the outline that is a series of things that go all the way from the initial safety review to the final closure.

Slide 22, the committee supports the staff thinking as it approaches multiple barriers, and again, I was to reiterate that the thinking is that prescriptive sub-system requirements are not consistent with the move toward performance-based evaluation.

In Part 60, prescriptive sub-system requirements for sub-systems served well, but they might not always have been optimum for safety, because they were independent of system effects, and that's fairly important.

The sub-system requirements do need to be spelled out. We don't want to generate another rock syndrome, but

we think that they should be spelled out in guidance with the acceptance based on the performance in the performance assessment.

Now, this will work only if the PA is transparent, but that should be a requirement in any case.

I should hasten to add, the staff is moving in these directions.

On Figure 23, the top bullet is just reiterating that we think the staff is moving in that way.

The last bullet, which actually has five items on it, two on this slide and three on the next slide, is to just identify things that the committee is working on and will be taken up in the next few meetings.

On slide 24, the design basis event probably requires a significant amount of rethinking. Most of the thinking within the agency on design basis events is related to reactors and dynamic-type accidents and things that are not exactly directly relevant to a repository. But there are some things, like human intrusion, that probably will require the design basis event as opposed to some other evaluation of how to go about it.

The issue of transportation continually comes up on everybody's slide, because it comes up with everybody you talk to.

I should say that the general public who live

right around WIPP may be comfortable with the transportation, but an awful lot of people, including representatives of the Conference of Governors and so forth, are not, and we've heard a fair amount of that, not in the

ACNW hearings but in some National Academy hearings in which I've participated.

The WIPP -- it's our understanding that the Yucca Mountain and the WIPP thing are different in the following respect:

In Yucca Mountain, it appears that DOE has total responsibility, that they take legal custody for the fuel at the reactor site, or if it's high-level waste from Savannah River or somewhere, it's clearly theirs already, and it will move in licensed containers to a licensed facility, and DOE has responsibility for everything along the way.

That's not exactly the case with WIPP. It isn't very clear who's responsible for what. DOE is responsible -- as they are for Yucca Mountain, DOE is responsible for funding the training of people and providing equipment, but apparently the responsibility for emergency responses, for monitoring, for escorting is not a DOE responsibility.

That's a state's right issue and it resides with the states, and when you talk to the people at the state level -- this was a real issue with WIPP, even more so with Yucca Mountain -- states haven't done anything because it

isn't going to be shipped until X years from now, why should we be doing something about it now, but the local public, all they see is nothing is being done, they can't get answers to their questions, and so, it remains a troublesome issue at the local level, even though any assessment you want to do, the risks -- the radiological risks are very close to nil.

If you're shipping tens of thousands of trucks through your community, the accident rate is not nil, and the committee needs to still cope with what is appropriate role for the Commission and for the committee, but we recognize that it seems to be one of the most sensitive issues.

For one thing, at some level up here, members of the public are concerned about their descendants 10,000 years from now, but at a much more gut level, they're worried about a truck smashing through a neighbor's car next month, and so, it's an issue for future considerations.

CHAIRMAN MESERVE: Thank you very much.

I have no questions, but let me just observe that this rule-making will come to the Commission, I think, the end of March, so that you ought to be planning your activities, as I'm sure you are, to make sure you have whatever input and advice you can give us as we're confronting that issue.

Let me turn to Commissioner Dicus.

COMMISSIONER DICUS: Thank you.

Two quick questions, one of which you may want to defer and answer and think about a little bit, which is the topic you were just on, and whether or not -- and being a former state person, I appreciate the fact that state people have mixed emotions on the transportation issue, and I dealt with that on the Southern States Energy Board, but the question you may want to consider and get back to us at a later time -- do you think that DOE is on board and recognizes that transportation is a political, legal, public, policy, interest question, even though it may not be a health and safety question, and they're really prepared to deal with it?

Like I said, you may want to think about that.

The other thing, the other question, then, is are

you pretty comfortable or do you have any concerns about the staff's approach on the defense-in-depth issue dealing with the repository?

MR. LEVENSON: Well, the defense-in-depth issue is an ongoing thing. In fact, there's a meeting in January to explore the staff's position on that. I'm, at the moment, not aware, but I will be attending that meeting. I think the important thing is a recognition that it's an issue that needs definition.

My own personal feeling is that, in the end, we ought to end up with two definitions, because I have trouble visualizing a detailed definition for defense-in-depth for a dynamic, high-pressure, potentially catastrophic thing like a reactor and as it applies to something that is very passive and slow-moving and slow-acting.

So, there's some over-arching requirements that will be general, but the meeting next month is a joint meeting between ACRS and ACNW, and I don't know what the committee members say. I can speak freely and say that I think it would make more sense to evolve two standards.

DR. HORNBERGER: Let me make just a quick comment.

I believe that your question relates to Part 63 in particular, draft part 63.

We have, of course, been in contact with staff, and we're aware of some of the things that they are looking into. We've discussed with them things like importance measures and a whole range of things.

So, we're aware of some of the developments that are going on, and in general terms, we are highly supportive of the directions the staff is taking.

COMMISSIONER DIAZ: I really wouldn't dream of trying to complete your statement, but when you were talking about EPA and overly-restrictive standards, were you implying that the superimposition of a ground-water standard

was an overly-restrictive standard?

MR. LEVENSON: Yes.

COMMISSIONER McGAFFIGAN: I think that makes it unanimous. We dearly hope that EPA will resolve this by reading the technical comments from all the technical bodies, including the Academy of Sciences, on that matter.

On our rule, you have human intrusion listed here, and you have others. Were these issues that were brought to you by the staff's attention or from you reading the comments that came in from others on Part 63 and saying we may need to make an additional comment here?

For instance, on human intrusion, you have EPA, DOE, NEI, almost universally, saying that our human intrusion -- and I think we probably overdid it, too -- that our human intrusion scenario is overly conservative and questioning whether we're following the academy and its advice that what we should do in building a standard is look at a stylized human intrusion scenario and see if there's significant degradation, not even under intrusion, 25 millirems to an average member of the critical group.

So, I just wonder, partly, was this a list that was brought to you by the staff or was this a list that you generated from your own review of the comments?

DR. GARRICK: I think it's our list, and we did observe the staff to make the comment in one of the

briefings that made to us that went along the lines, if

there's a lightning rod in the Part 63, it might be human intrusion.

So, we know that the staff is very aware that this could turn out to be a significant issue.

CHAIRMAN MESERVE: Commissioner Merrifield?

COMMISSIONER MERRIFIELD: Getting back to this issue of our ongoing professional disagreement of opinion with the EPA in terms of the appropriate health and safety standards, one of the concerns -- and it gets to the issue we talked about earlier about risk communication -- is you have two standards -- ours, which is a 25-millirem, and the EPA's, which is 15-millirem with a separate 4-millirem ground water standard -- and from the point of view of scientists or others sitting around the table, we can come up with an analysis of why ours is better than theirs, and presumably they can, as well, but the public -- I'm trying to give them the benefit of the doubt.

I've been accused of being too hard on our sister agency. I'm trying to be more kind.

From the standpoint of the general public, it's two numbers. The lower has got to be better. You don't get any greater issue of risk communication than that. How do we get beyond that? If you want to respond later on, you can do that.

MR. LEVENSON: Obviously, it's not easy to do or it would have been done long ago, but it's why I think the committee used the term "systems analysis" in referring to part 63, and part of the dialogue with the public and some of the dialogue in connection with WIPP, for instance, when we pointed out that if, in fact, you reduce -- you're overly restrictive and the result leads to the requirement to ship 150,000 additional barrels, picking a lower number is not necessarily better or safer, because it leads to other consequences, and you know, there will be a similar thing here.

You can drive a repository, wherever it may be, to doing a tremendous amount of fuel handling in the pre-closure operation and in the packaging that exposes a lot of people, a lot of radiation exposure which is real, for mythical things in the future.

I don't know how you get the public to realize that a number out of context is not a measure of safety.

DR. GARRICK: Let me comment on that, because I think here is an opportunity for us to draw a major distinction between reactor safety and nuclear waste management safety.

In nuclear waste management safety, probably the principle risk issue is the handling of the waste. This is not a case where we have a lot of stored energy somewhere

and if something goes wrong we're going to blow up things. It's not a dynamic system, as George has already indicated.

When you start looking at it on a scenario basis and a total system basis, one of the things that begins to jump out at you is that you really ought to be adopting a strategy that minimizes the handling of the waste.

So, clearly, you could say I want to get it down to a certain number and, in the process of doing that, increase the risk considerably, and I think this is especially obvious in the waste business that may not be in other systems and plants where you worry about that instantaneous, if you wish, catastrophe or accident.

The whole idea of geologic isolation as it was

professed in 1957 by the National Academy of Sciences was to minimize the handling of the waste as a result of taking advantage of the natural setting, and now we find ourselves kind of backing off of that and talking more and more about treatments and handling and losing, if you wish, some of the appeal and advantage that we were putting forth in the late '50s as the advantage of geologic isolation.

So, lower numbers are not necessarily better if you take a total risk perspective.

COMMISSIONER McGAFFIGAN: Just very briefly, one of the commenters -- and I forget which -- has made the point with regard to the ground water standard, which is

really two-tenths of a millirem, I think it is, for iodine-129 -- that's what the de facto standard for this repository is under the EPA rule -- that that will lead DOE to make design choices, I think the point you've just been making, that will actually increase handling but it will also increase output, because of the radon and other -- it won't be any big amount, but by focusing so heavily on that pathway and having a de facto two-tenths of a millirem standard, you're going to end up generating more through the air pathway and other pathways because -- you're just not optimizing as a system.

DR. GARRICK: Yes. And I don't want to do it here, but if we have time in the corridor someday, I'd like to give you a half-a-dozen examples in the reactor field where the over-focusing on a single criterion contributed to risk quite considerably.

CHAIRMAN MESERVE: Thank you very much.

Why don't we move on?

DR. GARRICK: Yes.

Dr. Wymer.

DR. WYMER: My topic is facility decommissioning. We think that it's a very important topic and one that's growing in importance almost daily. So, we're paying close attention to it and will continue to pay close attention to it.

My presentation has got two parts, really. One is I'm going to very quickly review our earlier recommendations in the letter of just about a year ago.

Last January, we wrote a letter on this topic, and so, I'm going to review the recommendations we made in that letter and give you some insight into what we think has been accomplished with respect to our recommendations very quickly, and then the second part of my presentation is a subset of decommissioning, which is rubblization, which is a relatively new concept, and I'll discuss a little bit about that.

Going to the first part, our previous committee recommendations are listed on this slide. I don't want to say that these recommendations are ours solely and that the staff hadn't thought of any of these things and therefore anything that's been accomplished is as a result of our recommendations.

For the most part, they were already on path to do all of these things. We pretty much endorsed their position, but they had not accomplished a lot of them at the time that we wrote our letter a year ago, and so, maybe a little updating is in order here.

With respect to continuing to develop review criteria for decommissioning, certainly that has been going

along a pace and will be finished sometime in the spring.

The relatively new D&D; screening code for screening radioactivity levels and thereby providing a path to license termination -- we suggested that they try that at a variety of sites. The code was relatively new at the time.

Since then, they have done that, and they have planned to test the D&D; code. It's my understanding they've used it at six different sites up to this point, relatively simple sites.

We did suggest that they use the code and screen a complex site just to see how versatile the D&D; code was. They have not yet really done that at what we would consider to be a truly complex site, but that's in the plans.

We thought that they should provide straightforward -- and this is another way of saying transparent -- guidance on selection, the screening and site-specific codes, and that has been done. A document has been prepared that lays out quite clearly, much better in its second iteration than it was in the first iteration, what codes apply to what situations and how to select among the several codes that are available.

We indicated that they should continue a program of licensee and stakeholder involvement. That's been done in spades. They've done a lot of that in the past year.

Shifting gears a little bit, we've concurred with

the staff that the clearance criteria should be a priority goal, establishing clearance criteria. This is the establishment of some sort of regulation or some sort of standard that allows you to release materials for unrestricted use.

We recognize that's a difficult issue.

We know that the staff is differentiating between clearance criteria now and below regulatory concern earlier in a sense that below regulatory concern was a policy position by the NRC, whereas the establishment of clearance criteria relates to specific situations and specific cases and it's not stated as a policy position, and that's very difficult.

We do know that the international arena says that maybe a millirem per year is an adequate limit below which something should be considered to be free for release.

Of course nothing has been adopted in this country yet, and it's only a working standard internationally, as I understand it.

We do believe that, if this could be done, it would save a lot of money and it would cycle a lot of useful and valuable materials back into commerce.

We recognize that there is a decommissioning management board which meets every other week, and we think that's a valuable integration tool that allows people in the

various parts of the Commission, of the staff to integrate and coordinate their activities one with another and sort of stimulate each other with respect to what to do next and what's important in a broad sense, and we support that.

That's my sort of quick resume of what we suggested in the past and what has been done since then, and a lot's been accomplished.

I want to move on to rubblization.

The best way to start talking about rubblization, I think, is to give you an example of what rubblization is,

as its presently considered, and that would be in the area of reactor decommissioning and license termination, because that's the area that's mostly likely, almost certain to come up first with respect to consideration of this concept, and there will be other kinds of examples, we think, that might come up later that are not related, necessarily, to reactor decommissioning and license termination.

We do think that it is a precedent-setting concept, and by that, I mean it's a different approach to the handling of low-level -- probably, in this case, very low-level waste.

In the past, there have been regulations -- Britain -- with respect to low-level waste repositories and the conditions that have to be met.

In the case of rubblization, these are more or

less bypassed and the broader basis for granting a license termination, either restricted or unrestricted, is the use of the 25-millirem-per-year standard, as opposed to some of these other standards that have been written into the regulations, which are, for example, having survey markers around the low-level waste repository and having buffer zones and having clearance monitor stations.

These are not necessarily specifically included in the rubblization concept.

It would be acceptable if the ALARA and the 25-millirem-per-year standard were met on the site, after rubblization and after the site is left.

So, it is precedent-setting, and it very likely will -- clever people in industry who are trying to do things in the most economical way and still meet their licensing termination requirements will extrapolate, extend this concept to other things than reactor decommissioning.

For this reason, we think that very careful attention has to be paid to this concept as decisions are made with respect to how it is handled. There are as yet, I think, unforeseen consequences.

We think that clearly we are certainly led to believe that there is a potential for significant cost savings with respect to the use of the rubblization concept, and basically rubblization says you take everything outside

-- in the case of a reactor, take everything outside of a reactor, all of the equipment, furniture, everything that's in there, and you're left with nothing but the structure, you've taken out the core and all these things, and there is some residual contamination.

So, that part of the structure which is above grade, above surface, you do some amount, a yet unspecified amount of cleaning up of that surface by scabbling or some sort of decontamination process to some level which is not specified but could be, for example, as much as 10 times as high residual activity left after the cleanup -- could be maybe as high as 10 times what you would permit under some of the screening criteria if the building were to be left standing and to be available for occupancy.

So, there is residual activity, and it does not necessarily meet the screening criteria that have been established, and then you take these buildings, you convert them to rubble, anywhere from granular, small granular size to large chunks, no specification with respect to the degree of comminution of the concrete, and that would be handled on a case-by-case basis with respect to what the license

termination application contains, and in addition to the cost savings, which are clear, we think that you need to understand better than we do what the cost-benefit ratio is with respect to doing this and what the risk implications

are, and the risk is not necessarily a negative thing.

The risk could go down by this approach because of -- in some ways it might be done, there would be less handling of the waste, as opposed to packaging it and shipping it and putting it in a low-level waste repository.

So, the risk could either go up or down, depending on how it's handled.

There is a significant problem, this same old bugaboo comes up here, with respect to conflicting radiation standards.

We not only have the Federal regulations and the conflicts there, but we have learned from -- in the case of the Maine Yankee, where the people gave us a little discussion, that the state may impose such stringent requirements that it would make it impractical for them to go ahead and use the rubblization concept, and they're waiting for a resolution of these conflicting standards.

I don't think there's a whole lot that the NRC can do about state standards, but nonetheless, this is a central issue.

We're looking for Maine Yankee to come in, we expect, in the not terribly distant future, that we heard from those people at our recent presentation last month, and this will be a test case, and we think a test case for rubblization is extremely important, because it's here that

the real issues will emerge, and the issues relate primarily to how do you demonstrate to the satisfaction of the Nuclear Regulatory Commission that you will, in fact, meet both the 25-millirem-per-year dose limit and ALARA standards and how do you measure the amount of radioactivity in rubblized waste where some of that radioactivity may be internal and not on the surface, you can't just run a probe over it and get a measure of it, and so, how do you get the volumetric measures?

Now, we should say that the staff at the NRC in the research branch have two study projects underway. They have contracts out to study how do you measure volumetric contamination, internal contamination, and we think that's important.

We don't really believe that there will be a lot of radioactivity there, and we think it's reasonably likely that, when you scabble the surfaces of these concrete structures, that you will remove the bulk of the radioactivity and they'll be relatively safe, but you've got to show it.

It has to be demonstrated. The models have to be produced.

Data have to be input, reliable data input to those models, both with respect to internal contamination and with respect to leaching of the contamination in

subsequent times, because this stuff, this concrete is pushed into the -- that part of -- in the case of reactors, that part of the reactor containment which is below grade, and it's covered over with dirt, and the real goal of rubblization is to get to unrestricted license termination.

That's what the desired goal is, and in order to accomplish this, models and the input have to demonstrate

that.

So, sort of a bottom line here, it's our view that restricted and unrestricted license termination, which it's going to be at a site where rubblization has occurred, that distinction is fuzzy, and the staff will have to be very careful in walking their way through this, since there will be residual activity left on the site.

It's not like normal, where you think about green field, where somebody comes in and they raze a building, tear it down, and everything is hauled away to Envirocare or somewhere and it's clean and there's nothing left that was formerly there.

This is not the same. There's something left. The question is can it be made unrestricted with respect to the termination?

As a general position, our position, I think, is that we've favorably disposed toward rubblization. We think it's a good idea. We'd like to see it practiced, if it can

be.

We think that there are a lot of difficult issues to be addressed, and they will best be addressed, probably, by actually looking at rubblization proposals.

I'm through.

CHAIRMAN MESERVE: Thank you very much.

In order to allow time -- we've really run through a lot of time, but in order to allow time for Dr. Garrick to give an abbreviated presentation on self-assessment, I'm going to defer asking any questions and turn to my colleagues and see if I can get similar restraint.

COMMISSIONER DICUS: We will follow suit. I may put a question in writing later.

DR. GARRICK: All right.

I've got some good news. This last presentation, as I indicated at the outset, is more on process than technical issues, and I think we can shorten it quite considerably, and it's been put together such that it's fairly self-explanatory, and let me just say that the committee has been singing a variety of tunes in our advice about what the staff should do and look for in the applications, and one of those tunes has had to do with the application of a systems approach, systems thinking.

So, we decided a couple or three years ago that maybe we ought to practice what we preach in terms of

applying a systems approach to helping us better organize, plan, and prioritize the issues that we should address, and we were partly also inspired to do by the strategic planning process that the NRC went through, and these next exhibits primarily address some elements of that process that are all well-documented.

Exhibit 33 just simply delineates the by-lines of our first-tier priorities.

Exhibit 34 identifies our second-tier priorities, by which we mean, if the opportunity allows us to go beyond our priorities, these are the leading candidates for the committee's consideration, and then the -- an adjunct to the planning process was the process of self-assessment, and we tried to systematize the self-assessment process.

We put a lot of energy into trying to come up with simplifying exhibits that would do this.

One of the exhibits that we're kind of pleased with is the development of a self-assessment matrix that

lines up our evidence and our metrics in such a way that you can get a quick snapshot of what we consider ourselves as doing and the effectiveness with which we're doing it.

As far as looking for evidence that our advice was useful, we have emphasized, as indicated on slide 35, direct evidence, including licensee response, customer feedback, staff requirement memos, EDO responses, and any indirect

evidence that we can see as a result of NRC actions, and as I see and as noted on 36, we created a matrix to track that, and we repeat this process every year.

We have currently scheduled time to do that next year in the month of February, and we'll go through the same two steps, the action planning and the self-assessment.

As far as what we've learned from this process, we've learned a great deal.

We have learned that the effectiveness of the committee is greatly stimulated when we kind of reach out and become creative on what the issues are and also when we are very sensitive to the Commission's interests, as a result of meetings like this, and follow up on those.

We do try to use the action plan as a basis for our operating plan and provide our executive director with information that will perhaps assist him in establishing budgets and so forth for the conduct of the advisory committee's business.

Let me end by just saying and highlighting what is coming.

Most of what we've been talking about will be documented in the form of letters and will be forthcoming, and that includes a letter on risk communication and the safety assessment process as it was evaluated in the working session, workshop, and the public meeting in Las Vegas in

October.

We will be addressing the draft environmental impact statement and some particular issues there.

As was already noted in several of the presentations, the ACRS and ACNW are planning a joint meeting on January 12th -- or 13th and 14th -- on the matter of defense-in-depth, and we're looking forward to that.

We are optimistic that there's probably some fundamental aspects of defense-in-depth that are basic enough that would apply to both reactors and waste, but beyond that, we should not be bounded in the implementation or application phase of one over the other and that the implementation will -- should take full advantage of the peculiarities and properties of the two activities.

We are writing a letter on decommissioning, rubblization in particular, and also on the research activities.

The next page, page 39, we will be passing on some additional views on Part 63, and of course, when we complete our February planning and self-assessment exercise, we will be forwarding to you the new plan, together with a summary and interpretation of both.

CHAIRMAN MESERVE: Let me speak for myself and say that I very much appreciate your efforts to undertake this self-assessment process. It's a very healthy thing to be

doing.

I have no questions about this presentation. It may well be that there will be some as to all of these that we'll submit to you later.

DR. GARRICK: Yes.

CHAIRMAN MESERVE: Let me turn to my colleagues and see if they have any questions that they'd like to ask at this time.

COMMISSIONER MERRIFIELD: I don't have a question. I have a comment I'd like to make.

COMMISSIONER DIAZ: I have a quick comment.

It would be worthwhile to the Commission to get your views on how can the staff differentiate between restricted and unrestricted release.

COMMISSIONER McGAFFIGAN: i do want to compliment the committee for all of its work. I think you do very good work, and going back to Dr. Wymer's presentation, I think, on the D&D; code and decommissioning issues, we're all searching for overly conservative assumptions, bias analyses, and I think you've been very useful in all of that.

I'm glad to see you are going to address the DOE DEIS. We were getting some indication you weren't. I think what is a technical issue and what isn't isn't always clear. For the transportation issues and risk communication in

transportation, I think is a technical issue. Somebody might argue it's not, but I look forward to seeing those comments.

But they do need to get in fairly quickly, because our overall comments have to be formulated and to DOE by the 9th of February.

DR. GARRICK: We're aware of that, yes.

COMMISSIONER MERRIFIELD: In deference to the Chairman, I didn't ask any questions relative to decommissioning. However, I did have an opportunity last month -- actually, it was earlier this month -- to visit the Haddam Neck site up in Massachusetts, where they are very actively engaged in that process, and like Commissioner Dicus, I did take the opportunity to meet with a variety of stakeholders there and members of the community who are concerned about that.

I think, overall, there is a concern -- and I don't think they were as sensitive to some of the rubblization issues as perhaps individuals surrounding Maine Yankee, since that seems to more close to where they are in the process at this point.

I think there was an underlying concern that even if we -- even if that were to be allowed and if it were to allow unrestricted use, would that mean that the site could be utilized for future purposes for the community, and I

think that was one of things that underlies their concern.

It might be clean, or at least clean enough for us to release it, but is it something that can be utilized for an industrial purpose or some other community-based land use, and I think that's something that we need to be mindful of.

The second thing is, in your analyses, I hope you not only will be thinking about some of the radiological concerns associated with those materials but also the non-radiological impacts and leaching that might result from the rubblization activities.

Further, I would hope that there are some specific questions that you will be able to come up with to assist the staff in asking the hard questions about rubblization.

I know, obviously, you indicated that you are

predisposed toward recommending rubblization, but I still think, in order to be fair to people who live around those sites, we do need to ask the hard questions and make sure that we are fully satisfied, all of us, in that regard.

CHAIRMAN MESERVE: Thank you.

If there are no further questions, I'm going to bring this meeting to a close.

I'd like to express my appreciation to the advisory committee and to Mr. Levenson for your participation today.

You've touched on many issues which are really central to our activities and very important to us, and we very much appreciate your thoughtful assistance, and with that, we're adjourned.

[Whereupon, at 11:42 a.m., the meeting was concluded.]