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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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COMMISSIONERS MEETING

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THURSDAY

MARCH 22, 2001

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ROCKVILLE, MARYLAND

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The Nuclear Regulatory Commission met at the Nuclear Regulatory Commission, One White Flint North, Commissioners' Conference Room, 11545 Rockville Pike, at 10:30 a.m., DR. RICHARD MESERVE, Chairman, presiding.

COMMISSION MEMBERS:
DR. RICHARD MESERVE, Chairman
DR. GRETA J. DICUS, Member
MR. JEFFREY S. MERRIFIELD, Member

COMMISSION STAFF:
KAREN D. CYR, ESQ., General Counsel
ANNETTE L. VIETTI-COOK, Secretary

ACNW STAFF PRESENT:
DR. B. JOHN GARRICK, ACNW Chairman
DR. GEORGE HORNBERGER, ACNW Vice Chairman
MR. MILTON LEVENSON, ACNW Member
DR. RAYMOND G. WYMER, ACNW Member
DR. JOHN T. LARKINS, Executive Director
MS. LYNN DEERING, Senior Staff Scientist

P-R-O-C-E-E-D-I-N-G-S
(10:30 a.m.)

CHAIRMAN MESERVE: Good morning.

DR. GARRICK: Good morning.

CHAIRMAN MESERVE: We are very pleased this morning to meet with the Advisory Committee on Nuclear Waste. As you noted, across the table you only have three Commissioners with you this morning. As it happens, Commissioner Diaz is out of town on business, and Commissioner McGaffin, unfortunately, is home with the flu.

So I apologize for the fact that you have less than the full attendance this morning.

DR. MERRIFIELD: We will try and make up for it.

DR. DICUS: I think we can handle it, yes.

(Laughter.)

CHAIRMAN MESERVE: There will be a transcript, of course, that is available of this so that even though they are not here, they will have the benefit of being at least able to read your remarks.

And since I think we are webcasting this, it is possible that Commissioner McGaffin has propped himself up in bed and is viewing us at this very moment.

One of the very challenging tasks that may be presented to the Commissioner in coming years is dealing with the potential repository at Yucca Mountain, and this is if and when this materializes, this is going to be a great challenge to us.

And in preparation for that there has been a very large effort by the staff to prepare for the possibility that an application might be submitted to us.

I know that you have appropriately spent a lot of time in assisting us and in assisting the staff, and thinking about this effort, and I understand this morning that we are going to be hearing about portions of that effort. We very much look forward to your briefing.

Before we get started, however, I understand that Commissioner Merrifield has a short opening statement that he would like to make.

COMMISSIONER MERRIFIELD: Thank you very much, Mr. Chairman. I have very much been looking forward to the presentation today. The reason that I wanted to have a brief opening comment is that I have a particular bone that I picked in the time that I have been here on the Commission

And the bone that I pick is -- actually there is two of them. One is the use of acronyms, and the other one is the use of plain English. Now, one of the things that I think that we have to be very concerned about is that we have issues associated with the possible use of Yucca Mountain raises significant concerns on the part of the individuals of the State of Nevada, and for understandable reasons.

I am pleased that we are going to be videostreaming this presentation today because it will allow them to have access to this information. I think that is a good thing.

We need to do all we can to make sure that we are presenting our information so that all of our stakeholders can understand what we are talking about.

When I was reviewing the slides this morning, I noted that there were some acronyms, such as RIPB and YMRP that were noted here, and there is no index for what those mean. Now, I now know what they are, because I am familiar with them.

But for those of our stakeholders who ware viewing this on the videostreaming, and who don't otherwise have the access to that, they are not going to be able to do that.

And so in the future I hope that -- and as you go through your presentation today, I hope that you recollect that we do have people who don't normally deal with these terms that have to be able to understand and grasp them as well.

I think it is part of our raising our public confidence that we need to do that. Similarly, I noticed on a slide regarding the vertical slide review that there are a variety of geological terms.

I am a lawyer and so a lot of this is unfamiliar to me, such as the word anisotropic. Fortunately, my staff has a copy of the Cambridge Dictionary of Science and Technology, and I was able to access that to determine that it is crystalline material for which physical properties depend on direction relative to crystal axes. These properties normally include elasticity, conductivity, permeactivity, permeability, et cetera.

That is not a word that a person with a typical college education would know, and so my second caution -- and this is again both in the presentation today, as well as your future presentations, is to put this in a manner which is understandable and can be grasped by an average resident of Nevada, because those are indeed some of the most important stakeholders that we have to worry about.

And we have to make sure that they can understand what we are all talking about, too. So, Mr. Chairman, I appreciate you allowing me to make those comments.

CHAIRMAN MESERVE: Commissioner Dicus has indicated that she would like to make a brief statement.

COMMISSIONER DICUS: Yes, I want to follow up just a little bit with the acronyms. It has been some time ago, well over a year ago, and maybe two years ago or something, the same issue arose with acronyms in the slides, and with the public trying to understand what they are.

And I asked that when acronyms are used that at the beginning of the briefing that there be a list of acronyms and what they mean. And for a while the staff did that. Then it has kind of drifted off because we are all familiar with what they are, and we have not gone into it.

And so I am going to remind the staff again that when acronyms are used, if we could just for the sake of the public -- and sometimes I don't know what they mean. I have a whole book, and it is about yea thick of all the acronyms that we use in the NRC. So I have to look at it.

But for the sake of the public, it would be good if we would get back to the habit of putting a sheet in front of the briefing material just with what the acronyms are that you are going to use. Thank you, Mr. Chairman.

COMMISSIONER MERRIFIELD: And there may be cases where we use acronyms where we could just put the words, and there is no need to. I always think we should be judicious about the use of acronyms when they are absolutely necessary.

CHAIRMAN MESERVE: Dr. Garrick, why don't we proceed.

DR. GARRICK: Thank you. And thank you for your comments, because I think the Committee is very sensitive to what communications and practicing better communications, in terms of the use of strange words and acronyms, and what have you.

Before we start, I want to acknowledge that in addition to the Committee, we have with us, of course, the executive director, John Larkins, and we have one of the members of the staff that has been particularly involved in this presentation, Lynn Deering, and we want to acknowledge their presence and help.

We have a rather different kind of presentation to make today, and it is perhaps somewhat of an experiment. As you know, we have a planning process and a self-assessment process, where we try to figure out how we better do our job, and we do that at least once a year.

And so we have come to realize that it is not only important to come to grips with what we consider to be important and a high priority, but how we are going to deal with it.

And a lot of today has to do with the how. One of the struggles that exists in a small committee such as this is how to come to grips with the massive amount of material that we review, and rather than the traditional approach that we have taken with you in the past, and talking about specific subjects, we are going to try today a strategy that we have adopted.

And that strategy is to evaluate the staff's capability to review a possible license application for disposal of high level waste at the proposed Yucca Mountain site.

And this strategy integrates activities across three of ACNW's first tier priority topics. These are priority topics that are shown in figure one, but are also cataloged and discussed in our 2000 action plan of which you all have copies.

The first tier priorities here that are going to be involved in today's presentation are site suitability and license application to the Yucca Mountain review plan, although we are not going to really discuss that because that is in a pre-decisional status.

And risk informed performance based regulation. These are all first-tier priorities for us and we are going to try to illustrate how they interact with each other in coming to grips with our strategy.

Now, as part of our strategy, we are conducting a vertical slice review of the DOE's technical basis documents for site recommendation as a way to evaluate NRC's staff, tools, guidance, and capability to do its intended job.

The idea here is not to do anything of a different kind than we have done in the past, but to emphasize it a little different, to put the emphasis on the NRC's capability, and whether they are really ready to evaluate a license.

The vertical slice therefore becomes a part of an integrated evaluation and decision making process. Now, if we turn to the next figure, figure two, we see if we take the issue or the priority of site suitability and license application, and decompose it into some of its parts that we are going to address, the idea here is to illustrate how we go from perhaps a process and the evaluation of a process, to the evaluation of specific issues; process being a vertical slice review, and a specific issue being the role that Alloy-22 plays in the performance of a waste package.

And the other things that we are going to address here are the performance assessment tools of the staff and the key technical issue resolution process.

The strategy includes our ongoing efforts to evaluate the staff's KTI issue resolution program. It includes the implementation of the vertical slice review process itself, and George Hornberger in a moment is going to pick up on that and discuss it in the context of a method, and in the context of an example.

Milt Levenson is going to present some information on the KTI, the key technical issue resolution program, and how that enters into the overall site suitability and license application process.

And then Ray Wymer is going to illustrate the example of a specific issue, like the performance of Alloy-22 under the conditions that the repository is asking it to perform.

And then we will continue with an evaluation of what might be considered the granddaddy vertical slice of all, and that is the performance assessment, which in a sense starts with the bottom line result, and peels back the information that leads to what that bottom line result is.

And I will make an attempt in addressing that. In addition, the strategy integrates the staff's regulatory framework, including the proposed 10 CFR 63, and draft white the Yucca Mountain review plan, and the Yucca Mountain review plan guidance for reviewing DOE's technical basis document for site recommendation.

We will not discuss those today for the reasons indicated earlier. So with that, I would like to jump right into our example of treatment of a vertical slice evaluation and ask George Hornberger to take the lead in that discussion.

DR. HORNBERGER: Thank you, John. We basically I think stole the term vertical slice from the staff. The staff had used the term vertical slice for an approach earlier that they had used to focus in on a topic almost in an audit like basis, and that really is our use of the term as well.

We had sent a plan on the 29th of June of last year which outlined our approach to a sufficiency review. And we have subsequently done some work in terms of really identifying how we intend to do that.

There was perhaps an implication in our original document that our review would be comprehensive, which really is impossible, and we did not really intend that. So I think our current approach outlined in what we would term the vertical slice really does our approach more justice.

It is to focus in and to basically take an audit-like approach. Let's see. On page 9 of this third slide, I guess, in my presentation, if we look at the vertical slice objectives, we basically wanted to address three things, and that was to evaluate whether or not the staff's approach was consistent with a risk-informed performance based approach to regulation.

And ultimately, of course, the staff is going to be required to produce sufficiency comments as detailed in the nuclear waste policy act, and our aim is to be able to look at the staff's comments and to be able to say something about how they are defensible and logical.

So that is our second objective, and then finally we typically look at the way that the staff approaches things to see if we think that they have everything covered sufficiently or whether there may in fact be some gaps in the available tools, or expertise that is required, or whether they fully integrate across all of the NRC.

Our vertical slice approach then is to review selected key technical issues. The KTIs are the way the NRC has up until now identified the issues that they want to address.

And we basically are going to -- well, because that is the structure that the staff has used up until now in their interactions with DOE, we intend to look at selected key technical issues and look at issues like traceability and transparency, and how this goes through the documents, not only of the NRC staff, that the NRC staff produces, but also looking at the Department of Energy documents as well.

And as the bottom bullet on the slide says, we do need to become familiar with the Department of Energy's technical basis documents, which are numerous.

And this again reemphasizes why we need to take a vertical slice approach, because just the sheer volume of the documentation on site characterization and the approach is quite formidable.

On the next slide, I wanted to point out that in fact the staff has progressed, and there is a predecisional Yucca Mountain review plan, and we may in fact use that as guidance in our review. We will also use the IRSRs, which are issue resolution status reports.

Issue resolution status reports are the way the staff develops the status of the treatment of key technical issues and the interactions with the Department of Energy.

We also have met -- the staff and the DOE staff, have met on selected key technical issues. Well, actually, I think on all of the key technical issues now, and they have had technical exchanges.

There have been reports from the technical exchanges on what the status issues are. And we also intend to interact with the NRC staff as we go through, because the staff is moving forward basically in parallel because of the time line we are all faced with.

We have selected four topics for our vertical slice review. These were topics that were selected in-part on the basis of the committee's own expertise, but also we looked at potential mis-significance.

We considered the fact that these issues cut across several subissues across key technical issues, and also the visibility of these particular topics right now. That is, there are aspects of these topics that are very current, or are of current importance.

The four topics are high level waste chemistry review, a review of the chemical aspects of the problem, and saturated zone flow, a flow beneath the water table; thermal effects on flow.

The fact that there is going to be a thermal pulse associated with the repository, and that is going to drive moisture and heat flow for that thermal period.

And then as John said, we will look at total system performance assessment, which John at least likes to refer to as the granddaddy of all of them.

CHAIRMAN MESERVE: The granddaddy of vertical slices.

DR. HORNBERGER: The example that I want to go through, and you may guess that I chose this example because of my particular expertise, is to just give you a flavor. This is very definitely a work in progress. All of this is a work in progress.

I don't have conclusions and results that I can present to you, and I just wanted to give you a flavor of how we are going about this, and some of the -- the way that some topics' issues may arise.

The subissue that the NRC staff has, or the way that they have defined it, is called ambient flow and dissolution in the saturated zone flow. It is basically to deal with processes by which ground water will flow from beneath the repository to Amargosa Valley, where there is a farming community.

And obviously the time of transient of this water has to do with how radionuclides may be transported from the repository to the accessible environment.

The status of this subissue is closed-pending, and the NRC staff has -- they itemize these issues as either closed, closed-pending, or open. And again I should reemphasize that being closed does not mean that there can't be questions raised later.

A closed issue is simply one that the staff currently agrees that DOE has produced enough information to carry forward for evaluation. A closed pending in capsule summary just means that the staff is confident that the agreements with DOE to produce information will result in sufficient information to carry things forward.

I think the next slide I have already covered. It is amongst the repeat of the objectives, and our approach is that we are going to look at the basis for this closed-pending status of the saturated zone subissue, and to look at the way the staff has used risk information in dealing with the issue.

The Department of Energy, their current modeling approach, continuing on, they have gone to a three dimensional flow and transport model. The principal axis -- this is a grid-based system on which they do their numerical calculation.

Numerical calculations are done on a grid, and therefore the grid has to point in certain directions, and their first principal axis is oriented in a southwest/northeast direction.

The perimeters in the model are treated stochastically. This means that there is a distribution of values that can be chosen. This in-part reflects the uncertainty that the DOE believes is incorporated in this.

There is an alluvial uncertainty zone. Again, for those of you who are geologically challenged, an alluvium is material that has been transported from the mountains, and the basin, and the range, that are classed and then fill in the valleys, the broad basins.

So it is this sandy material that fills the basins if you will, and it is an uncertainty

zone because we are not sure where the bedrock contact is, and that this has not been sufficiently characterized.

And Commissioner Merrifield has given you a definition of anisotropic. I will perhaps embellish on that in the next slide. If we look at the next slide, I will say that I should confess that I shamelessly stole this, the graphic, from the Department of Energy. I didn't do this myself, but it does I think illustrate things.

The anisotropy basically deals with the fact that there are preferred directions for flow of water in the rock. If you push in one direction, the water doesn't necessary go in that direction.

It will go in a direction determined in part by the orientation of fractures in the bedrock, and the flow path from Yucca Mountain to Amargosa Valley is through a fractured volcanic rock tough. The fractures control the flow to a large extent.

There also is some anisotropy in the alluvium because of the way that the alluvium developed. As I said, the NRC staff has expressed concerns in their technical exchange with DOE about DOE's treatment of anisotropy, about their flow paths in the alluvium, because we have this uncertainty about what the distance of the flow path is in the alluvium, and also the fact that there can be alternative conceptual models about how this flow occurs.

COMMISSIONER MERRIFIELD: A clarifying question regarding the slide on the legend. It talks about advection, which I am led to believe may mean horizontal flow. Would that be correct?

DR. HORNBERGER: That is good enough. It doesn't necessarily have to be horizonal, but it has to do with the water movement, per se.

COMMISSIONER MERRIFIELD: The direction of the water movement?

DR. HORNBERGER: Yes, the direction of the water movement and the water being carried along, the water substance itself. And the potential contaminants, like radionuclides, can be moved along by advection, i.e, with the water.

But it can also participate in other processes, like diffusion, so that even though it is being carried along with the water, some of it may run ahead because there is are diffusion processes.

COMMISSIONER MERRIFIELD: My cautions about the use of language -- and since this is a DOE slide, I presume that you have some DOE people, and I might translate a similar concern to them, given the fact that these very same stakeholders are going to have to read their documentation as well.

And having an understanding of the scientific terms for individuals who don't necessarily have a lot of basis for scientific understanding is helpful.

DR. HORNBERGER: I certainly don't want to get into the business of defending the Department of Energy, but I will say that I agree with you. But I think what will have to happen is that there will probably have to be documents at several different levels, because it is very difficult to convey precise scientific notions without using some scientific jargon.

COMMISSIONER MERRIFIELD: No, I agree with that.

DR. HORNBERGER: Okay. The next slide is -- and again this is the figure itself. The graphic reflects work that the Department of Energy is going cooperatively with Nye County, and I did not produce this graph. I lifted it from something else.

The important point that I wanted to make here is this notion of the uncertainty of flow paths in the alluvium. There is information that will be coming, and one of the reasons that this issue is closed-pending is that the NRC staff has requested from DOE detailed plans for their testing int he alluvium.

This map shows the location of a whole series of wells that have been drilled, bore holes that have been constructed in the alluvium. Prior to this effort, there was precious little information on the alluvium, and we are getting a lot of information from this new endeavor.

Finally, I just wanted to go over the fact that we anticipate that there may be several products that we come forth with as a result of these vertical slices.

First of all, we have been keeping track of the status of these issue resolution process for quite some time now, and we will continue to do so through this vertical slice approach.

In going through these selected vertical slices, we anticipate that we will come forward with some material that would be of interest to the Commission on our reports on just what we have learned from doing these particular vertical slices.

In looking at the Department's technical basis documents, we anticipate that we may in fact also have some comments that would be worthwhile for the staff, not that we would review the DOE documents for DOE.

But we may wind up having some comments that we think would be useful for the staff on the Department of Energy's documents as well. And then finally, of course, as I said, we know that the staff has to produce these sufficiency comments.

And we anticipate that we will interact with staff, and we will be able to comment on how the staff has produced these sufficiency comments.

If there are no questions at this time, if you will notice the first of the products listed on that last slide was the status of issue resolution, and we actually have taken at least a look at that, an up-to-date look at that recently. And Milt Levenson is going to give you a presentation on key technical issue resolution.

MR. LEVENSON: Thank you, George. Let me just say first in the matter of definitions and acronyms that I have my own definition for vertical slice, and that is to help me understand what we are doing.

I think a vertical slice is a method of sampling what to review when the time and resources do not permit a detailed review of everything and that is what we are really trying to do, is cut a slice through, rather than arbitrarily pick some things to sample, and try to do a slice.

The key technical issue resolution process is a little different than what George covered. It is a process. It is a process that is really a tool used by the staff to bring order to the complex matter of a pre-review.

There are so many things to be done in the pre-review that this seems to be a good tool to make an orderly process. The questions that we plan to pursue in the future as part of our ongoing evaluation of issue resolution, and our vertical slice review are two.

This is an ongoing work in progress. The risk of the various KTI subissues -- I'm sorry. Somebody shuffled my slides.

CHAIRMAN MESERVE: It is slide 23, I think is the one.

MR. LEVENSON: Well, 20 is the one that I want to go to, which comes after 19.

CHAIRMAN MESERVE: It does in mine.

MR. LEVENSON: Only if you have a card dealer that shuffles. The goal of the issue resolution is to clarify what is needed for the license application.

The resolution takes place based on technical exchange meetings, DOE submittals, and staff reviews, and the issue of resolution is not a compliance determination.

Issue resolution does not mean that the issue has been resolved. It doesn't even mean that the issue has been completely reviewed. It only means that there is agreement on what information DOE will provide so that the licensing review, if and when it takes place, can occur.

It is not a part of the license application review. In retrospect, for interacting with the public, it turns out to probably be an unfortunate choice of words, to use words like closed, and even closed-pending.

That has led to a lot of misunderstanding, and I want to make clear that in our review, in no case do we consider this is part of the review of licensing compliance or anything else.

Our observations were that the issue resolution process appears to be working. Members of the Committee and members of our staff have attended a significant fraction of the KTI meetings.

The observation that we have is that the staff has the capability to evaluate the closure

requirements, and that progress has been made in adopting risk informed and performance based approaches by the staff.

At the technical exchange meetings, but the NRC and the Center for Nuclear Waste Analysis that supports the staff in our opinion have demonstrated a sound grasp of the technical issues, and we are prepared to negotiate an acceptable way of not closing the issues, but identifying what needs to be done so the review can be done.

We think that the staff has made significant progress in adopting a risk-informed and performance based approach. It is not so obvious to us how far DOE has gone in that direction.

The staff is modifying some of their acceptance criteria to avoid unnecessary prescriptiveness, and allowing DOE some freedom. A few examples of why we make this statement that the staff is moving in this direction.

The treatment of seismic and volcanic events is risk-informed performance based, and the use of TSPA to identify -- the total system performance assessment, to identify issues, as well as the work on Part 63, sort of support our conclusion that the staff is moving in that direction.

We have a slide that lists concerns, and I want to point out that these were our concerns going into the review. It doesn't mean that that is the concerns that we will have at the end of the review. This is a work in progress.

Our concerns were that since the KTI, the key technical issue, program follows a rather formal format, have all the subissues been identified.

And if they have been identified, they will be treated and reviewed. Has integration been achieved, and has risk informed performance based been implemented, and has public participation been appropriate.

And a real worry is will design evolution require major changes. At this point, midstream, it is a little difficult for us to assess whether the key technical issue program, as extensive as it is, will accomplish its objective primarily because of concern of the evolving design.

Some closed issues may no longer be relevant, and there may no longer be a need to collect or submit the agreed to information, and new issues may arise from design changes and not be in the program.

And in fact in the worst case not even be obvious until a licensing review is in progress. We think, for example, that examination of coupled processes in the waste package and near field environments may lead to some questions that are not subsumed in the current structure.

With respect to integration, we agree with the continued use of the total system performance assessment code as a guide to determine how the pieces fit together.

I would like to note that the staff in the center has their own, somewhat simplified, model to help them in understanding the DOE model. They are not just plain following blindly. They have their own independent assessment of that.

We are disappointed -- and I think we have discussed previously -- with the matter of innovative ways of engaging the public in the evaluation process.

Sort of a specific example is that I think, Commissioner, you would be appalled if you attended one of these KTI meetings, which are public meetings, to find that the jump in with both feet directly into the technical resolutions which have been started even at a previous meeting, and there is no overview for how this is important or where it fits.

So it isn't just terminology and acronyms. If we are going to interact with the public, we have to do some other things. The questions that we plan to pursue in the future as part of our ongoing evaluation of the issue resolution and our vertical slice review includes is the risk of the various key technical issues, and subissues, and integrated subissues known or understood.

And are the key technical issues the most risk significant issues identified by the performance assessment. Those are the words that we use. The key technical issues are really not the critical thing.

We really should be -- the slide should have talked about the subissues. We say that we are doing a key technical issue review, but we are really looking at how the subissues are being handled because the important is all in the details down at that level.

And so when I say we are reviewing a key technical issue, that includes the subissues that come under it. In closing, after we get done with all the language and all the words, the most important, the very critical issue for risk informed performance based, or almost any other safety assessment, is have the risks been defined and identified.

Because if you can't do that, then the rest of it doesn't fit, and this is a work in progress, and that is what we are going to try and do with it. And from here I think we move on to an even more specific event, which Dr. Wymer will cover.

DR. WYMER: Thank you. This is a very narrowly focused presentation, and I hope that it will become apparent as I go along why it is included in this presentation, and how it made the cut to arrive at this table.

Last October, we heard presentations on the corrosion of these nickel-based alloys, which Alloy-22 is one, from consultants to Nevada. And in their presentations they questioned the ability of waste packages made of Alloy-22 to survive for 10,000 years based on these experiments that they carried out using trace impurities to catalyze or in some way affect the rate of corrosion.

Then following that, last November, we heard presentations from the Center for Nuclear Waste Regulatory Analysis, and from the Department of Energy on their Alloy-22 studies.

Now, the reason that this presentation is being made here today, and the reason that it did make the cut, was because the longevity of the waste package is a key attribute, and I mean a key attribute of DOE's repository safety strategy.

And DOE expects and models based on the expectation that Alloy-22 will in fact contain radionuclides to the extent that it has to for more than 10,000 years.

And I would like to read just a couple of sentences out of a DOE document which catches the essence I think of our position on this issue. They say, "Uncertainty is in the presentation of waste package performance will be extremely importantly to the post-closure safety case for the site recommendation and the licensing considerations."

"And of particular importance in this regard is the current waste package degradation model. The current model is based on two years of project data, and a few decades of related data from other sources. Consequently, extrapolation of performance to 10,000 years is a challenge."

Now, we agree with all of that, and so it is extremely important. We have written a letter to the Commission on the Alloy-22 performance, and this letter followed the results by the Nevada consultants, which brought the issue to the surface rather dramatically.

And in that advice we said that the environmental conditions that affect corrosion need to be bounded better. We would need to put the limits on the temperature and the amount of water, and the constituents that will be in the water that will enhance corrosion.

So we had to bound the environmental conditions better. This is complicated somewhat by the fact that the repository conditions are not totally set. This is a hot versus cold repository, for example.

So the conditions are not completely bounded, although they are in the process of being bounded. We commented in our letter to you folks on the corrosion issues, and specifically pit, crevice, and stress corrosion, which are specific kinds of corrosion that this alloy is subject to under the conditions in the repository.

And the principal point that we made was that the NRC needs to understand the mechanisms of these corrosion processes before they can take credit for the very long term protection that DOE is ascribing to this material.

Now, by that we don't mean that they have to understand it at the very basic level the

mechanisms of corrosion. There are only just a few processes in the literature where the true fundamental mechanism of corrosion is really understood at a very basic level.

But there is an intermediate level of mechanistic understanding which we think needs to be reached, and so far we are not convinced that that level has necessarily been met, although there are experiments underway, and there is work underway moving toward that objective, both at the NRC Center for Nuclear Waste Regulatory Analysis and by a larger effort by DOE.

And in particular the mechanism has to take into account the effects of these catalyzing trace impurities that the Nevada group pointed out, and things like lead and mercury, and in particular lead, and what is the influence of these materials on the rate of corrosion.

Now, the experiments done in Nevada as we pointed out in our letter are not representative of any conditions that we expect to exist in Yucca Mountain. They are very extreme.

They go from very high pHs to very low Phs, and at both ends, both higher and lower than is anticipated in the Yucca Mountain environment. And at acidities which are the particular hydrochloric acid concentrations which we think would be very hard to reach in the Yucca Mountain repository, if not impossible.

Nonetheless, the fact that there are corrosion data that suggest that these trace impurities, particularly led, can influence and enhance the rate of corrosion, that this needs to be elucidated.

It has to be understood so that we know whether or not this would be important of the conditions in the repository that are most likely to exist.

And as I said, experiments are under way to identify these conditions. We have recommended that the effect of these trace elements that were not necessarily included are accounted for in the earlier work that was reported by DOE, and that the facts be elucidated.

And that it was not anticipated, or it was not expected, that there would be such a profound effect, even under these extreme conditions, of things like lead in the corrosion of Alloy-22.

So although they may have been present in the experiments, they were not specifically examined with respect to their influence. They now are being examined, and we do have to understand the mechanisms.

And one other point that came out of the work sheet, the earlier work sheet that we had on the corrosion of Alloy-22, was that there is a window of susceptibility for corrosion, and that if you get too hot in the repository, then the water is driven out and you can't have corrosion.

And if you get too cold, the kinetics of the reaction are such that you can't proceed fast enough to be of import, and so there is appears to be based on the evidence that we have had presented to us a window, if you will, a range of temperatures where corrosion is likely.

So this window, and how wide open the window is, needs to be understood and looked at. And finally as a -- and this is a very abbreviated discussion of this topic.

But finally as a follow-up question, we asked are the expectations of the waste package performance, and that is the fact that it will last for more than 10,000 years, does this expectation limit the study of other features or processes that might affect performance.

Are these other things being given short tripped and being bypassed in the expectation that they will not be important, because the alloy will last so long that these things will not show their importance.

And that question needs to be answered, and as a particular example, this radionuclide transport in the near field being adequately addressed, and as we heard the presentation on the key technical issue resolution meetings that said the transport of certain radionuclides was under some of the conditions not really being looked at because it wasn't going to transport.

There wasn't going to be any leak in the container, because the Alloy-22 was going to last, and therefore it wasn't important to discuss these, which is consistent with the logic that DOE is pursuing, but it raised a question to us.

And that is all that I am going to say about that. Any questions?

(No audible response.)

CHAIRMAN MESERVE: Okay. The last topic on our review today is the NRC staff performance assessment capability. I know that this Commission is very much aware of a number of recommendations that this Committee has made about performance assessment and the performance assessment capability.

For example, as indicated in Slide 31, we have talked and recommended in the past about strengthening the staff capability, and the engineering analysis material science, and chemistry.

We have been very persistent in pushing the notion of improving the methods for exposing this is an element of transparency, and exposing the contribution to the performance of the repository of individual barriers.

And as a fallout of that, of course, we have talked much about being able to rank the contributors to risk by importance on the basis that that is really what we mean by risk informed.

Continuing with Slide 32, we have written letters to you recommending that the staff seek peer review of the NRC's TPA code to enhance its acceptance in the peer community, and among the experts in this field, as well as the public.

We have talked a great deal about in our meetings and recommended in our letters the matter of using realistic models. The real virtue of risk assessment is that it is not a bounding analysis.

It is an attempt to tell us what realistically can happen, and the supporting uncertainty analysis gives us a basis for what kind of conservatisms might be appropriate with respect to actions that are actually taken.

But the risk assessment -- that is to say, the performance assessment -- should be a frame of reference as to what the best technology available indicates what actually might happen.

We have talked about the whole issue of generally improving the transparency and comprehensiveness of the analysis tools. That is to say the issue of understanding the analysis, and understanding and feeling confident that the scope of the analysis has been sufficient to cover the events and activities that can occur.

So those are the things that we have said and discussed, and documented, and I think that the real purpose of this presentation is to kind of report.

But we have been very pleased with the progress that has been made. Many of the recommendations are still very much a work in progress, but it is true that a major effort has been made to respond to these recommendations.

And our confidence has increased considerably that the PPO code has been improved very much over the last few years, and it is structured so that in the near term it should be an effective tool for evaluating the U.S. Department of Energy's total system performance assessment of the proposed Yucca Mountain repository.

One of the things that is always an important piece of evidence as to the quality of any analysis is peer review, and I just want to make a couple of comments in Slide 33 about that.

There was a peer review performed, and we were pleased to hear that the staff as a result of this peer review intends to modify the PA code, and the TPA code, the total performance assessment code, to calculate such things as the chemical composition of water at various locations in the repository, because the most important threat to the integrity of the waste package of course is water.

And as to the extent that it is a threat is very much dependent upon the composition and quality of that water. So that is something that is very critical to nailing down the capability of the waste package.

Now, there were many other comments that came from the peer review and the staff is considering its responses to other recommendations, and they will be reported on at a later date.

The only slight negative that the committee had relative to the peer review is that we would have preferred a peer review group consensus report, rather than the way that it was done, which was

a series of independent reports from each reviewer.

Now, it wasn't completely in the sense that there was an absence of interaction among the peer reviewers, because the process was kicked off with a meeting that involved them working at least during the introductory meeting together, and there were a number, we are told, of briefings and very intense discussions among and between the peer reviews.

But from that point on, it was pretty much a matter of dealing with individuals. So as far as the total system performance assessment code, and the NRC is concerned, we are reasonably satisfied that the staff is addressing our concerns, and improving their overall PA capability.

I think that when we first started looking at this that it was clearly not a risk informed performance assessment process, but much more of a traditional subsurface hydrogeological transport model.

It has since become very much probablistic, and very much in keeping with the desire to get increasing insights as to what the risks are.

We are also in full realization that the purpose of the code is not to calculate the performance of Yucca Mountain so much as it is to be an effective took for evaluating the DOE total system performance assessment.

It is a very different kind of end requirement, and as I say, we are reasonably satisfied with the progress that has been made. And I think that is about all that we want to say about that at this time.

We will do a vertical slice of the TPA, and a vertical slice in this sense will be somewhat along the lines of turning the analysis upside down and starting with the end result and peeling away things that allow us to see in a systematic fashion how that result was developed, and we are just getting that under way now.

So we do have some questions on Slide 35, and there is always the question of uncertainty, and uncertainty can be described in many complicated and esoteric ways.

But two components of uncertainty that turn out to be very important are information uncertainty and modeling uncertainty. That is to say how you process that information.

And the state-of-the-art is much more advanced with respect to the information uncertainty than it is with respect to modeling uncertainty. So we will be continuing to track that and convincing ourselves that the concept of uncertainty has become an inherent and integral part of the whole performance assessment process.

The other questions have to do with are the key issues treated with conservative bounding assumptions or assessed more realistically. Perhaps this is one of the areas where the risk assessment process as envisioned by its founders has been abused more than any other area.

And that is that some of the practitioners have viewed risk assessment as a bounding process, when in fact it is not intended to be that. It's more valuable contribution to our understanding is when it attempts to indicate realistically what is really going on.

As far as today's presentation is concerned, just a couple of comments to summarize it. We have attempted to describe our integrated strategy to evaluate the staff's licensing capabilities, and sufficiency review of DOE's technical basis for its sight recommendation decision.

We have discussed both work in progress, such as the vertical slice reviews, as well as information from the letter reports that we have issued you since our last public interaction.

We will continue to keep you appraised of our progress in our vertical slice review. I think we are very much looking forward to implementing that because it not only challenges our review skills, but it gives us an opportunity to see if we have still got it in the area of technical evaluation.

And we realize that there is some risk to this, but we are very much looking forward to it. And we look forward to briefing you on other aspects of our strategy that we were not able to address today, such as Part 63 and the draft Yucca Mountain review plan, and the attendant guidance documents.

So, with that, Chairman Meserve, we are open for questions.

CHAIRMAN MESERVE: Well, good. I would like to thank you all for a very helpful discussion. I am sure that we all have questions, but let me first turn to Commissioner Merrifield.

COMMISSIONER MERRIFIELD: Thank you very much, Mr. Chairman, and I appreciate the explanations, particularly of Mr. Hornberger or Dr. Hornberger, on some of the issues that were brought up. I thought it was very helpful.

I guess the first question that I have got is a general one. You made a decision, and I understand why you did it, to make the vertical slice of the technical basis documents.

Can you give me some sense of the decision making process you used to define the particular vertical slice you did, and to the extent that you have issues that evolve as you are conducting that vertical slice, how will that influence where it goes from here?

CHAIRMAN MESERVE: Well, that is a good question, and I will comment on it and let other committee members comment as well. The Committee has not been completely absent of information that would give us some insight as to what appears to be the important issues associated with the performance of this repository.

We have followed the analyses that have been taking place and as you know, the performance assessment now has gone through a number of cycles, and although the conditions have changed quite dramatically as a function of those cycles, but nevertheless, the committee between its knowledge of the performance assessment activity and the presentations and briefings that we have received on the technical issue, has developed a reasonable sense of what are considered at least by the committee to be the most important issues associated with quantifying the performance of the repository.

And we tried to identify those. We all know that the 800 pound gorilla in this repository is water, and if the design is such that that threat is minimized, and if the analysis is such that it is convincing with respect to how a source term is mobilized, then we are in a position maybe to understand the results of the analysis.

So that was one aspect of it, is our collective experience, our collective involvement, and the integration of that information indicated that there are certain fundamental issues that are key, such as the waste package integrity, and such as the flow -- the subsurface flow conditions.

And such as the effect of temperature on flow and so on. So that was important to that. And then as we said earlier -- and I think this was a secondary consideration, because we have at our disposal consultants and experts to move in the direction that is most important to quantifying the performance here.

But the other issue was our expertise as we have said. So those were factors. Now, as to why we went vertical slice, I don't think that by that we are suggesting that we are going to shirk our responsibilities in reviewing as much basic material as we possibly can. We are.

We are going to do that, but if you really are sincere about taking a risk informed approach, we have tried to practice what we are preaching in that regard.

We have tried to come with something that would allow us to move towards the issues that all of this information is beginning to suggest is the most risk sensitive, and in kind of an aggregated sense that is what was behind our choice, and what was behind our strategy. Do you want to add to that?

DR. HORNBERGER: Just one quick addendum. You asked how we might deal with where the path takes us, because we may define a linear path at the moment, but come across things that have to be pursued.

And we will have to do that on a basis. For example, in the saturated zone flow, radionuclide transport is separate from the saturated zone flow processes, and yet we all know that it is the radionuclide transport that we are fundamentally interested in.

And so it is conceivable to me that we could be led to look at across the way into another key technical issue if the need arises.

COMMISSIONER MERRIFIELD: Speaking of the associated issue, the Agency has been focusing on

what it believes are the key technical issues. Are there any areas in the review that you conducted so far where we have missed the mark where there are areas outside of the key technical issues where perhaps the staff needs to focus greater discipline and time?

MR. LEVENSON: I don't think we have identified any to date, but our concern is that the evolving design may bring some of those into the picture, and that's why we keep coming back to this issue that the staff at this point is not working with a fixed package.

COMMISSIONER MERRIFIELD: Fair enough. I guess also in the association change is the issue of specific disciplines that our staff has. I noticed that you have commented previously about weaknesses.

Have we resolved some of those weaknesses or are there still outstanding technical areas where we don't have the expertise that we should?

DR. GARRICK: Well, yes. We have as we indicated been quite satisfied with the steps that have been taken to resolve those weaknesses. The committee, if you take a snapshot in time, at one time was quite concerned about what we perceived as an absence of engineering based analysis capability that could really challenge the information that DOE was presenting to us on the performance of the waste package.

We were looking for a capability that could address the technical issues in a more mechanistic fashion and in a more engineering fashion.

The way that we have been able to be much more satisfied with that is the interaction we've not only had with the immediate staff, but with the scientists and engineers at the center.

And I think if you take the aggregate of the center and the staff, as well as the directions that they have now taken to address some of these issues, we are more pleased than unpleased.

But we are sure that there will come along issues and problems that some aspects of our concerns will probably resurface. But we are going to be very quick to point those out if that does happen.

COMMISSIONER MERRIFIELD: Good. I appreciate that. I mean, both as it relates to key technical issues and areas where our staff does not have the resources at its fingertips.

The earlier that you can identify those and get that information to the Commissioner, the earlier we can act if we feel it is appropriate to resolve them.

The final thing I would want to mention is that I know that there are a lot of issues which are on the plate of ACNW in addition to the things that we have discussed to day.

I do appreciate the focus that you have made on high level waste, as this is probably the most noteworthy issue that the Commission may face within the next few years on waste issues.

That having been said, Mr. Levenson, you mentioned your own insight on the key technical issue meetings at which you think in response to my comments that the staff has jumped into the middle of some of these discussions without putting them in to the proper context.

Without adding additional burden to ACNW, if there are some specific recommendations that you might be able to make without spending a lot of time on it, or deviating from other more important efforts, I certainly would like to take the benefit of those if you could follow those up. Thank you very much, Mr. Chairman.

CHAIRMAN MESERVE: Thank you, Commissioner. I have just a few questions, and a few general ones at first. As I have understood the strategy that you have laid out is that you are confronted with an immense mass of materials, and you have to try and find some way to assess it, and to assess how we are working with it.

So the strategy was to pick a few areas and go in those in considerable depth to make sure that you evaluate them, and as you described it, it is one where you judged those areas in part on the basis of their risk significance and with some consideration of the expertise that the ACNW itself could bring to bear.

And it was not a random selection for the audit process by any means, and it seems to me to be a risk informed approach applied directly in your own strategy.

I take it that you emphasized in describing it that your emphasis was on NRC capabilities, and I take that to mean that your thrust on this is to make sure that the staff is asking the right questions of do you have the right capability that is being brought to bear, rather than necessarily going in depth into the answers that are being derived. Have I got that correct?

DR. GARRICK: Yes, that's exactly correct, but also we are very aware of the fact that in order for us to do that we need to dig deeper than just the NRC documentation to make any kind of judgment on that.

And that digging deeper will get us heavily involved into the safety case that is developed by the DOE, but at least it gives us some direction, the strategy and some focus as to what our priority ought to be as far as that investigation process exists.

CHAIRMAN MESERVE: And I take it that the probable sensible, but implicit, assumption is that if the staff is doing well in those areas, then we should be comfortable, and that perhaps in the less important areas they have similar capabilities?
Is that the premise of the way the strategy is?

DR. HORNBERGER: Yes. That's why I said it is sort of an audit like approach, and that is the premise of any audit, and so I think the simple answer is yes.

CHAIRMAN MESERVE: I have another related issue that is a matter for me of terminology, and that you have indicated there are a few areas where you are going to burrow in deeply and those are parallel to the key technical issues.

You are looking into specific key technical issues. You used the term of vertical slice, which to me suggests it is an orthogonal cut to something, and is vertical slice the same thing as an in-depth review, or is this in fact orthogonal to somebody's arraying of issues or what have you?

DR. HORNBERGER: I don't think it is quite simply the in-depth look at a particular issue. I think the verticality has to do more with how these issues have been set up historically, and we recognize, for example, that even within the NRC structure of these key technical issues that we have always had concerns that while we have ground water flow, and then we have radionuclide transport, and then we have unsaturated zone flow, and then we have saturated zone flow.

And these things don't come apart that way. It is a continuous process, and so in that sense the slices have almost been set up within the NRC structure, but the bottom line is that we just made an in-depth review of a particular topic.

DR. GARRICK: Yes. As we have talked today, various visions have come to me about how we could better communicate that to the Commission. But the idea here --

COMMISSIONER MERRIFIELD: And our stakeholders.

DR. GARRICK: Yes, that's right, but the idea here is that if we take something like the waste package and its performance, it is to decompose the analysis that leads to some performance measure of that waste package in such a way that we begin to see various inputs come into play.

The issue resolution reports is an example from the NRC, and the technical basis documents as an example from DOE, and so one possible graphic that we could experiment with maybe time next time around is some sort of a line function which we would orient geometrically vertically with the various inputs, in terms of what they are and where they appear as you evolve to this particular performance calculation.

But George was right. The answer to your question is that this is not to suggest that we are going to not be thorough. On the contrary, one of the appeals of this approach was that it allowed us to be very thorough.

All we had to do was to accept our ability to pick the topics that when we got down we had a pretty good envelope of what was going on. And that may have to be aerated.

And as we go through this process, we may find, oh, no, we should have picked radionuclide transport, or source term development, or something else as the start topic.

CHAIRMAN MESERVE: I have a question for Dr. Levenson. I appreciate your comments about the challenges on defining the key technical issues in light of the fact with changes in the repository design, and that some may drop way, and some of it might emerge.

And I join Commissioner Merrifield that that would be interesting to sort of monitor that process. But it seems to me that there is a related issue, and I want to just inquire if you have any sense of this.

And that is that there seems to me a possible danger, and not necessarily a real one, is that because you are focusing on things issue by issue that you can lose the integration across the interconnections between issues, and that our way of structuring the way we look at the problem may cause us to lose some things or sight of some things that end up being important.

And I wonder if you have any concern about that, or whether that there is enough fought being made to that issue that the interconnections are all being made as well.

MR. LEVENSON: I think that we have a significant concern about it, and the way that we deal with that is we keep coming back to the performance assessment, which ties things together. And not as a tool for what is the bottom number, but how do these things tie together, and if you change "A" and then what is its effect on "B" and "C" then. And its why that part of the review is not a one time thing

That is kind of a tool that we keep coming back to, and as kind of a follow-up, maybe if I tell you how -- well, I mean, we talked about what we intended to do. Let me just give you what happened in my own case when we decided do look at key technical issues.

There are obviously many more of them than there are members of the committee. So we each had to pick one, and then the four of us agreed that this was a reasonable sampling or representative.

But how I went about picking one is that I put the whole list of key technical issues and crossed out those that had words in them like anisotropic, and things which I knew that I couldn't understand.

And of those that I thought that I could understand, I then sorted them into those from the performance assessment that were significant to risk. Not necessarily the most important, but were significant to risk.

And thirdly which ones seemed to be somewhat complex, and therefore maybe are worthy of looking at it. After I attended one of the meetings, my follow-up was to contact a couple of the NRC staff members and arrange a one-on-one meeting with a couple of staff members and a conference call with someone from the center, to in fact go into details way beyond what I had heard at the meeting.

But just to make sure that I understood not just the process, but that I could understand why -- at the meeting I heard the staff say, well, we need this information and we need that before we can close it.

It wasn't obvious to me from the meeting why that was needed, but I pursued that and all the rest of us are doing the same kinds of things. So there are technical details being pursued as we try to develop a warm, fuzzy feeling about the piece of the slice that we are looking at.

CHAIRMAN MESERVE: In your February letter to us, you raised the prospect that the examination of coupled processes in the waste package and the near field environments may lead to some surprises that are not subsumed in the current structure.

And Dr. Levenson made passing reference to this in his comments. Is this a shorthand for the issue that you raised, Dr. Wymer, about the problems with trace constituents and the thermal window with regard to the alloy, or is the letter referring to something else?

DR. WYMER: No, that's exactly what it is, and I can elaborate on it just a little bit more to give you a better understanding of what was meant.

For example, I pointed that the Phs that were done or that were looked at in this work by the Nye County people got very, very low, and they were unrealistically low.

However, we heard some information from the people at the Center for Nuclear Waste Regulatory Analysis that there might be conditions where once the package was breached and you got in to the actual fuel material, where you have fairly high alpha concentration from the uranium and a few aconites that are in there, that you may have radiolysis that would produce nitrous and nitric acid from the nitrogen in the air that would be present in the package.

And this could in fact drop the Ph considerably, and maybe down into the range where you might in fact get conditions where you might be able to oxidize or reduce the neptunial ion. How, that is important.

And the reduction would be caused by the corrosion of the iron, with the stainless steel in the inner waste package, which would be favus while it was still in contact with the elemental iron.

And you could reduce the neptunium to a neptunium-4 while the radionuclide transport of the neptunium-4 would be expected to be considerably slower. This is a surprise and a positive direction. This would be a salubrious conclusion.

So we did not mean to imply by that that all surprises are bad. There an be surprises on both sides of the null point.

CHAIRMAN MESERVE: My experience has been that surprises are usually bad.

(Laughter.)

DR. WYMER: But we got some feed back from the staff on what do you mean by that, and what are these surprises. They must be horrible, and we didn't mean that. We just meant that there could be surprises, and we probably should have made it clearer.

CHAIRMAN MESERVE: But it is this Alloy-22 interaction issue that you were focusing on here?

DR. WYMER: That was the example that I had in mind. There could be other things, but that was the specific example that I had in mind, yes.

CHAIRMAN MESERVE: Let me make sure, but I think the bottom line that I am getting from all of your presentations is that there is lots of work to be done and it is your efforts of evaluating is a work in progress, but that fundamentally you are comfortable with the way that we are proceeding, and with the resources that we brought to bear, and the skills the staff is bringing to the task? Is that a fair evaluation?

DR. GARRICK: Yes. We are not by that saying that we are going to become complacent, but I think that we are feeling much better about the primary concerns that we have.

CHAIRMAN MESERVE: Okay. Thank you. Commissioner Dicus.

COMMISSIONER DICUS: Thank you. I am going to go back to the vertical slice objectives a little bit, and quiz you a little bit on the criteria that you are going to use to make your evaluations, and whether you are going to use like the Yucca Mountain review plan guidance, or have your own criteria, or is it a combination?

DR. HORNBERGER: To the extent that we can, we hope to use the Yucca Mountain review plan because that is the direction in which NRC is going.

Now, having said that, the technical exchanges were all based on the key technical issues, which have been or are likely to change once the Yucca Mountain review plan is released.

And I think that the staff has been focusing more on what they call integrated subissues, which the -- and the vertical slice by the way, sometimes the staff presents this in a matrix form, and the columns are the key technical issues, and then going down the side there are other items.

And that is part of the vertical, okay? Although for plain English, we should change the name. At any rate, what one can do is one can go and look and there are processes that are important in several issues, in several subissues, and the staff has done a good job of collapsing these things. And so to the extent that we can, we are going to follow along that track.

COMMISSIONER DICUS: I will go now to the subject of terminology, which we have all hit on in one way or the other, and how the public perceives what we are saying, and whether that has any connection with what we meant when we said it.

And this is the issue that the public has brought to us in Nevada with regard to the

closed-pending issue, and whether that terminology -- well, is there a better way for us to explain to the public what we mean by closed pending, or should we change terminology? Do you have an opinion on that?

DR. HORNBERGER: First of all, I will say that every meeting which I have attended the staff has done or has bent over backwards to explain this terminology every time that it comes up.

So at least people who attend these meetings I believe should get a fair impression of what the staff means. My own personal opinion, and this is not an ACNW opinion, because you caught us cold on this one, is that we are probably so far down the line on this closed and closed-pending that we should live with it.

I think we should learn a lesson that when we go forward in the future with such things that we might be a little more careful in how we choose the words.

DR. WYMER: In the interest of communicating with the public, Mr. Chairman, and which Commissioner Merrifield is interested in, and we all are, we did when we were out at Las Vegas get a pretty good tongue lashing from one of the participants that closed-pending is a biased way of saying it.

If it isn't closed, it isn't closed was the position, and therefore it is still open. So don't say it is closed pending. Say it is open and there are still some issues to be resolved, or something like that.

COMMISSIONER DICUS: So it may be the definition and how we explain it, rather than the terminology itself.

DR. GARRICK: So that is an example of a case for having just two categories.

COMMISSIONER DICUS: And the same thing applies coming in behind Commissioner Merrifield and his question regarding the issue of resolution or issue resolution process.

You expressed, Mr. Levenson, some concern that the public is not really being served with how these are being dealt with, and perhaps we need to start out on the front end explaining, even if it is the fifth time that it has been explained, or the sixth time, or whatever. It doesn't matter.

If it is good to say that this is where we were, and this is where we are going, and then get into the technical issue. But how can we -- it is another situation, because the public may not understand that the issue resolution doesn't mean that the issue has been resolved, and that it is compliant.

Who would better explain that? Again, is it an issue that we need to change terminology or is it too late to do it?

MR. LEVENSON: Well, I think for the key technical issue resolution program that it is too late to change, because a significant fraction of them are done, and we are down the road.

I think what could be done is even though they are pretty much done, there will be a significant flow of paper yet, documentation reports, and what would probably be worthwhile is somebody carefully preparing an introduction which defines that this does not -- that the key technical resolution does not resolve the issue. It only addresses whether enough information is going to be provided.

And similarly with the closed and closed pending, and just stick that at the front of every document that reports on or summarizes the key technical program. You only need to do it once.

COMMISSIONER DICUS: Okay. Thank you.

MR. LEVENSON: By the way, it isn't only the general public. A significant part of the technical community has problems with it.

COMMISSIONER DICUS: I understand that. You mentioned that the staff is doing a pretty good job of doing a risk informed performance based approach in the high level waste area if I understood you right.

But that DOE is not going in that direction, and that they are in fact staying rather prescriptive and deterministic in what they are doing. Does that present a problem down the road?

DR. GARRICK: Who made that comment?

COMMISSIONER DICUS: You did.

CHAIRMAN MESERVE: And we have it on the transcript.

DR. GARRICK: Well, it has to be put in the proper context, because the truth is that the TSPA that DOE is doing is a rather pioneering effort in the use of probablistic methods to assess geologic repositories. There is no question about it.

Where we are seeing sometimes the absence of a risk perspective is when we isolate issues, and analyses, and activities, and hear briefings from people, and sometimes we don't get the sense that there is a real connection between what they are doing, which could end up being an important part of a total system performance assessment, and what has actually ended up being used in the performance assessment.

So it is kind of at a lower level or a lower tier. I don't think that the risk thought process has really been embraced across the board. It hasn't even in the NRC, because we will sometimes have the same experience in briefings from the NRC people and follow it with the question of, all right, how do you risk inform what you are doing.

So I think it is more of a degree thing than a kind. I would really hate to be unduly critical of the DOE attempt to bring probablistic thought processes into the total system performance assessment, because that is a pioneering effort, and has major impact on the way repositories are going to be analyzed in the future.

But we find individual situations, specific situations, where we have trouble making the connection between what we hear in the TSPA and what some presenters are telling us.

DR. WYMER: But we do hear a lot from the DOE about sensitivity analyses. They are doing a lot of those, which is certainly related.

DR. GARRICK: Right.

COMMISSIONER DICUS: Okay. Thank you for that explanation. And one final thing, and it is a curiosity question on my part, and this would probably go to any of you, but I am going to address it to Dr. Wymer.

You talked about the trace elements and what effect it may have, and things along those lines. Has the committee looked at, or are you going to look at, what effects, for example, bacteria might have on waste packages?

Because I know that at the center they may be doing a little bit of work on that if I recall, but I have read a little bit about that this is not something to be ignored.

DR. WYMER: Well, we have not paid much attention to it so far in all honesty, and most of what we read that is presented to us says that this is probably in the final analysis a non-issue. So we have sort of taken that at face value at the moment.

Actually, I have independently read some things that suggested that perhaps it is not something you can actually ignore, but so far we have not paid much attention to it.

COMMISSIONER DICUS: Okay. I might mention that again next year.

MR. LEVENSON: Well, let me add that it isn't that DOE is ignoring the subject of microbial corrosion because they have a program underway on support of the WIPP program. So they are doing work in that field, but it just has not been applied to this field.

COMMISSIONER DICUS: Okay. Thank you.

CHAIRMAN MESERVE: Thank you very much. We very much appreciate your efforts in these very helpful briefings. I have a brief closing remark, but I know that Commissioner Merrifield does as well. So let me turn to Commissioner Merrifield.

COMMISSIONER MERRIFIELD: Thank you, Mr. Chairman. I do appreciate that. I agree that it was a very good briefing and a very useful briefing. Today, I had earlier made some comments regarding in some cases schematic issues, but I think they are important because public confidence is clearly something that we care a great deal about around here.

And certainly in issues associated with high level waste, and that is near or at the top of

the list. In that regard, I just want to make a note -- and I am careful in how I choose my words, but if DOE moves forward and makes a recommendation regarding a high level waste site, and if that site happens to be Yucca Mountain, we will have a lot of work to do.

And the public certainly in the State of Nevada will look very closely at how we are conducting that. Our decision, if we were to receive such an application, will have to be based on the science, and we will have to take it wherever it goes, wherever it leads us, and that will be a decision one way or the other based on the science and the recommendations that we have from you.

The only caution I would make regarding the presentation today -- and this goes to Dr. Wymer -- is that when we were talking about surprises, and you utilized the word good surprises versus bad surprises, and I just caution -- and not to go into this too far, but I think it is more appropriate to talk about surprises even do or don't validate our previous understanding without putting any kind of an evaluation in terms of what those are.

DR. WYMER: That's a good point.

COMMISSIONER MERRIFIELD: So that is my final comment in that regard. Thank you, Mr. Chairman.

CHAIRMAN MESERVE: I would like to express my appreciation to the ACNW. I know that you are very overworked, and that you have a singular responsibility in providing assistance to the Commission in this, and what could be and prove to be an enormously important area for us, when and if there were an application submitted.

And on behalf of the Commission, I want to express our appreciation for the efforts that you have made. It has been very careful. With that, we are adjourned.

(Whereupon, the meeting was concluded at 12:04 p.m.)