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UNITED STATES NUCLEAR REGULATORY COMMISSION'S
ADVISORY COMMITTEE ON NUCLEAR WASTE

September 19, 2000

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

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON NUCLEAR WASTE

121ST ACNW MEETING

PUBLIC MEETING

Ballroom B
Crowne Plaza Hotel
Las Vegas, Nevada

Tuesday, September 19, 2000

The Commission met in open session, pursuant to notice, at 9:05 a.m., B. John Garrick, Chairman, presiding.

COMMITTEE MEMBERS PRESENT:

- DR. B. JOHN GARRICK, Chairman, ACNW
- DR. RAYMOND G. WYMER, Vice Chairman, ACNW
- MR. MILTON N. LEVENSON, ACNW Member
- DR. GEORGE HORNBERGER, ACNW Member

1 STAFF AND PARTICIPANTS:

2 DR. JOHN T. LARKINS, Executive Director, ACRS/ACNW

3 MR. HOWARD LARSON, Acting Associated Director, ACRS/ACNW

4 MR. RICHARD K. MAJOR,, ACNW Staff

5 MS. LYNN DEERING, ACNW Staff

6 MR. AMARJIT SINGH, ACNW Staff

7 DR. ANDREW C. CAMPBELL, ACNW Staff

8 JAMES E. LYONS

9 NEIL COLEMAN, NMSS

10 WILLIAM REAMER, NMSS

11 DR. JOHN TRAPP, NMSS

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P R O C E E D I N G S

[9:05 a.m.]

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

This is the first day of 121st Meeting of the Advisory Committee on Nuclear Waste. My name is John Garrick, Chairman of the ACNW. Other members of the Committee include George Hornberger, Ray Wymer, and Milt Levenson.

Today, the Committee will discuss activities regarding planning and future agenda items, and we have, as a matter of fact, already done that.

We will hold a special session, Key Technical Issues. Bill Reamer of NMSS will discuss the considerations involved with KTI closure.

We will discuss saturated and unsaturated flow under isothermal conditions. Neil Coleman, NMSS, will discuss the partial closer of this KTI, namely that having to with unsaturated zone flow.

We're going to discuss igneous activity, Dr. John Trapp, NMSS, will discuss the considerations associated with closure of this particular KTI.

This afternoon, we're going to hear public comments from stakeholders and members of the public, and interested parties between 1:00 and 4:30 p.m., and we're

1 going to discuss potential technical committee issues for
2 the Calendar Year 2001.

3 Lynn Deering is the Designated Federal Official
4 for today's initial session. This meeting, as usual, is
5 being conducted in accordance with the provisions of the
6 Federal Advisory Committee Act.

7 We have received one request from Dr. Jacob
8 Powers, who has indicated a desire to make a few remarks. I
9 assume that's going to take place during the afternoon
10 session, unless I'm advised otherwise.

11 In connection with people who will be speaking, it
12 is requested that each speaker use one of the microphones,
13 identify himself or herself, and speak clearly and with a
14 volume that we can all hear.

15 Also, I should note that there were some
16 last-minute changes in our agenda, due to activities of the
17 Commission, and these changes were made, however, learned
18 that the revised Federal Register Notice on the meeting did
19 not get out until, as a matter of fact, today. So we
20 apologize for that inconvenience, especially to those of you
21 who were expecting to see an agenda item on the Yucca
22 Mountain Review Plan.

23 That was out of our control, and pretty much out
24 of the staff's control.

25 Before proceeding, I'd like to note a few items.

1 Jim Lyons, who is supposed to be sitting on my right here,
2 we welcome him as the Associate Director for Technical
3 Support, ACRS/ACNW, at this meeting.

4 We did discuss his activities and experience and
5 curriculum vitae at our July meeting, and we welcome him. I
6 understand he had some personal matters he had to take care
7 today, but he will be here for the rest of the meeting.

8 The Committee also welcomes Judith Goodwin to the
9 Technical Staff as secretary. She reported on August 28th.
10 Judith was with the High-Level Waste Branch, so,
11 fortunately, is familiar with a lot of the business that we
12 engage in.

13 Janet Schleuter who is Commissioner McGaffigan's
14 Technical Assistant, is on a rotational assignment to
15 High-Level Waste for a couple of months, serving as the
16 Acting Branch Chief.

17 An item of interest is that the Utah regulators,
18 subject to some public comment, have approved license
19 amendments to the EnviroCare license to allow construction
20 of a new disposal cell for Class-A, low-level radioactive
21 waste.

22 TLG Services, a company leader in the
23 decommissioning services business, has been purchased by
24 Entergy Nuclear. Entergy Nuclear is a nuclear power plant
25 generating company.

1 Some of us have been interested in following the
2 Maine Yankee activity. Maine Yankee has indicated that it
3 intends to remove all fuel from the spent storage pool by
4 April 2001, by unloading it to NAC Universal Multipurpose
5 Systems Spent Fuel Storage and Transportation Cask System.

6 I think that's all the opening remarks, unless
7 there are some comments from members or staff or something
8 that I missed.

9 [No response.]

10 CHAIRMAN GARRICK: Hoping that there have been
11 none, I think we will proceed with the agenda. The first
12 issue is going to be key technical issue closure business,
13 and Bill Reamer is going to cover that.

14 MR. REAMER: Thank you, Dr. Garrick. And we have
15 actually three presentations today, as you enumerated.

16 The three presentations today all give some kind
17 of introductory description of issue resolution, the
18 process, what the staff is trying to achieve, the issue
19 resolution, what does it mean; then we'll have two of the
20 technical presentations on saturated zone and igneous
21 activity to follow, where we will really show what we've
22 done to implement issue resolution in those two areas.

23 So, what I'll be talking about today are the
24 givens that drive -- some of the givens that drive issue
25 resolution.

1 I'll be talking about the context of issue
2 resolution, which is prelicensing consultation. Issue
3 resolution, as we're talking about it today, is a
4 prelicensing concept.

5 I'll define, as best I can, issue resolution, and
6 will be interested in any questions that you have to kind of
7 assure that we have shared understanding of what it is that
8 we mean when we say issue resolution.

9 I'll talk about the constraints on issue
10 resolution which are very important as well, and the revisit
11 the distinction between prelicensing and the licensing
12 context, and hopefully driving home some of the points that
13 I want to make on issue resolution.

14 I talked about the drivers of issue resolution,
15 and I just want to mention several items here:

16 One is the statutory requirement that the
17 Commission complete its license application review in three
18 years. That assumes, of course, that there is a license
19 application.

20 There are many steps in this project that need to
21 be completed before there can be a license application.

22 The Department of Energy needs to complete the
23 scientific studies at the site, and needs to prepare a site
24 recommendation.

25 That site recommendation needs to be approved by

1 the President. It needs to be approved by the Congress.
2 This is not a project that is a foregone conclusion; there
3 are many steps that still need to be taken.

4 But assuming that there is a license application,
5 one of the requirements in the statute is that the
6 Commission must complete its review and issue a decision on
7 whether or not to authorize construction within three years.

8 This puts the onus on the DOE to submit to the
9 Commission, a high-quality license application. By a
10 high-quality license application, what I'm talking about is
11 a license application that addresses all of the issues in
12 some way.

13 That puts the onus on the Department to identify
14 the issues early on, and to address them. The three-year
15 timeframe that we work under, once the license application
16 is filed, really doesn't permit very much time to be
17 addressing questions.

18 The premium is on the early identification of
19 issues, and it's DOE's responsibility to do that.

20 What do we mean when we talk about issues? We're
21 talking really very broadly here: Questions, comments,
22 concerns. They can come from the staff, they can come from
23 the state, they can come from the Department of Energy,
24 technical people.

25 They are broadly defined; they relate to the data,

1 the models, the codes that the Department proposes to rely
2 on in its argument in favor of the project. As I said, the
3 Department's responsibility is to address all of these
4 issues in some manner.

5 For the NRC staff's part, we, too, are
6 implementing a policy of early identification of issues.
7 The Nuclear Waste Policy Act directs the Commission to
8 monitor and comment on the Department of Energy's site
9 characterization activities.

10 The staff takes that to mean that we should be
11 raising our questions now, not holding them. These, I would
12 emphasize, are questions at the staff level.

13 We're not speaking for the Commission, we're not
14 speaking for the Licensing Board, if there is a license
15 application. We're not speaking for other aspects of the
16 Agency.

17 The other point, of course, in prelicensing
18 consultation is that the staff has focused its review
19 activities on nine key technical issues. These are issues
20 that we have identified as what we think are most important
21 to performance.

22 We have done that identification based on our
23 iterative performance assessment activities, the insights
24 we've gained from that. And this is, in prelicensing, our
25 focus for issue resolution, the key technical issues.

1 What is issue resolution? To me, issue resolution
2 is an agreement by the Department of Energy that it will
3 address all of the questions, comments, and concerns, that
4 the staff raises at the staff level, before there is any
5 license application, and it will include that information in
6 the license application if there is a license application.

7 So that puts the onus on the Department of Energy
8 to provide to us, sufficient information so that the staff
9 can review the application and write a safety evaluation
10 report.

11 It puts the onus on the Department to provide a
12 complete record that we can review and reach a decision on
13 at the staff level.

14 Now, I say that issue resolution is achieved when
15 there is an agreement between the staff and the NRC, but
16 what I mean here is that there is an understanding on the
17 Department of Energy's part about our comments, and there is
18 an agreement on their part to respond, to provide the
19 information that the staff says is needed, that they have
20 heard our comment, that they have heard our question, and
21 that they have agreed to accept it and identify it.

22 Issues are, from the staff's standpoint,
23 considered closed when we have no further comments or
24 questions at a particular point in time about how the
25 Department of Energy is addressing something.

1 How is issue resolution achieved? In a very
2 general process description, we're using our TPA insights to
3 risk-inform our approach to issue resolution. We, the
4 staff, are focusing on those areas that we have identified
5 as areas of potential concern.

6 We're also identifying, at the staff level, what
7 additional information DOE needs to provide to address those
8 concerns, and I think the two following presentations on
9 unsaturated zone and igneous activity will really give you
10 concrete examples of how issue resolution in certain areas
11 has been achieved.

12 We have working definitions for issue resolution.
13 I haven't included them on the slide, because it looks like
14 the words are written by a lawyer.

15 CHAIRMAN GARRICK: You wouldn't want to do that.

16 [Laughter.]

17 MR. REAMER: In any event, I'll just give them to
18 you orally: Issues that fit within the closed category,
19 we're saying that issues can be closed if the DOE approach
20 and available information acceptably address the staff
21 questions such that no information beyond what is currently
22 available will likely be required for regulatory
23 decisionmaking at the time of initial license application.

24 In other words, we're saying that the data that's
25 been presented is sufficient for us to conduct a review.

1 Issues are considered closed-pending, if the NRC staff has
2 confidence that the DOE proposed approach, together with the
3 DOE agreement to provide the NRC additional information
4 through specific testing or analyses, acceptably addresses
5 the staff's questions such that no information beyond that
6 provided or agreed to will likely be required at the time of
7 initial license application.

8 The key difference between a closed issue and a
9 closed-pending issue is that closed-pending issues are
10 relying on an agreement by the Department of Energy to
11 provide certain information in the future before there is
12 any license application.

13 And the third category issues -- Yes?

14 DR. HORNBERGER: Just a clarification: Is it that
15 they agree to provide the information before or at the time
16 of?

17 MR. REAMER: Well, at the time of, but as a
18 practical matter, that means it's going to have to be done
19 before the license application is submitted. It's
20 information, typically, that will require potentially
21 additional data-gathering or additional analysis of
22 information that exists, or additional justification of some
23 aspect of the argument.

24 CHAIRMAN GARRICK: I think also, Bill, that it's
25 important to comment, maybe with respect to closed issues

1 and the issue of uncertainty.

2 You're not saying that the elimination of
3 uncertainty is a requirement for closure, but you may be
4 saying that good knowledge of the uncertainties is a part of
5 that process.

6 MR. REAMER: Yes, what we're looking for is the
7 DOE story, and the evidence that supports that story. And
8 the threshold for issue resolution is not that all questions
9 have been resolved such that there is no uncertainty that
10 remains; it's understanding the way in which the DOE has
11 used the uncertainty in their argument.

12 CHAIRMAN GARRICK: Right.

13 MR. REAMER: And, finally, issues that are open,
14 are open if the NRC has identified questions regarding the
15 Department of Energy approach, and the DOE has not yet
16 acceptably addressed the questions or agreed to provide the
17 necessary additional information in the license application.

18 DR. LARKINS: Bill, could that potentially affect
19 the acceptability of a license application, if there are
20 several open issues?

21 MR. REAMER: Absolutely. A license application
22 with a major hole may not be docket-able. As you may be
23 aware, there is an initial review that the staff does to any
24 license application that it receives, which is to assure
25 that the license application is complete.

1 And it must meet that acceptance review in order
2 to be docketed and reviewed. If a license application has a
3 major hole, there's always the possibility, the risk, that
4 it's not going to be a docket-able license application.

5 MR. LEVENSON: Bill, also, the term, closed, here,
6 applies just pre-license application. Is that correct, that
7 these things will all get thoroughly reviewed?

8 MR. REAMER: Issue resolution is a pre-closure
9 concept; that's right. It relates to the sufficiency of
10 information to conduct a review. It is not a merits
11 determination on that issue, and that's a very important
12 point, and I appreciate your raising that question.

13 The constraints on issue resolution are also
14 important points, and I try to remind people of this every
15 time I have an opportunity.

16 Issue resolution, the results of pre-licensing
17 activities, are not binding, if there is a license
18 application. They're not binding on the staff, they are not
19 binding on any potential party.

20 They are not binding on the state; they're not
21 binding on the Commission; they're not binding on the
22 Licensing Board, if there is a Licensing Board hearing.

23 Issue resolution is a prelicensing concept that's
24 designed to assure that there is a complete license
25 application, a complete record, that will provide the basis

1 for the staff to do its review, and write a safety
2 evaluation report.

3 The other point is that issues that are closed can
4 be reopened. And I think that Neil in his presentation,
5 Neil Coleman, may note in the unsaturated zone area, just
6 such a circumstance.

7 New information can always lead to the
8 consideration of what impact does this new information have
9 on that closed issue? Is it significant, such that that
10 issue should be reopened?

11 And so in conclusion, as I have said, issue
12 resolution relates to the left-hand side. It is a
13 prelicensing phase concept.

14 Its focus is on assuring that there is sufficient
15 information in any potential license application for the NRC
16 to conduct a review.

17 At the license application stage, the right-hand
18 concept, compliance determinations will be made by the NRC.
19 The DOE has the obligation, the burden of proof, really, at
20 all stages in this project, but particularly in the license
21 application stage, to demonstrate safety against the
22 Commission's regulations.

23 And it will be DOE's obligation at the time of a
24 license application, if there is one, to demonstrate
25 compliance with NRC regulations.

1 And so the logical conclusion is, in the
2 prelicensing phase, there are no safety conclusions against
3 the Commission's regulation, and it would be inappropriate
4 to attribute to issue resolution, any such conclusion or
5 finding with respect to compliance with the Commission's
6 regulations.

7 Any other questions?

8 CHAIRMAN GARRICK: I failed to recognize my
9 colleague here, George Hornberger, who was going to lead our
10 discussion on these next few presentations. George?

11 DR. HORNBERGER: Any questions, John?

12 [Laughter.]

13 DR. HORNBERGER: Any questions from the members?
14 Staff?

15 [No response.]

16 MR. REAMER: Any questions on just broader aspects
17 of issue resolution that I haven't addressed? What I've
18 tried to talk about specifically, or is the meaning, the
19 definitions, the meanings, the constraints, the boundaries,
20 the limits?

21 DR. HORNBERGER: As Bill well knows, we have been
22 quite interested in the issue resolution process, and I
23 think this is a good introduction to make sure that
24 everybody is on the same page with regard to the issues.

25 I think that I, at least, am looking forward to

1 the two specific discussions to follow, because my point is
2 that I think that we're okay on the general nature of the
3 issues.

4 What we need to do is better understand how this
5 really works.

6 I think one comment, though, worth making, is that
7 this is an open -- it sounds like it's just between the
8 Department and the NRC, but it's really an open process for
9 public and other stakeholder participation.

10 MR. REAMER: Right, the technical exchanges that
11 are frequently the point where we discuss issue resolution
12 with the Department of Energy are all open meetings, and the
13 documents the staff issues to document its progress in issue
14 resolution, those are public documents as well.

15 CHAIRMAN GARRICK: The only thing I would ask,
16 though, is from your perspective, you've had some experience
17 with this. I know we're going to get at the detailed level,
18 but from your perspective, has the issue resolution process
19 so far accomplished what staff had hoped it would
20 accomplish?

21 MR. REAMER: Yes, but I wouldn't want to give the
22 impression that we're done. I think we have a lot more to
23 do in the issue resolution area.

24 Remember that there are essentially nine key
25 technical issues that we are focused on. We've held

1 technical exchanges with the Department of Energy on three
2 of those. We're hopeful to be able to meet with the
3 Department and the other -- the remaining key technical
4 issues as well.

5 So there's a good deal of work to be done, but
6 what we've found is an understanding and a willingness on
7 the part of the Department of Energy to hear what we're
8 having to say, and to respond to those questions and
9 concerns.

10 CHAIRMAN GARRICK: Thank you.

11 DR. HORNBERGER: Thanks very much, Bill. We're
12 going to -- even though the schedule says -- we're going to
13 move on.

14 CHAIRMAN GARRICK: We're going to move on.

15 DR. HORNBERGER: We're going to move on. And so
16 we're going to --

17 CHAIRMAN GARRICK: The speakers are here.

18 DR. HORNBERGER: We're going to hear about the
19 unsaturated flow under isothermal conditions at KTI, and
20 Neil Coleman is with us for that.

21 MR. COLEMAN: Hello everyone. It's nice to be
22 here today to talk to you about a meeting that we had a
23 month ago in Berkeley, California.

24 I know from your staff, Lynn Deering attended that
25 meeting. Also, David Diodato, with the TRB attended, and we

1 had some very good technical discussions.

2 This was the first of this group of meetings on
3 issues resolution, and under our KTI, the unsaturated and
4 saturated flow under isothermal conditions, we've divided it
5 into two meetings, because it's really a lot of material to
6 cover.

7 The first meeting covered the unsaturated zone
8 issues and matrix diffusion, and also, to the extent we
9 needed to go over it, the climate issues as well, shallow
10 the infiltration.

11 The saturated zone issues will be covered in a
12 meeting that starts October 31st, and that is a definite
13 date. It will be a three-day meeting in Albuquerque.

14 And my counterpart with the Center for Nuclear
15 Waste Regulatory Analyses, Jim Winterly, is here today. A
16 number of folks from the Center were at this meeting as
17 well, and a host of NRC management and staff.

18 Briefly, again, the basis of these meetings is to
19 review the basis to resolve open issues at the staff level,
20 and for this meeting, those involving unsaturated zone flow
21 at Yucca Mountain, and to look at paths forward, if you
22 will, for any of the remaining issues under the unsaturated
23 zone.

24 Bill went through this, so I won't go through it
25 again, other than to stress that new information at any time

1 could cause us to reopen an issue, whether it's closed or
2 closed-pending.

3 And as you will see, new information prompted us
4 to reopen an issue that was resolved for several years, and
5 that was the shallow infiltration subissue.

6 Now, there are six subissues altogether under this
7 KTI or Key Technical Issue. And climate change, there are
8 two issues related to climate change:

9 There is one on just the general nature of what
10 kinds of climate change could be expected over the next
11 10,000 years and longer. This is a principal factor in
12 reviewing performance assessments.

13 And one reason we did look at it again is because
14 DOE changed their climate approach. They no longer assume,
15 as was done in the viability assessment, that a full pluvial
16 climate will occur over the next 10,000 years.

17 That was an extremely conservative assumption in
18 the VA. They now assume that a monsoonal climate, which is
19 somewhat wetter and warmer than today, will begin as soon as
20 600 years into the future, and last about 14000 years, and
21 that a glacial transition, which would be transitioning to a
22 pluvial climate, would occur in the following 8,000 years.

23 The mean annual precipitation during the glacial
24 transition is about 70 percent greater than in the present
25 day. DOE' assumptions about climate change are based on

1 generalized paleoclimate trends, and are acceptable.

2 The basis for this was published in a report by
3 Forester et al, 1999. The title of that is Climatic and
4 Hydrologic History of Southern Nevada During the --

5 So that subissue was closed, remains closed, even
6 though there was a revised approach.

7 The second subissue on hydrologic effects of
8 climate change, there was no real change in the DOE
9 approach, but because the climate change assumptions were
10 altered, we looked at this.

11 And we found that the same assumption made in VA
12 was made in -- continues to be made now, and that is that a
13 water table rise of about 120 meters would occur for the
14 future climate scenarios of both the monsoonal and the
15 glacial transition climate.

16 And you'll find that documented in the unsaturated
17 zone PMR on page 172, that that continues to be an
18 assumption.

19 This is a very conservative assumption that
20 continues to be, because we know that the water table rise
21 was probably nowhere near that much, and that was one of the
22 discoveries of the Nye County Drilling Program under the
23 leadership of the late Nick Stellavato, that one of the
24 first bore holes they drilled, Nye County Number 1, which is
25 drilled at a diatomite deposit known to have been flowing in

1 the very latest Pleistocene, just before the Holocene, and
2 confirmed that the water table depth there today --

3 We know it was flowing somewhere around 12,000
4 years ago, at the surface. Today, the water table there is
5 about 30 meters deep.

6 CHAIRMAN GARRICK: Neil, are these assumptions
7 absolute or probabilistic?

8 MR. COLEMAN: It's not an assumption; it's a
9 direct observation.

10 CHAIRMAN GARRICK: So they are absolute.

11 DR. HORNBERGER: I don't think he means the
12 flowing water.

13 CHAIRMAN GARRICK: No.

14 DR. HORNBERGER: He means the 120-meter rise.

15 CHAIRMAN GARRICK: Yes, yes, rise in the water
16 table, for example.

17 MR. COLEMAN: It's not treated probabilistically.
18 As each of the future climate --

19 CHAIRMAN GARRICK: So it's an on/off thing?
20 Either it's this or it's that?

21 MR. COLEMAN: At 600 years in the future, suddenly
22 the water table is treated as being 120 meters higher, and
23 it stays that way thereafter. It's a very conservative
24 assumption.

25 So this subissue remains closed. It was closed

1 and it remains closed. This is not closed-pending, this is
2 closed.

3

4 CHAIRMAN GARRICK: This is called shoot yourself
5 in the foot, but go ahead.

6 MR. COLEMAN: Then present-day shallow
7 infiltration, which was previously closed, since the
8 viability assessment, DOE has revised downward, the mean and
9 the upper part of the range for shallow infiltration.

10 In TSPA-VA, a total system performance assessment
11 viability assessment, DOE used a value of about 8
12 millimeters per year for the mean annual infiltration over
13 the repository block.

14 The distribution now used in the UZPMR ranges from
15 about one to 12 millimeters per year, with a mean of about
16 five millimeters per year.

17 Now, the main reason for this change is further
18 incorporating the effects of vegetation and performance
19 assessment, which increases the transpiration, and also
20 runoff effects and how much water is assumed to run off
21 under different kinds of rainfall events.

22 However, we can perhaps buy off on the mean, the
23 lowered mean, but the upper end of the range, we feel should
24 be about 50 percent higher, should account for the many
25 uncertainties that exist in the system, some of which

1 include the true range of soil thicknesses and textures over
2 the Mountain, and the bedrock hydraulic properties which are
3 only known to some extent.

4 And then there are the effects of the plant
5 distributions, because on different slopes, with different
6 solar aspects, you actually get different types of local
7 populations of plants.

8 Uncertainties in the methods used to develop the
9 shallow infiltration model -- oh, I do have a slide on this,
10 too. Sorry about that.

11 I'm at this point down here, uncertainty in the
12 methods used to develop the shall infiltration model. And,
13 by the way, you might correct on your slides, at the end of
14 neutron probe, that semicolon should not be there.

15 But some of the main tools that DOE has used to
16 look at shallow infiltration include determining water
17 counts and profiles using neutron probes; chloride mass
18 balance method; and temperature profiles.

19 Now, the main DOE action on this is that they've
20 indicated they would like to respond further to the comments
21 we made, and by October, provide an action plan on where to
22 go from here.

23 DR. HORNBERGER: The 50-percent higher figure,
24 this is present day? Do you feel that perhaps it should be
25 as high as 18 millimeters per year?

1 MR. COLEMAN: Around there, yes. We couldn't come
2 up with an exact number, of course. It's a number that was
3 more comparable to what was used in VA, and that certainly
4 does a lot better job of accounting for the uncertainties
5 here.

6 DR. HORNBERGER: The uncertainties, for example,
7 in the chloride mass balances are uncertain to the extent
8 that it could be 18 millimeters per year?

9 MR. COLEMAN: Well, some of it has to do with the
10 distribution of where the bore holes were placed, that it
11 doesn't really give you a true sampling of the site. It's
12 probably more that than anything else.

13 DR. HORNBERGER: But I guess what I'm -- you're
14 doing this based on a technical assessment, and you look at
15 it and say, well, okay, the chloride mass balances, because
16 of the placement of bore holes, it looks to us as if 18
17 millimeters per year is the -- would be reasonably
18 consistent with the information available?

19 MR. COLEMAN: Well, not just chloride mass
20 balance, but also from temperature profiles, yes; that there
21 is certainly enough variability at the site, and over the
22 whole range of different environments at the site, from the
23 crest where you have very thin soil environment, and, in
24 fact, bedrock exposure in places, quite a few places. And
25 then locations of the washes where a lot of the bore holes

1 are concentrated where you have much thicker alluvium, and
2 we suspect that infiltration is very much dominated by the
3 thinner soil environments and including the Western Slope.

4 When you're at the crest of Yucca Mountain, you're
5 looking down the other side, there's a lot of bedrock
6 exposure there, a location where you can have a lot of
7 fairly rapid infiltration.

8 You will notice that there are no bore holes in
9 that side of the Mountain. None of these measurements were
10 taken on that side, because you physically couldn't get in
11 there to do it.

12 MR. WINTERLY: Could I add to that point? Jim
13 Winterly, Nuclear Waste Regulatory Analysis.

14 If I understand Dr. Hornberger's question --

15 VOICE: I'm sorry, is your mike on?

16 MR. WINTERLY: We're discussing the technical
17 basis for our requesting a higher number of infiltration
18 somewhere around 18 millimeters per year.

19 The DOE has an analysis model report, AMR as we
20 call them, on uncertainty in infiltration that considers all
21 the parameter uncertainties and the uncertainties and what
22 the climate states are, but the analysis was only done for a
23 future climate.

24 And the infiltration rates used in the PMR aren't
25 really based on that AMR. The results of that AMR sort of

1 go into a different model abstraction for PA.

2 But the result of that AMR shows a certain
3 distribution of uncertainty for what the infiltration would
4 be under future climate. So we sort of extrapolate from
5 that that if present-day climate uncertainty follows a
6 similar distribution, that would move the upper bound up
7 quite a bit from where they are currently saying it is.

8 MR. COLEMAN: I just wanted to mention, while
9 we're still on this slide, that deep percolation, which
10 we'll get into in a minute, that is closed-pending, that is
11 present-day and future deep percolation.

12 Ambient flow in the saturated zone un-dilution,
13 that is one of the topics that will be covered at the
14 October 31st meeting.

15 At this meeting in Berkeley, we dealt with matrix
16 diffusion, and it has two parts: Matrix diffusion in the
17 unsaturated zone, that is closed-pending, as we'll discuss;
18 Matrix diffusion in the saturated zone, which is a quite
19 different issue, remains open, and that will be addressed in
20 the November meeting, as well.

21 Now, the agreements that we came up with at this
22 meeting, just reviewing Subissues 1 and 2, these are closed,
23 no agreements were necessary. Subissue 3, present-day
24 shallow infiltration, which is now, again, an open issue.

25 The DOE folks are planning to respond to our

1 comments, provide an action plan for further work, and also,
2 if needed, we will have a third meeting under this key
3 technical issue, and that would be scheduled by March of
4 next year.

5 Now, it's also possible that if we have the
6 information available that DOE wants to provide to us, this
7 could be discussed as an item of old business, shall we say,
8 at the October/November meeting, if there is time.

9 And by the way, from our summary meeting minutes,
10 the proposed DOE actions on shallow infiltration -- let's
11 see if there is anything different here from what I
12 mentioned --

13 [Pause.]

14 No, that's it. The bottom line, again, on shallow
15 infiltration is that it's open because we feel the new upper
16 bound is simply too low, approximately 12 millimeters per
17 year, does not encompass the uncertainties that we see at
18 the site.

19 DR. LARKINS: Neil?

20 MR. COLEMAN: Yes.

21 DR. LARKINS: Do you go -- I assume that you're
22 going to go back and re-factor these into your TPA analysis
23 and see what results, how these impact the results of your
24 TPA analysis?

25 MR. COLEMAN: Oh, yes. I'm glad you mentioned

1 that, because something that came up in our meeting -- and I
2 suspect that it will come up in other meetings as well --
3 the extremely robust waste package that DOE has proposed
4 makes it very difficult to see the effects of varying
5 assumptions in the natural system, the effects of the
6 different components in the saturated zone, such as effects
7 of valley fill, retardation in the valley fill, the role of
8 the Calico Hills in slowing down or absorbing radionuclides.

9 It has become much more difficult to see just
10 truly what those effects are.

11 Now, we talked with the DOE folks about this, and
12 they are thinking about ways to make this more transparent.
13 We really do need to see that more clearly, since in a
14 number of cases, a path to resolution might be a sensitivity
15 study, showing the true effects, NPA, of, say, assumptions
16 about matrix diffusion.

17 It was easier in VA to see what the effects were
18 of changing matrix diffusion on the overall system. We
19 noticed that even significant changes in dripping scenarios,
20 the numbers of waste packages that received dripping of
21 water, did not have nearly as large an effect as seen
22 before.

23 You would expect that, given a very robust waste
24 package, but there needs to be a treatment to make it more
25 transparent, what these effects are. Whether it -- where an

1 analysis would not include all the robust components of the
2 waste package, just so we can clearly see how the changes in
3 the natural system play out.

4 Agreements related to deep percolation,
5 present-day and future deep percolation, in order to reach
6 closed-pending on this subissue, we know that the importance
7 of the ongoing and planned tests, really most of the
8 remaining program of data collection that DOE has going on,
9 is focused in some remaining work in the east-west drift, a
10 fair bit of work in the cross-drift or east-west drift --
11 what I meant was, in the ESF and in the cross-drift, and
12 then the other work is concentrated to the south in the
13 saturated zone, involved with the Nye County drilling
14 program.

15 But it is very important for the ongoing and
16 planned tests to proceed and to be completed. Two of the
17 key examples here are the isolated part of the east-west
18 drift, and perhaps its --

19 [Pause.]

20 This projector is not too good. The isolated part
21 of the east-west drift, you can see the beginning point
22 where it comes off the north ramp, and then right about
23 here, at Station 16+95 or 1695 meters into the tunnel, is
24 the -- I'm sorry, 1763. I'm reading the wrong one. -- this
25 is the first hydrologic bulkhead.

1 This then isolates the remaining part of the
2 tunnel from the ventilation effects, which all of the tunnel
3 from here back are highly ventilated for the safety of the
4 workers.

5 And this test -- an additional bulkhead had been
6 added back here. There are two additional bulkheads at the
7 end, and these are isolating the test zone from a number of
8 things: There's a transformer at the end, the tunnel boring
9 machine is still here at the end of the drift; there's a
10 transformer there that gives off a fair bit of heat.

11 And at one time, in order to read the instruments
12 that are in the tunnel, it was necessary to leave the lights
13 on. They were all connected together. That's been
14 corrected so it's not necessary to have the lights on.

15 And this additional bulkhead then helps isolate
16 the effects of the heat. This transformer apparently gave
17 off so much heat that it was detectable in the isolated part
18 of the tunnel.

19 The idea of this test is to bring this section of
20 the tunnel as closely back to natural conditions as
21 possible.

22 The reason for doing that is to see just what the
23 moisture conditions are like in the wall rock, and help
24 answer the key question, does dripping occur in the
25 underground at Yucca Mountain under natural conditions,

1 fully equilibrated conditions?

2 This is a key finding to be made. It does not
3 depend on model assumptions, it does not depend on trying to
4 understand output from a black box. It's a true test of the
5 performance of the Mountain.

6 And one of the most recent additions to this part
7 of the tunnel -- and it's mainly in the farther end -- is a
8 series of cloths which are impregnated with a pH-sensitive
9 reagent. They are drip cloths which are designed to detect
10 whether any dripping takes place today.

11 So that while this tunnel is isolated, they will
12 record, because if a drop falls on them, it produces a spot,
13 a chemical reaction, and is preserved on the cloth, whether
14 dripping is happening.

15 I would say the main reason that we were able to
16 agree with DOE that this is a closed-pending, is the
17 commitment to run this test, and until equilibration is
18 achieved. That's very important that that happen.

19 The other test I want to mention is here at the
20 point where the east-west drift crosses over the main
21 tunnel. Now, an alcove has been constructed off the
22 east-west drift called Alcove 8.

23 Below it, off of the ESF, is a niche called Niche
24 3, and what are planned are infiltration tests to percolate
25 water down from the overlying tunnel to the underlying

1 niche.

2 This will be done at a series of different rates,
3 and approximately three weeks will be used for each of the
4 tests. There will also be a series of tracer tests to look
5 at matrix diffusion phenomena in there.

6 One of the agreements from DOE was to provide test
7 plans for Alcove 8 and Niche 3, and, in fact, they had done
8 that a few weeks ago. We have reviewed it, and provided
9 those comments -- in fact, I hand-carried the letter for
10 that today to give to one of the DOE folks.

11 Another commitment is for Alcove 8 and Niche 3 to
12 try to get a better mass balance of the water use in the
13 testing, and we talk about that in the comments that we
14 made.

15 And for all of the continuing tests in the
16 underground at Yucca Mountain, for DOE to carefully monitor
17 evaporation during these tests and to see what the effects
18 are. One of the things we understand is that a similar type
19 of infiltration test was done involving Alcove 1.

20 So where you first enter the Mountain at the north
21 portal, if you look up on top of the ridge, you'll see kind
22 of a disturbed area, and this is a place where water was
23 ponded on the surface, directly above the first alcove known
24 as Alcove 1, and a very considerable amount of water was
25 percolated there.

1 And it was noted -- the reason I bring this up --
2 if the bulkhead door was opened during the process of the
3 test, there is a dramatic decrease in the water that was
4 entering the tunnel.

5 Correct me if I'm wrong, Jim, but I think it was
6 about 50 percent, roughly. This is a dramatic effect,
7 showing how very quickly the infiltration -- or, I should
8 say, percolation in this case is affected by the dryout of
9 the tunnel ventilation.

10 And a couple of other agreements to enable us to
11 get to closed-pending, to let -- well, to get DOE to
12 closed-pending -- that they should include the effect of
13 film flow in evaluating the seepage fraction and seepage
14 flow in the underground, affecting waste packages, or
15 justify that this is not needed, that there is no need to do
16 this.

17 In seepage studies, DOE should consider smaller
18 scale irregularities in simulating collapse of a drift.
19 Because what happens is, if a block of rock were to fall
20 from the overhead, you will get considerably more
21 irregularities, perhaps on smaller scale, which can enhance
22 dripping.

23 And we have a commitment to do just that, or show
24 that it's not needed.

25 And we are looking for additional documentation on

1 the effectiveness of the Paint Brush Tuft non-welded unit to
2 dampen episodic flow.

3 This unit is above the repository, and a key part
4 of this is reconciling the differences in the Chlorine-36
5 studies that we all recently became aware of.

6 It is very important for the DOE conceptual models
7 of the site, and the resulting mathematical models, that
8 they get to the bottom of these differences in Chlorine-36.

9 I was at the TRB meeting where this first was
10 presented. And TRB, of course, is also quite concerned
11 about this.

12 The differences that were found between the
13 Lawrence Livermore studies and the Los Alamos work, the
14 longstanding Los Alamos work, are really quite large, and
15 this must be resolved.

16 And then finally, we need to see more of an
17 analysis of the geochemical data that are used to constrain
18 the flow field below the repository, involving the Calico
19 Hills and the potential for a fraction of flow to bypass the
20 vitric and zeolitic units there.

21 DR. HORNBERGER: Now, before we leave this issue,
22 I know that one of the comments that DOE had made was that
23 in this issue, the NRC staff says the DOE drift scale
24 process level seepage model has not been shown to be of
25 reasonably conservative upper bounding values. And it goes

1 on then to the status and path of the resolution and says
2 that therefore conservative assumptions are needed.

3 DOE took exception to that, noting that there
4 isn't anything in risk-informed regulations that would
5 suggest that upper bound conservative estimates are
6 required. Have you made any progress on resolving this
7 interpretation?

8 MR. COLEMAN: Well, we're not saying, to make
9 unreasonable -- bounding analyses, as long as they are
10 reasonable, are okay. That does not get away from
11 performance-based, risk-informed. This is a seepage issue.

12 This is one of the number one factors identified
13 by DOE and in our own performance assessments. And it
14 relates, in a way, the same question that you asked, that
15 applies to shallow infiltration.

16 And I don't think I mentioned under it -- and I'll
17 mention the same thing about seepage -- we're not
18 necessarily looking for, in the case of shallow
19 infiltration, a lot of new data collection. The easier way
20 is to increase the upper bound and to account for the
21 uncertainties in that way.

22 If they choose, they could collect a lot of
23 additional information. That's another way to go.

24 But I realize there is a line that --

25 DR. HORNBERGER: But, you see, I ask the question

1 I asked on the infiltration for specifically that purpose.

2 Now, Jim gave me an answer that would suggest that
3 there is a technical basis for suggesting a 50-percent
4 increase. And to me, that's different than saying that this
5 is important, we better make it reasonably conservative, and
6 therefore raise that upper bound. They are two different
7 approaches.

8 Do you agree with that?

9 MR. COLEMAN: I do, but I think they're related.

10 DR. HORNBERGER: Okay.

11 MR. COLEMAN: Because percolation and infiltration

12 --

13 DR. HORNBERGER: No, no, the percolation and
14 infiltration are related. That wasn't my point. But I'm
15 just interested in how you resolve this, because DOE
16 obviously, when you say -- and these are NRC words,
17 evidently -- the DOE drift scale process level seepage model
18 has not been shown to yield reasonably conservative upper
19 bounding values. That sounds pretty conservative. It
20 sounds like that's what you want them to do, rather than
21 take into account, the uncertainty in a reasonable way.

22 MR. COLEMAN: Well, you notice that closed-pending
23 was achieved here.

24 DR. HORNBERGER: Yes.

25 MR. COLEMAN: The reason is -- and I stress the

1 importance of these tests -- where there's no professional
2 judgment involved if there is dripping going on in the
3 Mountain. And the thing we would expect, and the reason we
4 can get to a closed-pending and make statements like the one
5 you read, is if they proceed with these tests, let them run
6 the full course, and then calibrate their models based on
7 the results from east-west drift, Alcove 8, Niche-3 testing.

8 So the closed-pending is not based on here's what
9 we think the seepage rate is, but it's based on an
10 affirmation that DOE will make their models consistent with
11 the observations of these tests to be completed. Does that
12 help?

13 DR. HORNBERGER: Yes.

14 MR. WINTERLY: Could I add a sentence to that,
15 Neil? This is Jim Winterly again.

16 I think DOE does raise a good point there, that
17 there is really no regulatory requirement that they be
18 conservative, and that's Revision 2 of the IRSR for this key
19 technical issue that is quoted there.

20 And in the current working draft of Revision 3
21 that's not out yet, the language has been changed more along
22 the lines of they need to adequately bound the uncertainty

23 MR. COLEMAN: Thank you. Subissue 5, as I
24 mentioned earlier, this will be -- this is open, involves
25 the saturated zone issues, dilution, and also matrix

1 diffusion in the saturated zone. That will be covered at
2 the meeting that starts October 31st in Albuquerque.

3 Matrix diffusion for the unsaturated zone was
4 dealt with in this meeting at Berkeley, and for those who
5 are not familiar with matrix diffusion, this refers to the
6 migration of radionuclides from flow-in portions of a
7 fracture into the unfractured matrix of rock.

8 And once it happens, then minerals like the
9 zeolite minerals that are present in there can absorb
10 radionuclides. And that's the importance of matrix
11 diffusion; it's the mechanism by which radionuclides might
12 get into the solid part of the rock.

13 From work that we've done over the years, it
14 appears that DOE should not take a great deal of credit for
15 matrix diffusion in the unsaturated zone. The saturated
16 zone is very different, and we would expect that much more
17 credit could be taken for that.

18 In fact, matrix diffusion is usually talked about
19 as just a fractured rock phenomenon. That's not true.

20 In the valley fill materials, it's probably one of
21 the most important things that could happen, because of
22 diffusion into the rock class which range from gravel size
23 up to boulder size that are entrained in the valley field
24 materials, so it's a very effective mechanism there as well.

25 We'll talk about that at the Sat Zone Meeting.

1 But to achieve closed-pending, although DOE pointed out that
2 they feel they don't take a huge amount of credit for matrix
3 diffusion in the unsaturated zone, we wanted to see an
4 update of this in the TSPA SR, showing just how much credit
5 was taken.

6 We pointed out an example -- let me see if I can
7 read the page number on this -- from the viability
8 assessment, Volume 3, page 5-36.

9 There are a series of diagrams that show the
10 relative effects of matrix diffusion, so we want to see
11 documentation similar to that, and I'm sorry that I don't
12 have a slide of that.

13 Also, for DOE to provide the final testing plan
14 for Alcove 8, which I mentioned already that we have
15 reviewed and provided comments on that. And it will also
16 address matrix diffusion for the unsaturated zone.

17 And that DOE take into consideration, these
18 comments that we've made.

19 Okay, it's taking me a moment to get to future
20 milestones, where we go from here. We will review the DOE
21 action plan on shallow infiltration which I mentioned should
22 be available in October.

23 We have the upcoming meeting, October 31st to
24 November 2nd. We also plan to release Revision 3 of our
25 issue resolution status report in the coming months. We

1 hope to have that out by January, if not earlier.

2 And there will be a followup meeting on shallow
3 infiltration that will be held by March of 2001, if that's
4 needed.

5 So that's for the KTI, unsaturated and saturated
6 flow under isothermal conditions; that's where we are today.
7 I'm ready for any additional questions.

8 DR. HORNBERGER: Great, thanks very much, Neil.
9 Questions from the Committee? Ray?

10 DR. WYMER: No.

11 DR. HORNBERGER: Very well.

12 MR. LEVENSON: I have sort of a philosophical
13 question: As you go through this procedure, you're
14 collecting more and more information. In fact, you had one
15 closed issue which when subsequent information becomes
16 available, you reopened.

17 As more and more information is collected, do you
18 or do you intend to back away a little bit from the required
19 over-estimates, the word you call conservative, which I
20 don't agree with, because over-estimating quite often is not
21 conservative. It forces you to do something else.

22 But using your definition of the word, it's to
23 cover uncertainties. As more and more information becomes
24 available, do you have a mechanism for backing that down?

25 MR. COLEMAN: Are you referring to infiltration,

1 in particular?

2 MR. LEVENSON: Just generically, as you go into
3 the technical issues. This applies to almost all of them.
4 Since you use over-estimates to cover uncertainties, as more
5 and more information becomes available, do you back down
6 your over-estimates? And if not, why not?

7 MR. COLEMAN: Well, for deep percolation, really
8 in the hydrology area, the amount of water that could
9 contact an engineered barrier, drip shields, waste package,
10 here's where DOE doesn't have to become overly conservative.
11 We don't have to require things that may be perceived as
12 overly conservative.

13 The results of those two tests that I mentioned --
14 and we don't have the results of them yet -- that there's
15 very little professional judgment that has to be made in
16 interpreting them. They will be really some of the best
17 understanding that there will be until and if a construction
18 authorization would be made.

19 Certainly the best way to learn about the Mountain
20 is if it looks okay now, to excavate it and see what's truly
21 there, what we call performance confirmation.

22 But before that can ever happen, it has to be
23 shown that a good safety case has been made on what is known
24 today. But these tests -- and this relates to the
25 present-day percolation, because DOE has very little chance

1 of reasonably estimating future conditions under future
2 climates without establishing the present-day case.

3 So, I think whatever they come up with in these
4 tests, they could use in performance assessments, because
5 they would have the best data they're going to have.

6 There would still be some bounding in the case
7 because there will be variability. There may be no dripping
8 at all in the East-West Drift, but no one has to make that
9 estimate. You simply wait and see.

10 MR. LEVENSON: I understand that for the unusual
11 case, in a way, where you have an experiment that can answer
12 the question.

13 But I was asking it more generically. In a lot of
14 the technical issues, you can't have a simple test that says
15 when we do this test, we can forget the modeling and the
16 analysis that's the fact.

17 There aren't very many like that, so I'm asking
18 the generic question about as you get more information, do
19 you have a mechanism to reduce your over-estimates as you
20 reduce uncertainty?

21 MR. COLEMAN: I think the way I'd answer that is
22 that the whole story has to hang together. So, it could be
23 that the information that's been learned about the
24 stratigraphy of the site, the geochemistry of the site, the
25 hydrology parameters, everything has to hang together or it

1 will hang separately.

2 [Laughter.]

3 CHAIRMAN GARRICK: That sounds like the answer is
4 yes, that you do have a mechanism for changing assumptions.

5 MR. COLEMAN: Quite frankly, it's not something
6 we've talked a great deal about, because DOE is moving in
7 the right direction, we think.

8 Now, you did see a case where new information
9 reopened an issue, but this issue was resolved. It would
10 not have been reopened, if DOE had not cut the numbers in
11 half, which is really a dramatic change to make this late in
12 the program. That's why we really scrutinized this
13 question.

14 DR. TRAPP: Let me try and answer that. One of
15 the things that -- this is John Trapp from the NRC.

16 One of the things that we do have is what we call
17 the Iterative Performance Assessment, in which each time we
18 do get the new information, this is factored right into the
19 performance assessment model to get us a better estimate of
20 where things stand.

21 So, yes is the answer to your question, that the
22 iterative performance assessment is basically the way we
23 work through it.

24 DR. HORNBERGER: Thank you. John?

25 DR. LARKINS: I don't think so. Thank you.

1 DR. HORNBERGER: Okay, thanks very much, Neil, and
2 thank you, Jim, for piping in.

3 [Pause.]

4 We're going to move right along and move to the
5 KTI on igneous activity, and John Trapp is going to give us
6 a presentation on what's been happening in this arena.

7 DR. TRAPP: I have asked Dr. Hill to assist me in
8 doing this, actually for two reasons: It makes it a little
9 easier on me, and also if I don't know the answer to the
10 question, Rick does.

11 The presentation today is going to be focused on
12 the results of the technical exchange we held two weeks ago
13 on igneous activity. This is actually the second in a
14 two-seeK series of exchanges we had with DOE.

15 The first was basically an observation audit which
16 was dealing with the total disruptive process and events
17 area which covered week one.

18 The objective of the exchange is basically to
19 resolve the open issues related to igneous activity, and by
20 resolve, I'm going to say it again, is resolve as was
21 explained by Bill Reamer.

22 We were trying to discuss a basis to resolve these
23 issues, determine which ones we could resolve at present,
24 and if we couldn't resolve them at the meeting, come up with
25 some mechanism by which we had a path forward to reach

1 resolution.

2 Now, going into the meeting, we had the two
3 issues, probability and consequence, and they were in the
4 open state. Next slide, please.

5 On these next two slides, there are what I listed
6 as NRC technical concerns, and I'd like to discuss these
7 just a little bit.

8 First off, how did we get to these things? If you
9 take a look at the IRSR, and go through the IRSR and take a
10 look at the sensitivity analysis, we basically made a run
11 through this thing and said, okay, which points have to be
12 resolved, have to have the information to get to licensing?

13 We then, like I said, used the sensitivity
14 analysis, so we used the risk information that we could get
15 out this to rack these out and see, are the ones that we
16 have left important?

17 So this is basically what we call technical
18 concerns. These are the things that are necessary to be
19 addressed, to be resolved, so that we've got sufficient
20 information to get to a licensing application, to docketing.

21 Or, another way to describe this is, how much is
22 enough? If DOE can resolve these and the ones that are on
23 the next slide, we basically have enough information that we
24 can get to licensing.

25 CHAIRMAN GARRICK: Are these approximately

1 importance-ranked?

2 DR. TRAPP: No, these are not important ranked.
3 The only two that don't quite fit into this thing -- and
4 I'll get to them later -- are these two at the end, and
5 those are there to make sure that we know our mechanisms for
6 doing the modeling.

7 Go to the next slide, would you? I'd also like to
8 just talk a little bit about these three points:

9 If you take a look at the IRSR, we did have at
10 that time, expert elicitation, quality assurance, in there.
11 We knew they really didn't belong in there, per se, but we
12 didn't have a mechanism to hang them on at that time.

13 If you take a look -- well, you can't take a look
14 -- if you could take a look at the Yucca Mountain Review
15 Plan, you would see that there are specific sections dealing
16 with expert elicitation, the mechanism of quality assurance,
17 the mechanism.

18 And so these parts of the issues that we had in
19 the IRSR will be taken out of the IRSR and moved on over to
20 those areas.

21 Features, events, and processes is a means of
22 trying to make sure that we have all the different
23 mechanisms that could possibly be related to igneous
24 activity, all the features and events considered in the
25 analysis.

1 The previous week, during the review, the quality
2 assurance out -- the FEPS PMR was one of the main parts of
3 the audit. Very simply, what we came out with at that time
4 was that we really didn't have any disagreements with what
5 was being presented, but the basis, the justification for
6 what was in there was, we felt, not quite up to speed.

7 However, we also had a chance to take a look at
8 some of the stuff that was going into the next revision.
9 And my only statement I can make right now is that if you
10 take a look at what appears to be going into the next
11 revision, a lot of this concern about justification should
12 be taken care of when we get to that point.

13 Okay, where do we sit? Like I said, probability,
14 that one was open, and on the ACNW meeting following the
15 April technical exchange, there were some questions raised
16 about this.

17 One of the agreements that came out of this
18 meeting is that DOE would put together their licensing case,
19 and they would use what they considered the best value that
20 they could justify.

21 At present, it looks like this is going to be
22 something like about 1.2 to 1.6 times ten to the minus
23 eighth. However, in addition to this value, what they're
24 going to put in the license application -- and it doesn't
25 have to be right there; it can be in a reference document,

1 anyplace -- is an analysis which is also done at one times
2 ten to the minus seventh.

3 I feel quite comfortable with this. Both parties
4 agree that these values do fall somewhere in the range. The
5 big difference is how we would put the adjectives on them.

6 DOE would say that ten to the minus eighth is
7 their main value, and ten to the minus seventh is something
8 at the extremes.

9 We would say that ten to the minus eighth is a low
10 value, and the value should lay somewhere between ten to the
11 minus eighth and ten to the minus seventh, so we feel that
12 by doing this, we've got stuff available for us and for the
13 Licensing Board to make a decision as to the site.

14 In addition, there was another agreement raised on
15 this. And we do necessarily expect at any time new
16 information does come in, that DOE would take a look at it
17 and factor it into their analysis.

18 This, however, was kind of a specific case. It's
19 new aeromagnetic data, which basically was funded by Nye,
20 Clarke, and Inyo County. I believe those are the right
21 three ones, and then was run and put into an open file
22 report by the USGS.

23 Because this information just became available, I
24 think, the week before the meeting, we wanted DOE to agree
25 to take a look at this, see if it made any changes in the

1 number of buried features that they could find, and they
2 have agreed to do this.

3 We don't know the actual survey specifications, so
4 we're not sure that they can actually accomplish much by
5 doing this. They are first going to take a look at the
6 survey specifications, find out if it's worthwhile, report
7 back to us if it is, give us the plan on how this is going
8 to be analyzed.

9 Therefore, the probability is one we call
10 closed-pending. We've got this stuff coming in, but we feel
11 quite comfortable.

12 DR. HORNBERGER: John, I take it that if the
13 aeromagnetic specs aren't up to snuff, it's not required
14 that DOE redo the survey?

15 DR. TRAPP: That's correct. We're not asking for
16 a redo of the survey; we're just asking for an analysis of
17 the data, if the data is sufficient to analyze, yes.

18 Just to give you the bottom line on where we're
19 situated, if you take consequences, the issue is described
20 as open, but the reason that it's open is that if you go
21 through the various acceptance criteria and divide them into
22 intrusive and extrusive and take a look at them, everything
23 is closed-pending, except for one point.

24 So, we in this meeting, I think, made tremendous
25 progress, and we'll talk about where we're sitting on that

1 right now.

2 Yes, that is important. This does come from
3 Revision 2 of the IRSR, the acceptance criteria. The
4 acceptance criteria in Revision 3 will actually change.

5 I have said that so many times, I'm not sure I
6 need to. And the way they will change is, they will
7 basically be reflective of the ISIS that you'll see in the
8 Yucca Mountain Review Plan, so, for instance, most of this
9 will end up going into volcanic disruption, and airborne
10 transport.

11 Most of the material right through here, will end
12 up going into mechanical disruption of the waste package, so
13 you'll see slightly different acceptance criteria in
14 Revision 3, however, the basic thought is still there. We
15 are not trying to ratchet anything; we're trying to make
16 sure that we've got things up to date as the license will be
17 handled.

18 If we take a look at Acceptance Criteria 1,
19 basically it states that models are consistent with the
20 geologic record of basaltic igneous activity in the Yucca
21 Mountain region.

22 For records, you can track it right back to the
23 technical points we were talking about. This is Technical
24 Point Number 12.

25 Our concern, very simply, was that if you take a

1 look at the tougher volumes that are being used in the DOE
2 analysis, they were coming up with values which we felt were
3 too high.

4 The range was basically too large, and one of the
5 things we found in doing our sensitivity analysis is that
6 when we go to these higher ranges, we kind of get a dilution
7 of the material.

8 Therefore, we wanted DOE to document the real
9 range that we're using, come up with a better basis for this
10 range, and put it in the TSPA analysis.

11 Since they have agreed to do it, this is something
12 that we expect to see in June of 2001.

13 Acceptance Criteria 2: Models are verified
14 against analog igneous systems. This is really the model
15 for the airborne transport.

16 And the question is, can you show that ash plume,
17 as it's being used, can be run against some well-documented
18 volcano, and replicate the results?

19 This is one that DOE has readily agreed to. They
20 are using this 1995 Sierra Negro eruption, the same one that
21 we used to run through this. Very honestly, it's the one
22 that's got the best documentation that you can check the
23 model against and make sure that you have got an exact
24 repeat.

25 Again, this is a June 2001 date that we expect to

1 find this information.

2 AC-3, models account for magma/repository
3 interaction. This right here, we are dealing with the
4 extrusive component, and one of the things in the change of
5 the repository layout -- what happens when you change the
6 repository layout and start figuring out the most likely
7 angle for dikes?

8 You start getting a spot where the dikes and the
9 repository layouts coincide. When they coincide, you have a
10 very large probability that the conduits will not be in a
11 circular nature, but will be elongated, and if they are
12 elongated, you could end up with a larger number of waste
13 packages being intercepted.

14 In reality, this will probably not be that big an
15 effect, because if you take a look at the range and possible
16 dike orientations, and the range -- not the range, but the
17 present layout -- the angles at which they can intercept is
18 relatively a small range.

19 However, DOE is going to take a look at this
20 concern, find out how it does affect their whole analysis,
21 and, again, this will be documented in the Revision 1 of the
22 TSPA of June of 2001.

23 AC-4, models account for interactions within magma
24 and engineered barriers and waste form, this takes care of
25 Points 2 and 3. Another concern, as they took the ash flow

1 cone which was developed by the Center, they modified it for
2 their own use, and we're not totally sure, exactly some of
3 the modifications they've done.

4 In reality the dates and the repository layouts
5 coincide. When they coincide you have a very large
6 probability that the conduits will not be in the circular
7 nature. It will be elongated, and if they are elongated you
8 could end up with a larger number of waste packages being
9 intercepted.

10 In reality, this will probably be that big an
11 effect, because if you take a look at the range and possible
12 dike orientations in the present layout, the angles at which
13 they can intercept is relatively a small range. However,
14 DOE is going to take a look at this concern, find out how it
15 does affect their whole analysis and again this will be
16 documented in the revision, one of the TSPA of June, 2001.

17 AC-4, models account for interactions between the
18 magma and engineered barriers and waste form. This takes
19 care of points 2 and 3.

20 One of the concerns as they took the ASHPLUME code
21 which was developed by the Center they modified it for their
22 own use and we're not totally sure exactly some of the
23 modifications they have done.

24 The question we've got is in doing so and
25 incorporating the waste into the ash, have they correctly

1 accounted for the density variations in two of the
2 materials.

3 At the meeting nobody could lay their hands on
4 enough documentation to determine if it had been or not,
5 therefore they are going to be taking a look at this to make
6 sure they have handled it correctly if they haven't handled
7 it correctly make the modifications that are necessary and
8 we'll have this in January of 2001.

9 Document the results of sensitivity studies for
10 particle size consistent with the above -- if you take a
11 look at the interactions between the magma and the waste
12 form itself, you really end up with extreme thermal and
13 physical load. The information that DOE has been using is
14 according to our waste package people, first off the best
15 basic information we've got on fragmentation of magma and
16 fragmentation of waste forms, but from that there are
17 basically three different slots you can choose.

18 DOE happened to take one slot and use this in the
19 range which is documented in the literature. However, the
20 question is, hey, why didn't you use the other two slots?
21 What's the basis?

22 DOE is going to take a look at these two
23 different, two other grain size distributions in the
24 sensitivity analysis, find out exactly how it does affect
25 the TSPAs and report back to us on that in June, 2001.

1 SPEAKER: Where did these come from, Joe? Brit?

2 MR. HILL: This is Britt Hill from the CNWRA.

3 There were a number of studies done even back to the '60s in
4 changes in waste grain size during mechanical disruption
5 from crush impact studies, for examples. DOE has now pulled
6 together a range of some of the literature for nonoxidized
7 spent fuel. They are coming up with an average grain size
8 of about 20 microns with about plus or minus one log unit
9 for the grain size distribution.

10 We have been using an order of magnitude approach
11 at about 10 microns. We have first to see that the waste is
12 being incorporated properly into the ash for the disruption
13 in the modeling and then see if that difference is
14 significant or not or other potential waste forms, other
15 spent fuel forms and glass, whether the grain sizes for
16 those would significantly affect how much was transported
17 downrange.

18 DR. TRAPP: Also in going through this whole thing
19 one of the difference that has happened is there's been a
20 jockeying back and forth trying to decide if we are going to
21 have backfilled repository or not.

22 The AMRs that we have received were based on a
23 backfilled repository and based on the backfilled repository
24 DOE had calculated that if a dike is going through the
25 repository that you should end up with about three waste

1 packages on either side of it. Basically it's completely
2 destroyed as far as any ability to protect the thing from
3 groundwater movement.

4 Going through a nonbackfilled repository what you
5 have got is a much greater potential zone of effect.
6 Instead of the magma coming in basically being stopped by
7 the backfill, the magma will go in, hit the initial waste
8 packages, continue on down the drift. However, if you
9 logically look at this, as the magma is going down the drift
10 there should be some dissipation of energy but for some
11 places along this line it's not really reasonable to assume
12 complete disruption. There should be something else that
13 happens.

14 According to the DOE's analysis and it agrees with
15 what we have done, the temperature alone when you get down
16 to that point would be enough to cause cracking of the
17 endcaps but not complete disruption of the waste package, so
18 what we really need, and this is the one point where we have
19 got the open issue, is to really understand how this
20 mechanism is being modeled by DOE, how the energy
21 dissipation is being taken into effect, what the effects of
22 thermal flow are and then actually how they are modeling the
23 whole groundwater flow out of this thing to take care of it.
24 Next slide, please -- the groundwater flow post intrusion.

25 What DOE will do is basically go through analysis,

1 show which one of these and how these waste packages are
2 affected. There are a number of packages that are hit on
3 this thing in Zone 1 or Zone 2 total disruption or partial
4 disruption. We expect to get that by 2001.

5 They will also show what the relative contribution
6 to the whole TSPA is from these two different zones. This
7 also would be coming but that would not be until June, 2001.

8 To better understand how the thermal effects are
9 being modeled, they basically provide an evaluation of these
10 thermal effects in Zone 1 and Zone 2. Again this is in
11 January, 2001.

12 As I said, this is the one point that was left
13 open. It was felt that we couldn't have the degree of
14 confidence with the amount of analysis that had to be done
15 to close this one at this time.

16 SPEAKER: But the good news is that it seems to me
17 that you have an agreement on what needs to be done.

18 DR. TRAPP: We definitely have a path forward and
19 very honestly if we'd had a few more waste package and waste
20 form people at the meeting we might have gotten farther
21 along with this. Because of the change from the backfilled
22 to nonbackfilled we really have not, neither site had enough
23 people in that area to cover it, so, yes, it's open, and it
24 will take some analysis.

25 Acceptance Criteria 5, parameters are constrained

1 by data from Yucca Mountain, et cetera, we have four areas
2 that really fell into this -- wind characteristics, airborne
3 particle concentrations, deposit remobilization, and
4 inhalation effects.

5 Up to this point neither DOE nor NRC have had wind
6 data that really covered the range of the plumes that we
7 needed to deal with.

8 Now basically you have up to about three and a
9 half, four kilometers above ground level. The levels that
10 you would have to be dealing with for a plume would be
11 somewhere between two to six, seven kilometers.

12 During the QA audit we did some talking to people
13 and I am not sure who actually found it but somebody did
14 find some additional data that carries the information on up
15 to the elevations of concern. Because of this, DOE is going
16 to take a look at this data, put an analysis together, be
17 able to give us a composite wind speed and altitude and use
18 this really in a stratified way because there is a
19 tremendous amount of difference between what you have at
20 ground level versus what you have at height, and then use
21 this in the analysis.

22 This will be available in June, 2001.

23 One of the things that we want to make sure is
24 when they are doing the dose conversion, et cetera, this
25 type of thing, that the mass loading parameters are really

1 correct for the type of deposit that they are dealing with
2 and the type of activity that the people are working with.

3 Taking a look at some of the information we were a
4 little concerned that some of the measurements may have been
5 static measurements instead of the dynamic measurements you
6 would expect with people walking out in the fields, this
7 type of thing.

8 We are concerned that some of the information may
9 be dealing with mass loading parameters that are from
10 deposits that really are not reflective of ash deposits.

11 DOE basically during the meeting, I had a fairly
12 good feeling that they probably do have the right
13 information. They just don't have it at the present time,
14 but in January, 2001 they will document exactly what mass
15 loading parameters, et cetera, and the basis for these
16 parameters.

17 This last one on this page is a very complex one
18 and it really wouldn't be there if we were dealing with a
19 rule slightly different than it was.

20 In going from a rule that -- well, the previous
21 rule where we were primarily dealing with peak dose and the
22 one which is totally risk informed and this type of thing,
23 we had to take a look at the overall changes in the area of
24 the critical groups or time.

25 If you assume that you have got in eruption at the

1 Yucca Mountain area the majority of the ash, et cetera, is
2 going to be going into the 40 mile wash drainage basin. As
3 it goes in 40 mile wash drainage basis erosion is going to
4 start and materials is going to be moved on down the slope,
5 and just about Highway 95 is where you go from primarily an
6 erosional transport situation to an area where you are going
7 to primary deposition.

8 As such, what you have got is an area which will
9 have material constantly being brought in, but in addition
10 to the material being in, there will be some subsequent
11 erosion of material coming out, so you have got a tremendous
12 problem on mass balance of this material.

13 You also have a problem in trying to figure out
14 during the erosion what is the amount of dilution that you
15 have got going on. You have got to deal with the changes in
16 particle size in the ash and this type of thing.

17 This is going to be, I believe, the second hardest
18 of the whole bunch to resolve and I rather suspect that DOE
19 is going to be using kind of a bounding analysis to come
20 through this. That seemed to be the results of the meeting
21 and I just saw Eric Smithstead come in here and he's just
22 kind of shaking his head, so it looks like I am correct on
23 that, so they will probably be using the bounding analysis
24 to try to resolve this concern.

25 Originally the analysis in the VA was only talking

1 about doses and was only using the 1 to 10 micron range in
2 calculating these. However, with a lot of the isotopes that
3 you are dealing with, the 10 to 100 micron range can provide
4 a significant dose impact even though it doesn't get down to
5 the lungs, it will lodge in the nasal and pharynx region and
6 this type of thing.

7 DOE basically had realized this was a problem.
8 They proposed to treat this as an additional soil ingestion
9 and have it calculated that way. They are going to review
10 how they are considering these things and make sure that
11 this is the right way to handle it or if they don't do it
12 that way use ICRP 30 analysis methods.

13 Again, we will see this in January, 2001 so this
14 should be taken care of without any problem.

15 Miscellaneous -- if you go back to the VA, one of
16 the things that was assumed during an eruption is that there
17 really wouldn't be a dose because people would be running
18 out of there.

19 If you take a look at what happens in areas where
20 you have got these type of eruptions, people do not leave.
21 They stay in that area and so really it's been resolved
22 totally because they are no longer assuming the
23 self-evacuation during an eruption.

24 These two were kind of miscellaneous concerns.
25 Remember, I mentioned them before, because they don't fit

1 into the risk deal, but one of the things that we were
2 noticing is that there was quite a bit of difference between
3 what DOE was getting in their intrusive scenario from what
4 we were getting, and we are trying to understand the
5 difference.

6 I first off wanted to make sure it didn't have
7 anything to do with igneous activity so I don't have to
8 worry about it, and truthfully it doesn't. It's totally a
9 difference in the way the two model release and transport in
10 the saturated zone, or both saturated and unsaturated zone.

11 Integration of results from all pathways -- this
12 is basically making sure that with a change in the rule and
13 going to the expected dose that the calculational
14 methodology that DOE was using was correct. It appears to
15 be -- well, it is correct as far as Jim McCartin is
16 concerned and Jim is supposedly the guru on this stuff so I
17 am taking his word for it.

18 From where we sit, well, truthfully, while we have
19 got all these "closed pendings," there's an awful lot of
20 work left to be done.

21 The first thing we have got to do is issue
22 Revision 3 of the IRSR, which will have the modification
23 going to the Yucca Mountain Review Plan type criteria.

24 It's listed as 2001. Basically the Center's
25 component is supposed to be due in mid-November and the

1 exact date past then is how fast I work.

2 We've got a review of the TSPA-SR. We have got
3 the basic topics we've got and basically with some of the
4 things that came in from the biosphere we've got some
5 additional topics on surficial process that go into this
6 review that have to be factored in.

7 If you were looking at that list and listening to
8 me talk, I kept on saying January, 2001 and June, 2001.
9 There's a lot coming in those two dates. We are going to
10 commit ourselves to review these things, get the response
11 back to DOE in a quick timeframe.

12 In addition, however, we do have some research
13 going on still at the Center on magma-repository
14 interactions which would get into this whole waste package
15 type deal and the tephra deposit evolution which gets into
16 the remobilization, and we're talking a little more of a
17 look at wind speed and we will be taking a look at the new
18 data, looking at stratification until we exactly find out
19 how this all fits together.

20 In conclusion, I guess I would say I was extremely
21 satisfied with the technical exchange we had. We went
22 through an awful lot of material.

23 Like I said, Eric Smithstead just came in, Carol
24 Hanlon is sitting there. Those two I think really deserve a
25 lot of credit because they put an awful lot of time and

1 effort to making sure from DOE's side that it would get
2 done.

3 Questions?

4 DR. HORNBERGER: Thanks very much, John. Ray?

5 DR. WYMER: Yes, I have one general question.

6 DR. HORNBERGER: Want to use the microphone?

7 DR. WYMER: I have a general question. Presumably
8 whether or not the site is acceptable in the context of
9 volcanic activity at least is some sort of a product of
10 probabilities occurring and the consequences of the
11 occurrence. I heard the probability was 10 to the minus 7,
12 10 to the minus 8.

13 What do you look for as the product of the
14 probability and consequences? 25 MR per year? Is that your
15 criterion?

16 DR. TRAPP: Basically, yes. The criteria would be
17 a probability weighted consequence, which should have to be
18 at the present time assume less than 25 MR per year.

19 DR. WYMER: Okay, I didn't see that.

20 DR. LEVENSON: I have one question. Back on your
21 fourth slide you identify the elicitation of expert opinion.

22 My question is, is that a relatively important
23 part of this issue?

24 DR. TRAPP: It was a relatively important part
25 back on the probability because that is the basis of DOE's

1 probability. We had some concerns with how expert
2 elicitation was conducted. However, if you go back to I
3 believe it is a 1997 letter from Mike Bell to Steve Brocum,
4 we had basically talked about these concerns but decided
5 that even though there were some concerns that we would
6 accept the results of expert elicitation and give it its due
7 consideration, so, yes it was at that time.

8 As far as consequences, no, there is no expert
9 elicitation being planned on the consequences.

10 DR. LEVENSON: Okay -- because the expert
11 elicitations are a couple of nice-sounding words but there
12 is a huge range of application, and the reason I think I
13 have to raise the question is that in another activity in
14 which I am involved which has nothing to do with ACNW or
15 Yucca Mountain expert opinion was provided and it was a
16 group of very highly qualified technical people.

17 The question was what is the likelihood that this
18 new facility being considered could be licensed. The only
19 thing wrong with the group of experts -- not a single person
20 had ever worked in a licensed facility, ever worked for the
21 NRC, had ever applied for a license, and in fact there's
22 some relatively new literature on how valid are things like
23 probability projections made by technical experts in other
24 fields.

25 If expert elicitation is a significant factor

1 here, I think I'd suggest it really be looked at very
2 seriously.

3 DR. TRAPP: Well, like I said on probability,
4 DOE's an expert elicitation. Ours is not. There's a
5 difference in the mechanism that both of them were used,
6 therefore I think we have got a real good range in values.

7 Like I said, there's technical disagreement and
8 difference in adjectives but I feel quite comfortable with
9 the numbers.

10 DR. HORNBERGER: In fairness, I think I'll put in
11 that DOE expert elicitation of the probability of volcanic
12 activity, the experts were informed of all the data that
13 John mentioned, to the extent it was available at the time,
14 so it wasn't that they were just put in a room and asked.

15 Also, for the most part there is a NUREG giving
16 procedures for expert elicitation for NRC and that procedure
17 was basically followed. John?

18 CHAIRMAN GARRICK: John, I guess where we are now
19 is that preliminary analysis indicates that igneous
20 processes are the main contributor to the dose during the
21 10,000 year compliance period.

22 Is that kind of where we are?

23 DR. TRAPP: Very honestly, it was one of the
24 things I enjoyed because after getting hammered on this
25 thing for years and years and years, to have DOE actually

1 say the same thing, yes, that's where we came up.

2 Dose -- no, it would be expected dose, the risk.
3 It's the main contributor to risk.

4 CHAIRMAN GARRICK: Okay. I am still behind in
5 trying to understand this decoupling process of the
6 probabilities from the consequences because we know that
7 extrusive and intrusive igneous processes have a very big
8 range of values associated with them.

9 Can you give me a little bit of a discourse on how
10 the consequence thresholds are established to which a
11 specific probability is assigned?

12 DR. TRAPP: Really it is not assigned to a
13 specific probability. It is all stochastically sampled
14 throughout the end and by doing enough repetitions hopefully
15 you would have a stable product.

16 CHAIRMAN GARRICK: But then you must surely get a
17 result that has a wide range of uncertainty associated in
18 terms of the consequences?

19 DR. TRAPP: Very definitely.

20 CHAIRMAN GARRICK: Because it seems -- go ahead.

21 MR. HILL: This is Britt Hill from the Center.

22 Compared to, say, earthquakes, where you would
23 assign an annual probability to a ground acceleration, with
24 earthquakes you would see a significant range in the event
25 manifestation.

1 The range of ground acceleration that you would
2 get greatly exceeds the range of volcanic eruption energy,
3 if you will, that you would get from a basaltic igneous
4 event.

5 While it seems at times that there is a lot of
6 uncertainty about that event, the volumes, the mass flow,
7 the temperatures, all of that is very narrow compared to the
8 range that you get from, say, an earthquake, so we are not
9 assigning a probability to a different event volume or mass
10 flow rate, we are saying the probability is the initiating
11 igneous event.

12 Now that event can have a range of column heights.
13 It can have a range of mass flow rates and durations, but
14 those ranges are much smaller than the range that you get
15 in, say, ground acceleration from an earthquake.

16 CHAIRMAN GARRICK: Okay, in a seismic analysis you
17 have something called a hazard curve.

18 MR. HILL: Right.

19 CHAIRMAN GARRICK: And this gives you information
20 on the frequency of occurrence of earthquakes of different
21 magnitudes.

22 You are saying that you don't have a counterpart
23 to that necessarily for a igneous event and if you do have
24 it, the ranges are much, much more narrow?

25 MR. HILL: That's correct. There's really no

1 fragility curve, if you will --

2 CHAIRMAN GARRICK: Right.

3 MR. HILL: -- for an engineered facility when a
4 volcano, basaltic volcano, comes up through it. There's
5 just a range in how many waste packages are damaged, but it
6 is difficult to say that you would have, for example, a
7 design threshold, which is a common application --

8 CHAIRMAN GARRICK: There are a number of waste
9 package thresholds.

10 MR. HILL: Or a waste package threshold -- at this
11 time there's no information to say that you would have a
12 certain resiliency for a waste package in the center of a
13 volcanic conduit while the volcano is erupting.

14 It is pretty much that there is no basis to say
15 that, well, "x" percent won't get in that conduit, "x"
16 percent won't get transported to the accessible environment,
17 so unlike with earthquake, you can say you have got .2g
18 ground acceleration and that there is a lot of robustness in
19 the system. Here even a small igneous event, the smallest
20 volume basaltic eruption, say about 10 to the 6 cubic
21 meters, is comparable in size to the entire volume of the
22 proposed repository layout, about again I think it is three
23 or four times 10 to the 6th cubic meters.

24 The minimal igneous event is comparable in scale
25 to the entire volume of the repository and then it goes up

1 to maybe 10 to 8th cubic meters, so even the smallest
2 initiating event, to try to use the right language, the
3 smallest initiating igneous event is capable of the same
4 level of localized damage of the largest igneous event.
5 There is just a change, the significant figure change, if
6 you will, between those two.

7 CHAIRMAN GARRICK: So the issue is more a matter
8 of if you get an intersection than it is a matter of the
9 size of the volcanic eruption?

10 MR. HILL: That is correct.

11 Just for a final clarification, some of the
12 highest potential concentrations of waste a 20 kilometers
13 can come out from a relatively small volume event that has a
14 high wind speed because you have a more concentrated plume
15 and you can carry the material down in a very focused plume
16 towards the critical group location as proposed, as opposed
17 to something that is one of the larger ones with a more
18 dispersed plume to it, so that is where we look at -- of
19 course, we are considering the uncertainty in what that
20 event is going to be.

21 We are not predicting or trying to forecast the
22 exact event, but we are taking a more probabilistic approach
23 of given these range of conditions in the magma system, what
24 is the range of eruption characteristics that we could
25 sample for a future igneous event.

1 CHAIRMAN GARRICK: Thank you.

2 DR. TRAPP: Just one thing to carry that a step
3 farther, Britt kind of hit on it, but remember we are only
4 dealing with a very small subset of the types of volcanoes
5 you could be dealing with. We are not dealing with the Mt.
6 St. Helens type eruption. We are not dealing with a
7 Maunaloa type eruption. We are dealing with a continental
8 basalis eruption.

9 DR. HORNBERGER: John, a lot of this, it strikes
10 me I would agree with you had I been at your meeting it
11 seems like it was very profitable indeed.

12 I would like to see Bill's writeup to find out if
13 he agreed.

14 DR. TRAPP: Yes, he did.

15 DR. HORNBERGER: Good.

16 DR. TRAPP: He did a good writeup.

17 DR. HORNBERGER: One of the things that you went
18 through I would be a bit concerned about right now is this
19 issue of remobilization and deposition, because as you
20 indicated, that is going to be a nightmare to sort out so
21 that some kind of bounding analysis is likely to be the only
22 way that you can get at it.

23 Do you have any gut level feeling that this is
24 going to be a feasible thing and that the bounding analysis
25 is not going to be so constrained as to produce something

1 that is ridiculous?

2 DR. TRAPP: I wish I could give you a much better
3 warm and fuzzy. Generally from what I have seen, I think
4 this would be a reasonable approach and I think they can get
5 to it.

6 If you start taking a look at models of erosion,
7 et cetera, trying to put these all together, there are some
8 models that you can put there. There also are some ways
9 that -- for instance, like I said, it's a mass balance, so
10 instead of -- and I am not sure that this would work, but
11 you could try it -- is, say, just shutting off the removal
12 rates and only consider the rate of material coming in.
13 This might be a way of getting the material.

14 Now as you build up the section, you are starting
15 to get some shielding, so someplace along there you should
16 end up with something that is a reasonable value.

17 I am actually kind of glad that DOE has got the
18 problem of working with it and I also feel kind of good
19 about this one because of the people they have got organized
20 I have got quite a bit of confidence -- with Peter Swift,
21 who is basically going to be taking the major role in this.

22 DR. HORNBERGER: Has NRC Staff or anyone at the
23 Center done any analyses?

24 DR. TRAPP: Not that I know of.

25 MR. HILL: Again this is Britt Hill from the

1 Center. That's one of our tasks this year is to try to take
2 our own scoping calculations about the extent of
3 remobilization, not just from waterborne remobilization in
4 the 40 mile wash, but also having to consider the windblown
5 processes out there.

6 When you are driving up Amargosa Valley on your
7 next trip, you can take a look out to Big Dune or the sand
8 wraps up around Busted Butte to see that the wind can
9 remobilize a significant amount of finer grain material and
10 especially when we start to consider the critical group
11 itself being a farming community that is erecting fences,
12 buildings, growing crops that are all going to be serving as
13 particle traps.

14 We have to consider the potential influx of
15 material into the critical group location from wind and
16 water as well as the potential outflow of material also by
17 wind and water, so it's really turning into a challenging
18 flux problem, but it is a problem that is going to have to
19 be addressed because the whole expected annual dose is based
20 on the long-term behavior of the contaminated fall deposits
21 through time, so we have to be addressing these problems and
22 bounding them in a realistic, defensible way.

23 SPEAKER: You're going to apply your analysis to
24 mill tailings, right?

25 DR. HORNBERGER: I have got sort of a follow-on

1 question. Do your models for things like the windblown and
2 resuspension and all of these physical things have a nice
3 sophisticated term for gravity, since even the highly
4 oxidized uranium oxide fuel has a density of 10, which is a
5 factor of four heavier than anything else that is going to
6 be in there probably.

7 DR. TRAPP: This is one of the things if you took
8 a look at the questions that's basically making sure that
9 ASHPLUME is correctly considering these difference in
10 densities in the evaluation.

11 DR. HORNBERGER: Other questions? Andy?

12 DR. CAMPBELL: Do you guys have any analog
13 information on -- I mean it seems to me that one of the key
14 uncertainties on kind of the conceptual model end of things
15 is how magma intrusion disrupts and then disperses waste
16 into the magma, which then either gets extruded at the
17 surface or blown into a plume.

18 Is there any analog information on the
19 interactions of magmas and dikes and lava flows with
20 human-made objects to give you some way of bounding this?

21 DR. TRAPP: There really isn't. The only one that
22 I can think of is the one in Iceland several years ago where
23 they drilled into one of these active dikes by accident and
24 caused a miniature volcano through the drill pipe. Aside
25 from that, no.

1 DR. CAMPBELL: But in terms of the percentages of
2 material that starts out as a rather large steel and nickel
3 alloy container with stuff inside of it, there's really
4 nothing analogous to how that gets disruptive, so basically
5 you would just assume that "x" number of waste packages
6 based upon dimensional arguments get totally pulverized and
7 carried up into the plume?

8 DR. TRAPP: Basically, yes, any analysis that we
9 have done at least when you are dealing with the conduit
10 itself, we end up with the thing so totally disrupted that
11 we really can't go any farther than that.

12 I am not sure that it would really gain that much
13 in the analysis myself, but if you have some information I
14 would be glad to hear it. We don't have it.

15 DR. LEVENSON: One place there might be some
16 information from is quite a few years ago I took the cable
17 car up to the top of Mt. Vesuvius and I was a little
18 concerned about how it looked, so I went up and asked them
19 about the maintenance and they said, well, we don't maintain
20 this because this gets destroyed by the volcano about every
21 10 years or so, and it has to be replaced, so there might be
22 some interactive information available.

23 DR. HORNBERGER: John?

24 DR. LARKINS: Just a quick question for
25 information.

1 Aerosol transporting deposition is a function of
2 size, shape and density and what you assume for your load
3 distribution. How close are you between DOE analysis and
4 what you are assuming in your ASHPLUME models?

5 DR. TRAPP: Well, Britt is closer to that than I
6 am.

7 MR. HILL: We are very close. The differences at
8 this time don't appear to be significant in terms of the
9 particle densities, the constants that we are using for eddy
10 diffusivity, the dispersion. We are using the same
11 dispersional model.

12 The differences on the waste, we're evaluating
13 whether their mean value is significantly different from
14 ours, but we are in the same ballpark on just about
15 everything.

16 DR. LARKINS: Okay, chemical remobilization would
17 be impacted by the solubility and what you assume for your
18 chemical form for aerosol.

19 MR. HILL: We haven't made any assumptions about
20 chemical remobilization and surface leeching processes. We
21 are talking at this stage solely the physical transport of
22 particles by wind and water.

23 DR. HORNBERGER: Any other questions?

24 [No response.]

25 DR. HORNBERGER: Okay. Thanks very much, John.

1 That was an excellent presentation, lots of good technical
2 material.

3 We are glad to see progress.

4 CHAIRMAN GARRICK: This is an unusual event. We
5 are ahead of schedule, but it is fortunate because the
6 committee has been looking for some time to get access to
7 some computers and download some information that we need
8 for the balance of the meeting, so we are going to do that
9 now, and in that regard I think we will adjourn until 1:00
10 p.m.

11 [Whereupon, at 11:03 a.m., the hearing was
12 recessed, to reconvene at 1:00 p.m., this same day.]

AFTERNOON SESSION

[1:00 p.m.]

CHAIRMAN GARRICK: Could we get people to take their seats, please, because we are going to conduct this next phase partly by telecon and we have some timing issues that we want to deal with, and I will be back online in just a moment.

[Pause.]

CHAIRMAN GARRICK: Will the meeting come to order, please.

For the benefit of the Honorable Shelley Berkley, we want to get started, and I am John Garrick, Chairman of the Advisory Committee on Nuclear Waste, and I am supported with the other members, George Hornberger, Ray Wymer, and Milt Levenson.

This is the part of the meeting that is the primary reason that we have it approximately once a year in the Las Vegas area, and that is to establish direct contact with stakeholders and the public in connection with the Yucca Mountain Project.

We always consider this a highlight of our activities and I can say with great confidence that it has had a considerable influence on our communication and our advice to the Nuclear Regulatory Commission.

I think that in the last letter we wrote following

1 last year's meeting we stated it pretty clearly about this
2 sort of a session. We said, "Our objective in holding these
3 discussions is to enhance our own capability to communicate
4 technical issues and to develop ideas about how to improve
5 effective public participation in the NRC's regulatory
6 process. We also hope to strengthen our relationship with
7 Nevada stakeholders and clarify our role as an independent
8 technical oversight body to the NRC."

9 We have as a result of these meetings, and this is
10 our third one of this type, we have been specific in our
11 advice to the Commission about public participation. We
12 also have to acknowledge that the Commission has had a very
13 deliberate and determined effort to upgrade, if you wish,
14 its own activities in relationship to public involvement and
15 communication so we can't take all the credit but certainly
16 we have been a stimulant in that regard and I think we have
17 been pretty frank and direct in our advice on what should be
18 done.

19 Just as a minor example of that, in our last
20 letter following our meeting last time, we were very candid
21 in making some of the observations and I will just note a
22 couple of them, and we indicated that some representatives
23 of the state and counties and members of the public
24 perceived the following about the NRC:

25 One, NRC's attempt at risk communication is

1 disingenuous because of a lack of opportunities to influence
2 NRC's options and decisions -- all of this is in a letter
3 that we wrote that is in the public record.

4 Two, the NRC relaxed regulatory requirements to
5 ensure that the Yucca Mountain Repository can be licensed.
6 This was a comment made by state representatives.

7 Three, the NRC and the DOE have a strong
8 comraderie and a common language and have a common interest
9 in getting the repository license -- that is, the NRC will
10 not challenge the DOE, et cetera, et cetera.

11 And there are many more, and I just cite these to
12 indicate the frankness and candidness with which we
13 attempted to communicate what we were hearing from the
14 public about the project.

15 Now as far as actions beyond these letters are
16 concerned, there have been numerous.

17 One of course is that we annual prepare an action
18 plan for the committee that prioritizes its activities for
19 the coming year, and these meetings have had a direct
20 influence on establishing as first-year priorities such
21 things as risk communication and offering advice on
22 improving relationships with the public, et cetera.

23 In addition, we have noted several specific issues
24 such as transportation and have established a schedule for
25 dealing with these subjects as seems appropriate in the

1 context of the proceedings of the Yucca Mountain Project,
2 and we will say something about that a little later.

3 Now what I would like to do is give our guest, and
4 we are delighted that she is taking the time to do this, the
5 Honorable Shelley Berkley from the U.S. House of
6 Representatives and First District of the State of Nevada an
7 opportunity to address us for a few moments. Representative
8 Berkley?

9 CONGRESSWOMAN BERKLEY: [via telephone] Yes,
10 doctor, thank you very much. Good afternoon. I would like
11 to thank the Nuclear Regulatory Commission and its Advisory
12 Committee on Nuclear Waste for the opportunity to offer my
13 testimony by telephone. Needless to say, I would much
14 rather be with you in person, but as you know, Congress is
15 still in session.

16 It is my understanding that the committee and the
17 NRC Staff will be discussing how to handle an application
18 from the Department of Energy to build and operate a high
19 level nuclear waste repository at Yucca Mountain. I am also
20 informed that tomorrow the committee will discuss the
21 so-called progress at the Yucca Mountain site, focusing on a
22 DOE site recommendation report and performance assessment,
23 and with all due respect to all concerned and I mean that, I
24 must say that the work of the Commission and the committee
25 should be directly in an entirely different direction.

1 Instead of continuing the Yucca Mountain Project,
2 I urge that you begin to consider shutting it down. The
3 dangers of Yucca Mountain as a nuclear repository are now so
4 well-known and so well documented that it is sheer folly to
5 continue the project and dump additional billions of dollars
6 literally in a hole in the ground.

7 Long ago the Yucca Mountain Project reached the
8 stage that the only way it could be kept alive was to
9 undermine the safety provisions of the Nuclear Waste Policy
10 Act. The calculated erosion of these provisions has kept
11 the project on life support for years. It is time to pull
12 the plug so that the nation may move on to consider safe and
13 effective strategies to solve the problem of nuclear waste
14 disposal.

15 On three separate occasions the state of Nevada
16 has demonstrated using DOE's own data that the site should
17 be disqualified under both the EPA standard and the DOE's
18 own internal site screening regulations and each time the
19 DOE or Congress has changed the regulations to ensure that
20 Yucca Mountain would not be disqualified regardless of the
21 health and safety consequences to Nevadans.

22 In fact, DOE has found the geology at Yucca
23 Mountain so poor that over 90 percent of the waste isolation
24 capability of the proposed repository would have to be
25 provided by the metal waste container with only about 5

1 percent of the site's waste isolation performance depending
2 on the natural conditions.

3 When this project started the idea was to find a
4 place with natural geologic features to contain the
5 radiation. Clearly this objective has failed, and if that
6 were not enough an aquifer flows beneath Yucca Mountain with
7 water moving so rapidly that even with all of the engineered
8 barriers radiation would unavoidably escape from the
9 repository and contaminate the groundwater flow.

10 The discovery of water migrating through the
11 mountain is cause alone to abandon it. Additionally, Yucca
12 Mountain is located in a young geologically active area with
13 four volcanoes within seven miles of the site.

14 Yucca Mountain is surrounded by 34 -- 34 -- known
15 earthquake fault lines and has experienced over 620
16 earthquakes in the last 20 years. One of these earthquakes
17 measured a 5.9 on the Richter scale and caused over a
18 million dollars in damage to DOE's own surface support
19 facilities and I felt that in my bed in Las Vegas.

20 Recently I testified before a House subcommittee
21 to urge that radiation exposure standards not be relaxed to
22 fit the needs of the Yucca Mountain Project. It was
23 shocking -- shocking -- to listen to experts debate this
24 issue, with some of them actually advocating the abandonment
25 of established safety standards, not for the United States

1 as a whole, but only at Yucca Mountain, Nevada.

2 In other words, my constituents would be the only
3 people in this country living in an area where stringent
4 standards of the EPA do not apply.

5 I firmly believe that this is driven strictly by
6 politics. We have reached the point where the scientific
7 practice itself is being compromised by political
8 expediency.

9 I again request that Federal agencies change their
10 course. Instead of trying to change the rules to keep the
11 Yucca Mountain Project alive, we should begin the process of
12 decommissioning the Yucca Mountain Project.

13 Finally, when discussing a high level nuclear
14 waste repository we must also address the transportation
15 concerns that arise from the prospect of hauling 100,000
16 tons of lethal waste across 43 states. It is irresponsible
17 that we would jeopardize the lives of men, women and
18 children living along the routes the waste would travel on
19 our nation's highways without trying to find a safe
20 alternative.

21 I have faith in the technological advancement of
22 our nation and that our nation has experienced in the past
23 few decades and the advancement in our future. The NRC has
24 stated that nuclear waste can be safely stored in its
25 current containers for another hundred years. I have full

1 confidence in our scientific community that we can develop
2 an alternative where we do not have to dump 100,000 tons of
3 toxic materials into our earth.

4 The bottom line is that the Yucca Mountain Project
5 is a failed one. We need to invest in our future and the
6 future of generations to come and work together to find a
7 responsible and safe solution. Storing 100,000 tons of
8 nuclear waste in Yucca Mountain is not the answer to the
9 problem that this country faces with nuclear waste, and I
10 want to thank you very much for giving me the opportunity to
11 share my thoughts with you.

12 CHAIRMAN GARRICK: Thank you very much, and of
13 course your remarks will be part of the record of this
14 meeting, and again we appreciate your taking the time to
15 give us these remarks.

16 CONGRESSWOMAN BERKLEY: Well, I am -- although I'd
17 like very much to be discussing the decommissioning of Yucca
18 Mountain, perhaps a number of our citizens that are there
19 with you today will share my sentiments and express those to
20 you.

21 CHAIRMAN GARRICK: Yes, we are going to hear from
22 a number of people. We are going to hear from the State and
23 we are going to hear from the various counties -- Nye,
24 Clark, Lincoln, and Eureka, and we are going to hear from
25 the Nevada Nuclear Waste Task Force, and I suspect they will

1 all build on your remarks very effectively.

2 CONGRESSWOMAN BERKLEY: Well, thank you very much
3 for your kind attention.

4 CHAIRMAN GARRICK: Thank you.

5 CONGRESSWOMAN BERKLEY: Bye bye.

6 CHAIRMAN GARRICK: Bye.

7 One of the things that I wanted to continue with
8 just for a second because I think the committee has to be
9 sensitive to the fact that all of these kind of sessions are
10 only as effective as the follow-up makes them, and I am
11 anxious to reassure the stakeholders and the public that
12 there has been extensive follow-up and it has become an
13 integral part of the source material that we employ not only
14 to decide what is on our agenda, but that has had influence
15 considerably on how we view some of the issues.

16 There are a couple of issues that I just wanted to
17 mention. I have mentioned the one about making public
18 participation a priority ana making sure that we do a
19 professional job of representing the public views before the
20 body that we are offering advice to, but there's a couple of
21 other areas that I think worth mentioning.

22 One is transportation. Transportation almost
23 dominated the discussion of our last meeting and therefore
24 the committee put transportation on its list of activities
25 about which we would have a working group session, and that

1 is in our plan, but I would like to point out that even
2 though it is ahead of us in terms of addressing it
3 specifically through the ACNW that there are members of this
4 committee that have been actively involved in the
5 transportation issue, and I would like to just mention that.

6 In particular, I chair another committee for the
7 National Academy of Sciences called the Waste Isolation
8 Pilot Plan Committee, and interestingly enough one other
9 member of the Advisory Committee on Nuclear Waste is also a
10 member of that committee, namely Milton Levenson, and the
11 issue of transportation has been front and center in that
12 committee.

13 I am pleased to report that there have been
14 changes there already and a number of things taking place
15 that I think those of you who have not been following the
16 WIPP project and the details of its advisory bodies would be
17 pleased to hear, and I think I am going to ask Milt, since
18 he's been kind of the lead person on the transportation
19 issue for both the Advisory Committee on Nuclear Waste and
20 for the WIPP committee, I am going to ask Milt to just
21 quickly summarize some of the things that have taken place
22 in the transportation field.

23 DR. LEVENSON: The committee John referred to
24 issued an interim report and what I am really going to talk
25 about is the actions that DOE has underway following the

1 issue of our interim report.

2 That committee identified in the shipping area two
3 areas of concern. One was the communication tracking, et
4 cetera, system that DOE was operating known as Transcom. Do
5 you really know where the shipments are and what is going on
6 with them? The other general area had to do with the matter
7 of training responders, HAZMAT type people, et cetera, along
8 the route.

9 The communication tracking system was not a matter
10 of opinion of the committee by itself. We had surveyed and
11 got input from state highway patrolmen, local police and
12 fire departments, almost everybody that has a responsible
13 role in this sort of thing, and I think we were happy to
14 learn, just meeting last week in fact, that DOE is
15 completely revising the entire system and putting in place
16 what the committee felt was a very high quality, modern
17 communication and tracking system so that in real time
18 responsible entities that need to know, like whether a state
19 highway patrol, local police, et cetera, can in real time
20 track each and every shipment no matter where it is in the
21 country.

22 Secondly, there's an area of really seriously
23 divided responsibility here in the training of responders.
24 That's normally a local or state's issue, but DOE will be
25 funding it and DOE is playing a rather significant role in

1 making sure that there are responders who are trained as to
2 what to do, so that not only were we encouraged that
3 something was taking place but on a personal basis made it
4 clear that our work on the committee had not been in vain,
5 and that rather major changes are being made.

6 Now Yucca Mountain is some years away from
7 shipping anything, but if and when it comes into being it
8 certainly will be benefitting from a well-tested and
9 smoothly functioning system.

10 CHAIRMAN GARRICK: Thanks. Thanks, Milt. Okay.
11 I want to assure the representatives from the state and the
12 counties and the task force that they will be given whatever
13 time they need if they are concerned about us stealing some
14 of their time.

15 We will extend this session to whatever is
16 appropriate to get the messages across. All right, with
17 that why don't we proceed with the agenda. We will go just
18 in the order of the agenda: State of Nevada, Nye County,
19 Clark County, Nevada Nuclear Waste Task Force, Lincoln
20 County, Eureka County, and then finally we are going to hear
21 from the gentleman I referred to this morning, Dr. Jacob
22 Powers, who has asked to speak to us for a few minutes.
23 Mineral County representatives would also like to make
24 comments.

25 Now what I would like to do, starting with the

1 State of Nevada is ask the representatives to introduce
2 themselves, indicate their position, and give everybody the
3 benefit of knowing what their connection is to the state,
4 and we will start with Steve Frischman, I guess, who
5 obviously doesn't need much introduction but I would like
6 you to do it anyhow.

7 [Pause.]

8 MR. FRISCHMAN: My name is Steve Frischman. I am
9 Technical Policy Coordinator for the Nevada Agency for
10 Nuclear Projects.

11 This is the text of my talk, but I'll shorten it
12 up a little.

13 I want to talk to you today about a subject that
14 is within your purview and it is one where I have mentioned
15 this topic to the Commission in a couple past statements
16 over the years. They didn't take it up and I think it is
17 probably because there wasn't sufficient evidence to
18 understand my description of what is going on. I think now
19 there is enough in print from the Department of Energy to
20 make is clear that the Department of Energy has a
21 fundamentally different view of what licensing means from
22 what is clear in the regulations both in Part 60 and 63 --
23 it is there in both.

24 I think this needs to be explored and the
25 significance of it needs to be understood because it makes a

1 great deal of difference in how both the regulator, the
2 applicant and the public and all affected parties will view
3 a licensing proceeding.

4 It may sound a little complicated, it may sound
5 sort of esoteric, but I think it is really at the heart of
6 something that is going on that has not been clearly
7 identified by the Commission as something that they at least
8 need to think about and respond to because I think there's
9 enough evidence now to understand what the Department really
10 has in mind.

11 As some of you probably remember, I have spoken to
12 the Commission in the past about an apparent disparity
13 between NRC's approach to what is the primary licensing
14 decision and DOE's apparent effort to modify this to suit
15 its programmatic imperatives. The critical question is when
16 is the disposal decision made in the NRC's repository
17 regulatory process, when is the decision for disposal made?

18 I have interpreted the disposal decision with
19 agreement of Staff members to be made in the licensing
20 process when the finding of reasonable assurance is made
21 that the repository will meet the safety requirements, and
22 that is the original decision that is made when a license
23 application is presented, reviewed and the license is
24 granted and a construction authorization takes place.

25 DOE seems to think that licensing is an

1 incremental process with a final disposal decision made at
2 the time that a license amendment is approved for closure of
3 a repository. This has some very serious consequences not
4 only to the licensing process but also the upcoming
5 sufficiency report that is statutorily required that the
6 Commission has to provide to the Secretary as part of a site
7 recommendation.

8 The key to understanding this approach as DOE
9 appears to be applying it is in the use of performance
10 confirmation, which DOE views in part as an extension of
11 site characterization, even though they don't call it that
12 in many places, so we are in a situation where we can
13 interpret what DOE views as a disposable decision and when
14 the decisions are really consequential in licensing by their
15 use of performance confirmation.

16 We glean this through the repository safety
17 strategy. The safety strategy, if you remember, has five
18 key areas identified as the elements of the Department's
19 safety case for a repository.

20 Those five elements are: performance assessment;
21 design margin and defense-in-depth; explicit consideration
22 of disruptive processes and events: insights from natural
23 analogs; and finally performance confirmation. Performance
24 confirmation is a part of the safety case.

25 Now in Part 63 and in Part 60 performance

1 confirmation is defined essentially the same. That
2 definition is that performance confirmation means a program
3 of tests, experiments, and analyses that is conducted to
4 evaluate the accuracy and adequacy of the information used
5 to determine with reasonable assurance that the performance
6 objective in the licensing rule will be met.

7 Subpart (f) adds that performance confirmation
8 starts during site characterization and continues until
9 permanent closure of a repository.

10 Now the repository safety strategy speaks about
11 performance confirmation, and I am using Revision 3.
12 Revision 4 is due out this month. If it has come out I
13 haven't seen it yet, but my guess is that performance
14 confirmation is going to remain essentially the same in the
15 Department's thinking.

16 Now what I am going to be going through is some
17 details out of DOE documents and I will be reading you some
18 short quotes and then we can talk about what it all means in
19 the end, and I will have one slide to show you out of one of
20 these reports that indicates at sort of a minimal level
21 where the thinking is.

22 In the safety strategy, and by the way I will give
23 page references just for your transcript so you can get back
24 to these, the Revision 3 of the safety strategy, and this is
25 page 2-12, says the increased understanding and confidence

1 derived from long-term testing, observation and analysis
2 will be of great benefit to decisionmakers -- for example,
3 to determine when to apply to the NRC for authorization to
4 close the repository.

5 It goes on to say on page 4-8 that once sufficient
6 design detail has been developed plans will be finalized to
7 monitor -- and this is a list of elements that make up
8 performance confirmation in their view -- (1) monitor
9 subsurface conditions essential to performance of these
10 designs; (2) measure and observe for comparison against the
11 design bases and assumptions; (3) monitor the condition of
12 the waste packages; (4) monitor the environment of the waste
13 packages; and (5) perform lab experiments that focus on the
14 internal condition of the waste packages, so here is a list
15 of things that they believe are a part of performance
16 confirmation.

17 The performance confirmation plan, and I am using
18 Revision 1 dated May, 2000, on page 2-10 it says that
19 performance confirmation testing activities also include
20 post site characterization base line testing through
21 completion of the subsurface construction in addition to
22 pre-emplacment, pre-waste emplacment testing necessary to
23 support the license application submittal, licensing
24 interactions, and pre-emplacment licensing conditions.

25 Now out of that report on page 2-16 is a timeline.

1 [Pause.]

2 CHAIRMAN GARRICK: It's just a lousy machine.

3 MR. FRISCHMAN: Okay.

4 [Discussion off the record.]

5 MR. FRISCHMAN: What I was referring is this part.
6 You can see the site recommendation --

7 SPEAKER: We need a microphone.

8 MR. FRISCHMAN: I am looking at the
9 pre-emplacment testing on this schedule. This is FY 2000.
10 This is FY 2010.

11 You can see site recommendation is here. Submit
12 license recommendation is here. Receive construction
13 authorization is here. Updated license application, which
14 is the updated or the application for an amendment to
15 receive and possess, and then finally receive authorization.

16 What I am looking at are these four elements of
17 the program -- driftscale testing program, seepage
18 monitoring and testing, unsaturated zone near-field
19 environment testing, wasteform and waste package testing.
20 If you notice, all of these are shown to be ongoing work
21 beyond the site recommendation, beyond the license
22 application, and beyond the construction authorization, so
23 it is clear that there is work undone that needs to be done
24 in order to make decisions in these four critical areas.

25 Now all of this stems from the Department having

1 decided that it had sufficient information for a license
2 application. A license application is supposed to include
3 design and it is clear from this chart and also from the
4 meeting last week on container lifetime and source term that
5 the engineered barrier system including to a great extent
6 the waste package design is not going to be finally tested,
7 meaning the information proving up that the container will
8 do with reasonable assurance what it is expected to do in
9 the license application -- that work will not be completed
10 at the time the site recommendation, license application, or
11 receipt of construction authorization.

12 Also, the thermal testing will not be complete at
13 the time of site recommendation, so therefore the thermal
14 design also can't be firmed up.

15 Incidentally, the reference to repository design
16 document, Rev. 3, that came out in August of this year, this
17 document, is consistent in pointing out the work that needs
18 to continue in order to make decisions about repository
19 design. These four areas that I pointed out on the slide
20 are really at the heart of the principal factors of the
21 repository safety strategy.

22 The ones closest to it, of the seven principal
23 factors, one is seepage into the drifts, which is as real
24 key to the system, as was stated earlier today; performance
25 of drip shields, once again key to the system; performance

1 of waste package barriers, key to the system; and the others
2 are, most of the others are in one way or another related to
3 some portion of this work that is not planned to be finished
4 at least until an application for an amendment to receive
5 and possess.

6 That includes the solubility limits of dissolved
7 radionuclides, dilution of radionuclide concentrations,
8 retardation of radionuclides, and maybe or maybe not related
9 is retardation in the saturated zone.

10 So we have the safety strategy which is the core
11 of the Department's case that is not satisfied by data
12 collection complete, complete data collection at the time of
13 site recommendation, license application, or the expected
14 issuance of the construction authorization.

15 In discussing the sources of factors to be
16 included in the performance confirmation, the performance
17 confirmation plan, and it's on page 2-6, refers to other
18 items of potential postclosure safety significance, such as
19 residual data needs identified through process model
20 development. As you remember, the process models are at the
21 core of the total system performance assessment.

22 Data needs for processes important to postclosure
23 performance will drive performance confirmation testing
24 activities during preparation of the license application and
25 may be needed to support licensing interactions, licensing

1 interactions meaning discussions once the staff has the
2 license application under review.

3 Later in the discussion on data and validation
4 needs for analysis and process models, and this is on page
5 3-15, the performance plan says addressing these needs may
6 require additional testing efforts which would be identified
7 in the license application together with associated test
8 plans in accordance with regulatory guidance, so now we are
9 down with license application may contain plans for tests
10 that are necessary to firm up and to validate and to even
11 show the validity of the use of the process models.

12 This is from DOE's own documentation. They are
13 consistent throughout in different documents and what they
14 are essentially saying is that performance confirmation at
15 least in part -- there are parts of their performance
16 confirmation program that are very much in keeping with both
17 Part 60 and Part 63, but this particular element, which is a
18 most critical one, is outside the bounds of the performance
19 confirmation.

20 Performance confirmation I think is fairly easy to
21 understand if you look at it in terms of the Commission
22 makes a decision that there is reasonable assurance that the
23 safety factors will be met. They make that decision at the
24 time that they grant the license and the construction
25 authorization.

1 Now performance confirmation logically follows
2 from that in that a reasonable assurance decision has been
3 made. Now over the period of time of construction and
4 operation of a repository it is certainly reasonable that
5 you would want to improve your confidence in that finding of
6 reasonable assurance or if you found something that was just
7 completely outside of it, then you have something else to do
8 entirely, but performance confirmation is for the use of the
9 Commission to try to improve its confidence in its
10 reasonable assurance decision that was based on information,
11 analyses and interpretations that the Department presented
12 as its demonstration of safety.

13 The Department in one place does state that
14 performance confirmation is essentially a continuation in
15 part of site characterization and that is in a draft EIS.

16 There are some serious consequences of this whole
17 issue and it is not one to be taken lightly, as I have said
18 before.

19 First of all, the statutorily required report from
20 the Commission on sufficiency or whether the data from site
21 characterization seem to be sufficient for a license
22 application, the Commission needs to think very carefully
23 about whether they are going to have sufficient information
24 and how they are going to derive that.

25 In a meeting in San Antonio earlier this year, I

1 raised the issue of "closed pending," as you heard discussed
2 earlier this morning. Well, "closed pending" looks to me
3 like it is a convenience for the Staff and the Commission
4 for that sufficiency report. What it says essentially,
5 without using Bill's legalistic language, what it is saying
6 essentially is if the Department does everything it has
7 agreed to do and the results come out as the Department
8 expects that they will, then the Staff has no more
9 questions. I think that is what "closed pending" means,
10 because these agreements include provision of more
11 rationale, provision in some cases of more data and more
12 analyses, so if all of that is done as agreed and comes out
13 to where it does not elicit more questions, then the issue
14 is closed.

15 We saw the dates on some of John's expected
16 receipts. Some of those are June 2000 or June 2001. The
17 Department expects in its current schedule to have a site
18 recommendation at that time. The Department expects the
19 Commission Staff and the Commission to have provided its
20 sufficiency report in May of 2001, so now we have if the
21 Department does everything it agreed to do and if they have
22 no more questions.

23 Where does this leave the Commission and its Staff
24 in terms of a sufficiency report? Are you going to rely on
25 the promises of the Department? I am not sure that you can

1 do that. I think we have some past experience that says you
2 ought to at least question whether you can rely on that.

3 Does the Commission want submit a report, a
4 sufficiency report, that points out places where it is not
5 sufficient or where the results of site characterization are
6 not sufficient and we have information here saying the
7 Department plans that some of it will not be sufficient.

8 We also have the fact that this report is a
9 statutory requirement of the Commission. Now the Commission
10 is in a position where it is being relied upon by the
11 Congress and by the President to give a straightforward,
12 objective statement of whether the information at the time
13 of site recommendation is or seems to be sufficient for
14 license application.

15 The Department itself is stating through these
16 documents that it very likely will not be, because if we
17 look at last week's meeting on waste package lifetime and
18 source term, there is a mountain of work other than
19 wordsmithing that has got to be done and it has got to be
20 done in a very short period of time that relies upon
21 availability of funding, availability of personnel to do it,
22 and it also relies on ultimately that the results coming out
23 pretty much like what the Department predicted they would.

24 Well, we have one example where you are going to
25 have a presentation next week or next month -- in your next

1 meeting, at least one example where the Department has not
2 even considered an impact to the waste package that could
3 shorten its lifetime to the point where the waste package is
4 essentially inconsequential for waste containment -- hasn't
5 even been considered. I think you will hear a lot more
6 about that next month.

7 So the first question is to what extent can you
8 rely on the Department's agreements for meeting the
9 statutory requirement to the Commission for sufficiency
10 report.

11 Now it also seems that the Department has another
12 consequence of this. The Department has gotten into the
13 position where they are very comfortable now with the idea
14 of "closed pending." Well, it also suggests from looking at
15 that slide and from looking at their considerations of what
16 work needs to be done after certain milestone decisions, it
17 looks like they are looking for something called "reasonable
18 assurance pending" -- and that that reasonable assurance
19 pending is going to last until the Commission approves an
20 amendment for closure, because work will be continuing all
21 along to try to prove that what they said originally some
22 maybe 30 or 40 years before was in fact sufficient for a
23 reasonable assurance determination.

24 Another point of significance is that if you look
25 at this in a larger scale, originally under the Waste Policy

1 Act and under the approach of the Commission's Part 60, it
2 looked as if the requirement that originally I think Joe
3 Paladino, long time ago Chairman of the Commission, a
4 requirement that he placed on the Department and I think
5 Bill Reamer today even repeated that, and that is for the
6 Commission to meet its responsibilities, especially in terms
7 of the really short licensing review period, the application
8 must be, first, complete, and second, of high quality.

9 The Department has made clear through these
10 documents that it is not going to be complete, so we are
11 left with a situation where it never will really be complete
12 until the amendment for repository closure, so what this
13 does is it leaves a Yucca Mountain repository under this
14 plan as an open-ended experiment. It is an experiment where
15 the Department will tell you they don't know when they are
16 going to want to close it.

17 You heard at the very beginning that the
18 performance confirmation plan itself or the safety strategy
19 says that performance confirmation will help decisionmakers,
20 for example in the area of when to close a repository, so
21 they are relying on the ongoing sort of site
22 characterization as part of performance confirmation to
23 eventually decide when the experiment is complete.

24 Well, in reality the only outcome of this
25 experiment regardless of when it happens is repository

1 closure and that is because we can't accept or rely on the
2 concept that, oh, the waste is retrievable, because the
3 waste is only going to be retrieved out of a repository
4 under really extraordinary circumstances and I don't think
5 that anything short of waste packages breaking in a
6 preclosure repository that we are going to see something
7 considered so extraordinary that the waste will have to be
8 retrieved and also it's very unlikely that the money will be
9 available to reverse the emplacement process for the waste
10 or that the money will be available to do anything else.

11 What we have is a plan on the part of the
12 Department to incrementally license their active experiment,
13 with some confidence on their part that finally if the idea
14 of being in so far you can't get out is self-fulfilling.

15 I just point this out to you. I believe that the
16 evidence is here in DOE documents now to show that the
17 Department's thinking about licensing is fundamentally
18 different from the regulatory scheme for licensing and that
19 it has really enormous consequences due to the magnitude of
20 the project and the fact that once the waste is underground
21 it is essentially not reversible.

22 I guess finally what I would like to say is maybe
23 helping you think about some counsel to the Commission and
24 that is that if the Department is not ready at the time of
25 site recommendation to meet its obligations to provide the

1 Commission with information to make a sufficiency
2 determination as is expected and required, and if the
3 Department does not have sufficient information for a design
4 that will stand whether it gets amended later or not, a
5 design that will stand scrutiny at the time of initial
6 license application, then they are not ready to move
7 forward.

8 I think there are some serious issues here that
9 the Commission with your counsel needs to consider in terms
10 of how it first responds to its statutory duty relative to
11 site recommendation and further how it responds to its own
12 licensing philosophy, which is you must find from initial
13 license application reasonable assurance that the safety
14 standard will be met.

15 I am sure you will have some questions.

16 CHAIRMAN GARRICK: Thanks, Steve. As usual I am
17 impressed with the thoroughness with which you have
18 dissected in this case the schedule of activities and before
19 I ask others for questions I will just ask for a design that
20 will stand -- whether it gets amended later or not, a design
21 that will stand scrutiny at the time of initial license
22 application, then they're not ready to move forward, and I
23 think there are some serious issues here that the
24 Commission, with your counsel, needs to consider in terms of
25 how it first responds to its statutory duty relative to site

1 recommendation and, further, how it responds to its own
2 licensing philosophy, which is you must find, from initial
3 license application, reasonable assurance that the safety
4 standard will be met. I'm sure you'll have some questions.

5 DR. GARRICK: Thanks, Steve. As usual, I'm
6 impressed with the thoroughness with which you've dissected,
7 in this case, the schedule of activities, and before I ask
8 others for questions, I'll just ask one myself.

9 As you probably know, one of the major concerns of
10 licensees down through the years in the nuclear regulatory
11 environment has been the investments they have had to make
12 prior to a decision being made about their facility.

13 So, there is an inherent problem here, if not with
14 stakeholders, certainly with shareholders, of
15 decision-making and the timeliness of it and the efficient
16 use of people's money, and I just wonder if, in your
17 analysis of the Yucca Mountain schedule, if you looked at
18 the licensing process associated with other major facilities
19 -- say, for example, nuclear power plants, where there is a
20 lot of experience, and saw the kinds of inconsistencies that
21 you're presenting here today as a kind of a reference for
22 your conclusions.

23 MR. FRISCHMAN: All right. Well, first let me say
24 that there is a great difference between this project and
25 probably any other project that you would make reference to,

1 such as a nuclear power plant, if you're thinking in terms
2 of just the cost, and that's that nuclear power plants are
3 an object of commerce, and anyone who gets in commerce
4 understands that there are risks involved, financial risks,
5 and the financial risk for the builders of nuclear power
6 plants is one where, over the years, they've been looking
7 for more and more essentially consistency, so they can plan
8 on what it would cost to get to the point of a license
9 application, and yes, there have been difficulties in the
10 past some of them probably brought on by Three Mile Island
11 as much as anything else.

12 In this case, we're dealing with, first of all, a
13 Federal Government project.

14 We're dealing with a project that has gone on, in
15 practice, since early 1983, and actually, expenditures at
16 the Yucca Mountain site since 1978.

17 We're looking at approximately \$3 billion into
18 Yucca Mountain site characterization right now.

19 We're looking at, in 1998 dollars, for the entire
20 project, something arguably on the order of \$50 billion.

21 So, what we're looking at is, yes, a lot of
22 dollars right now, maybe what appears to be a lot more
23 dollars, maybe another billion, billion-and-a-half dollars
24 to get to where the Department could have what they and the
25 Commission considers to be a complete and high-quality

1 license application.

2 You're looking at 10 percent -- less than 10
3 percent of the total cost in 1998 dollars.

4 If you had to walk away from it then, you're
5 looking at less than a 10-percent sum cost.

6 Less than 10-percent sum cost, even though it
7 sounds like a lot of dollars in this case, is not
8 unreasonable, even in the commercial world. If you look at
9 military base closings, they don't even blink to walk away
10 from a 20-to-25-percent sum cost.

11 So, the financial argument doesn't do a lot for
12 me, because this is not comparable to a commercial venture,
13 and also, it doesn't do an awful lot for me when we're
14 talking about not having sufficient information in the core
15 area of the safety strategy.

16 You can do an awful lot of other things, but in
17 this case, the Department itself is saying the place that we
18 are most relying on safety, we don't have the data and we
19 don't plan to have it until after we at least get the first
20 green flag, waiting for a couple more green flags down the
21 line.

22 DR. GARRICK: Thank you.

23 Ray, do you have any questions?

24 MR. WYMER: No, I'm still digesting it all.

25 DR. GARRICK: Milt?

1 MR. LEVENSON: No.

2 MR. HORNBERGER: Steve, I wonder to what extent
3 we're talking about interpretation of words versus real
4 difference.

5 That is, I take it from your own words that you
6 certainly wouldn't envision a case where an applicant came
7 forward with a license application and, if the license
8 application were judged to be -- have reasonable assurance,
9 that no more work would be done.

10 MR. FRISCHMAN: No, that's not what I'm saying at
11 all.

12 MR. HORNBERGER: So, the real question, then, is
13 how one interprets the reasonable assurance words at the
14 time of license application, and what you're claiming is
15 that DOE's own words would indicate that they are not going
16 to have the data for reasonable assurance.

17 MR. FRISCHMAN: Right. They are not going to have
18 the data for reasonable assurance, and they expect that the
19 data that they do collect will, according to, at least their
20 timeline, will add a sufficient increment to where, when
21 they ask for an amendment to begin emplacement, at that
22 point they seem to think that the Commission will have
23 reasonable assurance, even though they're asking the
24 Commission to give them reasonable assurance pending.

25 I hope that word sticks, because I invent words,

1 and usually I don't get credit for them, but I'd like it for
2 this one.

3 No, I believe that, yes, it's perfectly
4 reasonable, especially if you can have an operating period
5 of 30 years, it's perfectly reasonable that work should
6 continue, but at the same time, I think it is obvious that
7 work should not start until you have someone saying we
8 believe that what you have right now, if you do it as you
9 say, will provide the performance that it must provide, not
10 wait and we'll give you a little bit more later, not to
11 improve your confidence but just to get to where you can
12 make a decision.

13 DR. GARRICK: Thank you.

14 MR. FRISCHMAN: Response pending.

15 MR. LARKINS: Steve, what's your comments on the
16 adequacy of the document to address these key technical
17 issues or key issues that are needed for decisions?

18 Do you think that they do all the work that's in
19 the document that that will provide a basis for an adequacy
20 or a reasonable assurance decision?

21 MR. FRISCHMAN: The documents don't give the
22 detail of the work that needs to be done.

23 The places where we're gleaning what really needs
24 to be done, which is kind of surprising at this point, but
25 we're gleaning it out of the meetings that are going on

1 right now relative to the Commission staff talking to DOE
2 about specific process models, and the things that are most
3 important are what come out of those discussions relative to
4 path forward.

5 That's where we're seeing the action, because
6 that's where the Commission staff is slapping on, in some
7 cases, the closed pending by saying that, if all of this is
8 done and comes out the way that you anticipate and we don't
9 have anymore questions, then it's closed.

10 So, that's where it's sort of focusing down.

11 The Department, obviously, is not going to do
12 anything more than what these meetings require them to do.

13 Regardless of all of the paper out there, the
14 200-pound site characterization plan we had 12 years ago,
15 they're at a point right now, they have a schedule, they
16 have a mission, and they're not going to do anything beyond
17 what the Commission staff leads them to agree to in these
18 issue resolution discussions.

19 DR. GARRICK: Thank you.

20 MR. FRISCHMAN: Thank you for the invitation to
21 speak again, and as you know, I always accept.

22 DR. GARRICK: We haven't been turned down yet.

23 All right.

24 Nye County.

25 MR. BUCCO: Good afternoon. My name's Tom Bucco.

1 I'm a consultant to Nye County.

2 Les Bradshaw is currently at the Board of County
3 Commissioners meeting and, unfortunately, was not able to
4 attend due to the time change, but I'm sure if he were here,
5 he would offer his greetings and thanks for the opportunity
6 to come and speak with the Commission.

7 This is very informal. I don't have any hand-out
8 materials.

9 I'd like to basically go over three items, and
10 then if you want to have a dialogue or ask questions, that
11 would be great -- three items, where one is the loss of our
12 leader, the second is the status of the EWDP, with the
13 particular emphasis today on what we'll be doing on Thursday
14 afternoon, and then the third item is with respect to the
15 AMRs that we're currently reviewing.

16 As you're all aware, Nick passed away in July and
17 we lost our leader.

18 We'd like to point out that we haven't lost our
19 focus, we haven't lost our desire, but one thing that we
20 have lost is our communicator.

21 Nick was a really good guy to get in and call
22 people individually and get the results out.

23 In his absence, we recognize communications are
24 not as good as they were with Nick, and Nye County is
25 looking at bringing people in, a couple of people to step

1 into that capacity.

2 In the meantime, we'll have to use forums like
3 this to continue to communication and our web-page to get
4 the information out to people.

5 With respect to Thursday's field trip, we expect
6 to see the Commission out there Thursday afternoon, ready to
7 -- we'll put on a formal presentation at that time
8 concerning progress to date on the phase two drilling, on
9 the early-warning drilling program.

10 Very briefly, we've got a couple exciting things,
11 accomplishments this year.

12 Number one -- and this is real tribute to Nick --
13 is at our site two DP, we hit the carbonate aquifer, and
14 that's where we'll be meeting and going over what our plans
15 are for that.

16 One of the unusual things about Nye County's EWDP
17 is it's flexible.

18 So, we're at a stage right now, we've got a
19 bore-hole sitting out in the ground ready to case, and the
20 casing operation -- we'll be reaming it out probably while
21 you folks are out there, and then we're going to case it
22 off, but we're trying to keep our options open, and we're
23 actively solicitating comments, suggestions, ideas about
24 where do we go forward.

25 It's a unique opportunity to put a 3,000-foot hole

1 in the ground, into the carbonate aquifer out there.

2 Now we need to decide how do we spend our
3 resources to get the most information out of that hole in
4 the ground that we can possibly get with the resources that
5 we have available, and we've always maintained Nye County
6 doesn't have all the answers, we're looking for the answers,
7 and the interchanges that we have with the Commission, the
8 Nuclear Regulatory Commission staff, the NWTRP, and so on,
9 are very instrumental in us making our plans for phase
10 three, and we'll be providing an overview of those, also.

11 Finally, with respect to something else Nye
12 County's got going on right now is the review of the AMRs,
13 and you know, from a county perspective, this is a very
14 difficult task.

15 The AMRs are very complicated. They're very, in
16 some cases, esoteric, and I've got a pile personally -- I've
17 gone through and reviewed two of them. I've got a pile of
18 paper sitting like this, and I'm just a poor desert
19 hydrologist.

20 I don't understand some of these technical issues
21 and these things.

22 So, what we'll do is we'll make the best comments
23 that we possibly can and do it in the right avenue and the
24 right attitude, but you know, as we look at these things, we
25 see things that the EWDP was directly designed to address,

1 is data deficiencies.

2 So, when we see things in the AMRs about analog
3 models, we always wonder, why use an analog model somewhere
4 over on the peninsula when we go take direct measurements
5 within the region of influence?

6 Why are we using expert elicitation? Why are we
7 using best scientific judgement?

8 One thing the EWDP is showing us is the only way
9 to resolve some of these things is go out and collect the
10 data, okay?

11 With that, that's all we really wanted to convey
12 here.

13 At the field trip on Thursday, we'll be putting on
14 a formal presentation with a hand-out package, but other
15 than that, I'd be happy to answer any questions or just sit
16 down and get out of the way.

17 DR. GARRICK: Okay.

18 George?

19 MR. HORNBERGER: I think I'll wait until the field
20 trip.

21 MR. BUCCO: Okay.

22 DR. GARRICK: Other committee members?

23 [No response.]

24 DR. GARRICK: Appreciate you coming in and doing a
25 good job.

1 MR. BUCCO: Great. We appreciate the opportunity.
2 Thank you.

3 DR. GARRICK: Clark County.

4 MR. TIESENHAUSEN: My name is Engelbert
5 Tiesenhausen. I'm with Clark County.

6 Fortunately, I am not the only one who is going to
7 speak for Clark County, so I'll keep my comments very short.
8 Dr. de Portolo is going to get up after me and make some
9 comments.

10 Some of what I have to say kind of echoes what
11 Steve Frischman -- the comments that Steve Frischman made
12 earlier. My concerns are not of a technical nature but in
13 the nature of policy.

14 I have attended -- so far, I have attended two of
15 these technical exchanges, igneous activity one and the one
16 on container life and source term, CLST.

17 The robust waste package, as has been mentioned
18 several times today, has become the cornerstone of DOE's
19 repository safety strategy.

20 As Neil Coleman mentioned earlier today, the
21 robust waste package makes it very difficult to see the
22 effects of the natural system.

23 I just want to mention some of the concerns that
24 we have that deal not with license application but with the
25 sufficiency comments that the NRC will make on the SR.

1 According to the current schedule, they are due by
2 5/2001, one month before the Secretary makes a site
3 recommendation.

4 In the CLST technical exchange, about 40
5 sub-issues were agreed upon by NRC and DOE.

6 The timeframe for completion of these, in the
7 majority of the cases, greater than 50 percent, at least,
8 was given as prior to LA.

9 I can only assume that this means after site
10 recommendation.

11 We are concerned as to how the NRC will consider
12 all of these open issues based on plans that have yet to be
13 funded in their sufficiency comments for SR.

14 We urge the ACNW and the Commission to take a
15 critical look at the issues and to evaluate the impact on
16 the sufficiency comments, taking into consideration not what
17 has been promised but only the information that is available
18 at the time of the review.

19 We feel very strongly that the SR should be a
20 stand-alone document and not be judged on what might be
21 produced in the future.

22 And now, Dr. de Portolo is going to make some
23 comments regarding socio-economic issues which we feel very
24 strongly about in Clark County.

25 Any questions?

1 DR. GARRICK: Questions?

2 One thing I need some help on -- and maybe I get
3 this from the NRC. We keep making reference to the fact
4 that it's very difficult to evaluate the impact of the
5 natural setting because of the emphasis on the waste
6 package.

7 Is that -- what's difficult about asking DOE to
8 provide the information you want?

9 MR. TIESENHAUSEN: Well, that's a comment from
10 Neil Coleman this morning.

11 DR. GARRICK: Well, I don't understand it. I
12 didn't understand it then either.

13 I mean they are the licensing agency. They can
14 ask them for whatever they want. Why do we go around
15 complaining about the fact that they're not getting us
16 information that we want? That's only because we're not
17 asking for the right information, isn't it?

18 MR. TIESENHAUSEN: I can't speak for the NRC, but
19 if you have a 10,000-year regulatory period and you have no
20 waste package failure for in excess of 10,000 years, then
21 how do you evaluate the natural system?

22 DR. GARRICK: The NRC doesn't have to accept that.
23 They don't have to accept anything.

24 MR. TIESENHAUSEN: I agree.

25 DR. GARRICK: So, I don't understand comments like

1 that, and to me, they are totally irrelevant, but let's go
2 on.

3 MR. TIESENHAUSEN: Okay.

4 DR. de PORTOLO: Thanks for the nice lead-in. I
5 appreciate it.

6 [Laughter.]

7 DR. de PORTOLO: My name is Russell de Portolo.
8 You've previously been -- members of Clark County Nuclear
9 Waste Division have previously addressed this group with
10 regard to transportation and socio-economic issues. So, I
11 feel a little bit off the path today, but I'd just like to
12 make some comments here, because I see that, in your
13 comments with regard to the DEIS, you did address some
14 transportation issues.

15 What you had said was that the Department of
16 Energy has failed to describe preferred routes and modes and
17 has failed to consider different options in sufficient
18 detail to allow meaningful comparisons among impacts and
19 mitigation strategies, some of that detail involving risk of
20 impacts regarding traffic, land use, socio-economics, and so
21 on.

22 You're pretty much saying the same thing we're
23 saying, and that is that we don't even know what the plan
24 is, let alone have the ability to address or even identify
25 particular impacts because of the lack of detail, and we

1 have, for some time now, been suggesting or recommending a
2 transportation feasibility study, just like a site
3 suitability study.

4 There just is no rhyme nor reason and no structure
5 for us to make any -- what we would think to be meaningful
6 comments on that.

7 Over the past year, we and our contractors have,
8 in preparation for the comments on the DEIS, have integrated
9 over 10 to 12 years of work regarding socio-economic impacts
10 in Clark County.

11 Much of this work was done by the State of Nevada
12 and contractors for Clark County in the early '90s and late
13 '80s, primarily in the early '90s, and some interesting
14 documents came up, and what we have found is there was a
15 rationale by our County Manager that was provided when we
16 first accepted Unit of Local Government status, and that had
17 to do with the role of local government, and we generally
18 understand our role to be to protect the health and welfare
19 of our residents and maintain and enhance the socio-economic
20 and natural environment, all of which leads to an improved
21 and sustainable quality of life.

22 Sometimes we have been strapped with regard to
23 staff, funding, programming, and so on, because of tenuous
24 DOE funding.

25 We're okay now, but the fact is, we will have to

1 continue to do this no matter what happens. This is our
2 responsibility.

3 We further found that, in fact, we are dealing
4 with what we call -- what certain scientists, social
5 scientists, and so on, have called the precautionary
6 principle in local government, and that is that people in
7 institutions have a duty to take anticipatory action to
8 prevent harm; the burden of proof of harmlessness of a new
9 technology or project falls with the proponent, not with the
10 general public; third, before using a new technology, people
11 have an obligation to examine a full range of alternatives,
12 including the alternative of doing nothing.

13 Now, that's been -- DOE has been absolved of that
14 responsibility by congressional directive, but we feel very
15 strongly that that is a -- the alternative -- the no-action
16 alternative should have been more strongly considered.

17 And last, the decisions regarding a new technology
18 or project must be open, informed, and democratic and must
19 include affected parties, and we have had much to say about
20 that in our comments.

21 It's very easy to jump from those principles to
22 the role of NEPA, related laws, guidelines, and procedures.

23 In our view, the purpose of an EIS is to provide
24 enough information to allow us to identify impacts and ways
25 to possibly address those impacts with regard to mitigation,

1 monitoring, and so on.

2 Because of the vagueness and incompleteness of the
3 DOE DEIS, we feel that, despite the fact that there have
4 been many, many hundreds of thousands of pages and comments,
5 that the document is so flawed that it is necessary for us,
6 as an affected unit of local government, to do our own
7 impact report, and hopefully, that impact report -- parts of
8 that impact report will be submitted with the report of the
9 State of Nevada under section 114(a), possibly a report
10 under section 116(c), and hopefully, our report, or certain
11 aspects of our report, will be included in the Secretary's
12 recommendation for approval to the President, which should
13 take place next year.

14 So, we're under the gun at this point to try to
15 have the Secretary and others who are involved in
16 decision-making take a look at our issues, none of which
17 were either looked at or adequately looked at by the
18 Department of Energy.

19 The way that it's set up under the DOE's approach,
20 which is the black-and-white traditional approach, is that
21 issues like land use conflict, for example, effects on
22 tourism, the life blood of Nevada and Clark County are not
23 addressed.

24 Issues like traffic congestion, traffic patterns,
25 costs to local government, costs to communities and other

1 such areas which I'll describe very briefly a little bit
2 later -- they're just not -- they just don't occur.

3 In fact, the Department of Energy appears to be in
4 conflict with the NRC definition of the region of influence.
5 In the EIS for -- in the environmental assessment for the
6 re-licensing of reactors, Las Vegas Valley was defined as an
7 area -- as a local area of influence, region of influence.

8 We see this in spots in the DEIS. We're not sure
9 what the region of influence is. It sort of seems to be a
10 moving target.

11 But the fact is that when the environmental
12 assessment was done with regard to re-licensing, Clark
13 County, especially the urban area of Clark County, was
14 defined as a region of influence.

15 So, what we're going to be doing -- what we are
16 doing right now in Clark County is -- are a number of
17 activities that have to do with our impact report.

18 These include preparing an impact report or
19 section with regard to property values along routes, and
20 this has to do with the modeling -- this will lead to
21 certain modeling with regard to appraisals, assessed
22 valuation, and so on, so that we can also take a look at the
23 fiscal impact on government.

24 There are a number of impacts, fiscal impacts,
25 that have not been looked at by Department of Energy. This

1 is one of the more important ones.

2 So, we are now doing a property value study in
3 Clark County and in each of the local jurisdictions,
4 including North Las Vegas, Las Vegas, Henderson, Mesquite,
5 Paiute, and other communities.

6 We are preparing a governmental fiscal impact
7 report for all of those jurisdictions.

8 We are preparing a public safety program impact
9 report, which will include initial cost estimates, and we
10 plan to integrate all of this information into an impact
11 report that we hope will be used and considered in the
12 approval process and that will be considered by the
13 Department of Energy, Congress, the President in making
14 certain program decisions.

15 We will continue to report our progress to you,
16 and we ask for your assistance in allowing Clark County's
17 concerns and those of other affected units of local
18 government to be heard and considered.

19 DR. GARRICK: Thank you.

20 When do you think you will have some preliminary
21 results?

22 DR. de PORTOLO: We'll have preliminary results
23 for the cities by January with regard to emergency
24 management or public safety programs and government fiscal
25 impacts, and we'll be happy to pass those on to you as soon

1 as we get them.

2 DR. GARRICK: Good. Thank you.

3 Questions?

4 MR. LEVENSON: I have a minor one for
5 clarification.

6 DR. de PORTOLO: Sure.

7 MR. LEVENSON: When you talked about reactor
8 re-licensing, what reactor are you referring to?

9 DR. de PORTOLO: There was an environmental
10 assessment that came out in January of this year.

11 Steve, can you help me with that one? That was
12 the -- remember, it was a re-licensing.

13 MR. FRISCHMAN: Part 51.

14 DR. de PORTOLO: Yeah, Part 51, right.

15 MR. FRISCHMAN: It was a generic assessment
16 regarding overall impacts of re-licensing within the last
17 year.

18 DR. de PORTOLO: Yeah, I think it was in January.

19 MR. FRISCHMAN: And it took the Las Vegas area as
20 an area to analyze impacts.

21 DR. de PORTOLO: This is the first time we had
22 seen that.

23 I could make sure you get a copy of that.

24 MR. LEVENSON: I'm confused. It took Las Vegas as
25 an area to analyze the transportation?

1 DR. de PORTOLO: It defined the Las Vegas Valley
2 as a local area surrounding the repository. It, in effect,
3 expanded the region of influence.

4 MR. LEVENSON: A re-licensing document refers to
5 Yucca Mountain, which hasn't even yet applied for a license?

6 DR. de PORTOLO: Yes, it did.

7 MR. FRISCHMAN: We were a little surprised, too.

8 DR. de PORTOLO: It assumed that, yes.

9 MR. FRISCHMAN: And it has to do with re-licensing
10 and, ultimately, the removal of the spent fuel from
11 re-licensed facilities.

12 MR. LEVENSON: Okay.

13 DR. GARRICK: So, it's kind of an industry impact
14 analysis, looking ahead, the nuclear industry.

15 DR. de PORTOLO: Yes.

16 DR. GARRICK: Yeah. Okay. Thank you very much.
17 All right.

18 I guess now we're to the -- we're going to take a
19 break here pretty soon, depending on how long Judy talks,
20 maybe.

21 [Laughter.]

22 DR. GARRICK: We're going to now hear from the
23 Nevada Nuclear Waste Task Force.

24 MS. TREICHEL: Well, I sure hope nobody's thirsty
25 or tired.

1 I have to say a couple things before I say what I
2 intend to say.

3 There was a response over here about the dialogue
4 that just went on with some surprise shown.

5 DR. GARRICK: I hate to interrupt, but following
6 protocol, would you tell us your affiliation, name,
7 etcetera?

8 MS. TREICHEL: Judy Treichel, Nevada Nuclear Waste
9 Task Force.

10 In regard to the last exchange that just went on
11 at the microphone there and the surprise that was shown over
12 the fact that Las Vegas was shown as a place influenced by
13 the repository -- sometimes referred to as proposed,
14 sometimes not -- in that EA, we've all been pretty surprised
15 in the way that it's treated in the Draft Environmental
16 Impact Statement for the Goshute facility that was prepared
17 by the NRC, which blatantly says that, as soon as Yucca
18 Mountain opens, all the waste that would be in the Goshute
19 facility would just be taken right on over to Yucca
20 Mountain.

21 So, this isn't a one-time shot. This happens
22 quite a bit.

23 I also take issue with the word "stakeholder," and
24 I have for a long time. It kind of denotes that you're
25 cooperating or participating in the project. I'm not doing

1 that, and I never will be doing it.

2 I am a public participant, and I do work with the
3 process, not with the Yucca Mountain project, and there
4 again, I think that would make it sound like a done deal,
5 and I don't think it is at all, and I don't think it's going
6 to be.]

7 So, there's just a lot of little wordy kind of
8 things that happen that sort of zing me like a little arrow,
9 and they may not be important to somebody else, but the fact
10 that we hear these things so often -- so many times people
11 call this -- well, it's just politics, you know, science
12 should really be deciding, and it appears that, when someone
13 comes out for the project, their decision has always been
14 driven by good science.

15 If they come out in opposition to it, they're
16 simply pandering or have been a victim of politics.

17 So, it's just the way that things are seen.

18 The only other thing I want to do before I finish
19 up here with the rest of the stuff I had was to let you all
20 know that, in Sunday's paper, they had a good part of a
21 section with a lot of pretty pictures, which you can take a
22 look at, since you're going out to the site, but some of the
23 dose receptors, the four-legged ones, are featured in here
24 from the organic dairy that's out there.

25 It's called Goodhart Milk, which is organic and

1 sells for about twice the price, and I talked to Ed Goodhart
2 one day, and he said, you know, the last thing I need -- and
3 he's been a vociferous opponent to this project -- is when
4 somebody say this is really good, this is great, we'd like
5 to buy more of your stuff, exactly where are you located,
6 and he has to tell them that I'm just right down the hill
7 from the Nation's high-level nuclear waste repository.

8 So, yes, they would be severely impacted in ways
9 like Russ de Portolo was talking about.

10 The main thing that I'm very concerned with right
11 now is the Nuclear Regulatory Commission and their move to
12 using risk-informed performance-based regulation. I believe
13 that, if that is done, there will never be any sort of a
14 real level of public trust and confidence.

15 There has got to be, in licensing this repository
16 or not, a strict pass/fail list of tests, much like the
17 guidelines that DOE is trying to throw out, probably
18 stronger than those guidelines, and somewhat like subsystems
19 requirements that the NRC used to have, and probably
20 stronger, as well.

21 The public is not only skeptical of the kind of
22 statistical analysis that goes on for this sort of
23 regulation, but they're also convinced that there is not
24 enough known about a repository or how it would or would not
25 work at Yucca Mountain to reach any kind of a meaningful

1 conclusion.

2 Nevadans are convinced, and with very good reason,
3 that any such analysis is pure guesswork and can and will be
4 slanted toward the desired outcome.

5 Regardless of the reasons that NRC gives for
6 adopting this type of regulation, the people will believe
7 that it was done to ensure that there is a license given to
8 Yucca Mountain.

9 And one of the reasons I believe that this is
10 happening is because of the waste package. There were
11 questions just asked about that.

12 It's the only way, when a site fails the natural
13 system tests, like ground water travel time or like
14 seismicity or igneous activity or any of those, that can all
15 be brushed aside with this robust waste package.

16 Many times the NRC staff and representatives have
17 announced and tried to explain to public audiences that they
18 are not part of DOE, and the public will not believe that
19 you're not working in cooperation with the DOE unless, when
20 you request comments on a licensing rule, it's clear that
21 you're utilizing the recommendations that you receive from
22 the public.

23 The public are the ones with the health and safety
24 that are up for grabs here.

25 If the public saw regulations being created that

1 reflected their views and their expectations, you would
2 never need to explain what your role was in this program,
3 but it's going to keep coming up until that happens.

4 In August of this year, the NRC published a white
5 paper regarding risk-informed, performance-based regulation.

6 The justification for changing to the approach
7 centered around increases in understanding and knowledge of
8 risk and performance in regard to reactors and materials
9 applications.

10 That may be true. We may know a lot more, but
11 with one significant exception, and that's a high-level
12 nuclear waste repository at Yucca Mountain.

13 There's no previous experience with nuclear
14 materials over the years that would be involved in this
15 project.

16 There's never been a mountain or any piece of
17 geology used in this way.

18 There is simply no credible knowledge or
19 experience, and the public who your decision directly
20 affects -- eternally affects -- knows that.

21 In lay terms, anybody who believes that they know
22 the unknown either has a deity complex or a serious lack of
23 humility.

24 In this white paper that the Commission did, they
25 talk about a risk triplet.

1 The risk triplet is what can go wrong, how likely
2 is it, and what are the consequences?

3 The answer to all of these questions, when it
4 comes to Yucca Mountain, is who knows?

5 I've got a file that I keep that's called things
6 that can't happen, and any of the examples in there is
7 probably called a worst case scenario, and it would be, with
8 the kind of analysis that DOE does in order to come up with
9 the probabilities that they have.

10 These things have such a remotely small
11 possibility of ever happening that DOE would say they didn't
12 need to be considered, but they're all sitting in there in
13 the file, they all happened -- or most of them happened in
14 Las Vegas, and probably all within the last 10 years.

15 I agree that you shouldn't have to look at
16 everything. You shouldn't have to believe that you thought
17 of everything, because I don't think that you can. I don't
18 think that anybody can imagine whatever could go wrong and
19 the range of consequences.

20 But the question, how likely is it to happen, I
21 don't think matters.

22 This project, unlike a reactor, cannot be turned
23 off.

24 If you came up with the wrong answer using the
25 risk triplet, you're stuck. There you have it.

1 Remember, this project is being imposed on people
2 who don't want it. They aren't going to be cooperating with
3 it, they aren't going to be working with it, and they are
4 unwilling to take those risks. They've already been the
5 victims of deception and terrible surprises with nuclear
6 materials before.

7 In licensing, there might not be a box that you
8 have to check off that shows whether or not the community
9 wants the facility, but there should be.

10 I think it's very important, and it should be
11 considered.

12 The DOE has adopted a method of graphically
13 showing radiation doses that employ some sort of new magic
14 math. It lowers the dose if the probability of the
15 dose-spewing activity is unlikely.

16 That would mean that, if I decided that -- or, in
17 looking back, if I thought that I probably got the flu about
18 once every six years, then it would mean that I always sort
19 of had one-sixth of a case of flu every year, and it just
20 doesn't work that way.

21 I don't think that the NRC should accept that sort
22 of calculation from the Department.

23 When you talk about a repository being directly
24 impacted by a volcano, I think you need to know the exact
25 dose that would result from that.

1 That's the way DOE is using this risk triplet, and
2 it's the consideration of how likely is it, and that plays
3 the most important part of all, and I don't think that that
4 should be accepted.

5 Risk is sort of all the rage these days. Experts
6 are trying to decide what's wrong with Nevadans when it
7 comes to Yucca Mountain, and we're subject to risk
8 assessment, risk analysis, risk communication, and all kinds
9 of new schemes that try and straighten out our thinking and
10 our hysterical or sort of ignorant perceptions.

11 I don't think other communities are being taught
12 these kinds of lessons in citizenship.

13 A good example of the sort of research that we're
14 continuously hit with is where risks -- how risky it is with
15 various activities to die of those activities. We see risk
16 ladders, risk charts, risk circles, all sorts of risk
17 things, and then the hope is that we'll just accept those
18 numbers and stop objecting to the project.

19 But it's just a hope. If we don't, somehow the
20 experts go the next mile, and they believe that they're
21 justified in imposing these risks on us because they've
22 determined that they're acceptable.

23 Wouldn't it be interesting if your surgeon could
24 just decide that you'd be better off, or at least not worse
25 off, if he or she operated on you and you didn't need to

1 give any consent or anything, you just suddenly found
2 yourself under the knife.

3 My point is that risk-informed performance-based
4 regulation is not acceptable, and it won't work in this
5 situation.

6 In the past, we've discussed the line about DOE
7 not being a burden on the licensee. If you don't require
8 that this application pass very rigorous tests, you'll be
9 placing a dreadful burden on yourselves.

10 TSPA and/or PA are not appropriate tests.

11 Again, in the case of the surgeon, you want to
12 know that the board that gave him or her a license to
13 practice medicine required that person to pass all of the
14 tests. You would find it unacceptably risky if that doctor
15 was, you know, just a little weak or clumsy in a few areas
16 but good in others. It wouldn't be enough to know that he
17 or she was really well-intentioned.

18 You should want the DOE to have strict guidelines
19 that Yucca Mountain must pass, and you should have tough
20 pass/fail requirements so that you don't have to assume the
21 burden of making a judgement call about issuing a license
22 and then take the responsibility if there's failure.

23 The white paper was right about the fact that we
24 now have more knowledge and experience. We've learned a lot
25 about non-volunteer dose receptors from weapons activities

1 and from nuclear testing, and we're arguing about how they
2 or their survivors should be compensated.

3 The test for Yucca Mountain or any disposal
4 facility should be that there will be no dose receptors
5 ever. The only time anyone should be called a dose receptor
6 is after they have given their informed consent.

7 That's it.

8 DR. GARRICK: Thanks, Judy.

9 You represent an interesting challenge. If we
10 could away on an island alone for about 10 years --

11 [Laughter.]

12 MS. TREICHEL: Is it time for a break?

13 [Laughter.]

14 MS. TREICHEL: Well, John, what do you want? I
15 think they just finished up the survivors.

16 No, I don't think we need to go off to a desert
17 island. I think you've just got to use your head.

18 You know, the analogy with the surgeon is a really
19 good one. You want to know that this guy -- let's, for the
20 sake of argument, say it's a man -- had to pass the most
21 rigorous tests, couldn't fail in any single one of them,
22 couldn't be, you know, just a little clumsy when it came to
23 the knife but great at stitches.

24 You just don't average this out when you do stuff
25 that matters to yourself.

1 DR. GARRICK: Yeah, I understand, and my comment
2 was not so much Yucca Mountain as the discipline of risk
3 assessment, which has served society unbelievably well in
4 terms of giving them added understanding and insights into
5 what the populations of the planet are exposed to and what
6 the likelihood of different outcomes are.

7 The evidence is overwhelming. The juggernaut is
8 rolling. The discipline is increasing. I just attended an
9 international meeting with the European Commission. It is
10 extending into every field of endeavor, from food to
11 technological systems to natural systems, and it is having
12 an enormous impact on our quality of life in a positive way,
13 and so, it is not reasonable to condemn a discipline that is
14 having that kind of an impact on the basis of its
15 application and your interpretation of that application to
16 Yucca Mountain.

17 But I understand where you're coming from and that
18 the human side of these issues clearly have to be taken into
19 consideration, and if the discipline can't stand up to that,
20 then, you know, there's -- a change has to be made, a
21 different algorithm has to be applied, but there is no doubt
22 that the concept is as basic as any law of physics that
23 we're subjected to, and the problem here is not the risk
24 assessment, it's who does it and how it's done.

25 There is no problem with the concept, it is a

1 problem of application, and I agree that some of the
2 applications have been badly performed and that it has been
3 associated with the game of statistics, which it is not.

4 Statistics may be 2 or 3 percent of a
5 comprehensive and important risk assessment, but most of it
6 is other things in understanding the system that you're
7 dealing with and being able to decompose that system into
8 the kind of pieces and parts that will allow you to
9 reassemble it into answering questions that we have to
10 answer.

11 MS. TREICHEL: I think risk assessment works
12 really, really well in a case --

13 DR. GARRICK: It works on everything.

14 MS. TREICHEL: No, in a case where somebody wants
15 to do something.

16 DR. GARRICK: Yes.

17 MS. TREICHEL: If you've got a town that really
18 wants an airport and they know that occasionally a plane is
19 going to land a little too soon, maybe a little too late,
20 but they really want an airport --

21 DR. GARRICK: Or on fire.

22 MS. TREICHEL: Yeah, whatever. Or you want to --
23 you're dying to get someplace and it's so important to you,
24 so you don't care if it's an Explorer with Firestones on it.

25 Anytime that you're making those decisions, you

1 have the ability to take those risks into account and then
2 you make your decision.

3 I have a couple of friends who are smoke-jumpers,
4 and the way people use risk now, they would condemn them to
5 put up with anything, because after all, look what you're
6 doing over here. How can you possibly not want to have, you
7 know, an operation done on your thyroid or whatever?

8 But it's misused when you don't have volunteers
9 and when you don't have people working with their own
10 cooperation and informed consent.

11 DR. GARRICK: Yes, and it's misused if there is
12 confusion about the risk assessors and the decision-making
13 process.

14 The risk assessor doesn't make the decision, they
15 analyze the risk, and the risk assessment has to pass the
16 test of acceptability and go through a tedious process
17 before it can reasonably become a basis for a part of the
18 decision-making process, and a risk assessment is not a
19 decision analysis.

20 It's a component of decision analysis that has
21 been neglected for many, many decades that we're finally
22 getting a better handle on.

23 But let me ask the committee members if they have
24 any questions for Judy.

25 We're always very pleased to hear from you --

1 MS. TREICHEL: Thank you.

2 DR. GARRICK: -- admire what you're doing and the
3 abilities you demonstrate at being on top of these very
4 important issues, and we'd like to think that we're as much
5 on your side as anybody's side, and we'll keep trying to be
6 that way.

7 MS. TREICHEL: All right. Well, let me know about
8 the island.

9 DR. GARRICK: All right.

10 [Laughter.]

11 DR. GARRICK: All right.

12 We've had a few names added to our list, and it's
13 obvious we're going to probably go over the time here, and
14 that's okay, because as I said, this is the most important
15 session of the trek to Nevada, but I'd like to break it up
16 now and take a 15-minute break, and then we'll resume with
17 the agenda.

18 [Recess.]

19 DR. GARRICK: We're now to my favorite county in
20 Nevada, Lincoln County.

21 We've had a program shift because of some time
22 commitments and problems, and we're going to hear from Mr.
23 Corbin Harney from the Western Shoshone, and you have the
24 floor.

25 MR. HARNEY: Well, my question's going to be

1 simple to you people. It is really a simple for you people
2 to answer.

3 I have asked the DOE people once before. Give me
4 the document saying that they own the land. Where is that
5 document today, if somebody's got it here or who's got it?
6 Under what law did the United States took our land? Under
7 which law?

8 We talk about law. Give me an answer on that.
9 What law did you guys, the United States Government, took
10 our land where the test site, where the Yucca Mountain is
11 today?

12 Under the treaty of 1863, at that time, it stands
13 today, it's still the way it was, at no time the Federal
14 Government, as we operate under, as you people operate
15 under, have give us a written statement saying they took our
16 land and so forth.

17 Today, you guys talk about somebody else's land.
18 You don't have a title to that land, but I have, under the
19 treaty.

20 What are you guys talking about here?

21 If I own the land, how did you guys get this land
22 from us, from the Shoshone? Shoshone own that land under
23 the treaty.

24 If you guys ever read that treaty, it's documented
25 under your Federal law.

1 I hope you guys would understand what I'm saying
2 to you.

3 This law that we all operate under -- we're
4 talking about law. Where is that law that protects our
5 land? Or you guys are making up your law as you're going?
6 And this is the reason why we're running out of things,
7 because the DOE have accumulated, developed something that
8 they don't understand, and today, throughout the world, the
9 DOE, as we call the nuclear energy department, terminating
10 the life on this earth of ours today.

11 We, the Shoshone people, have lived here for
12 thousands or maybe a million years. We took care of what we
13 had.

14 We took care of the water. We took care of the
15 earth. We took care of the plant life and so forth. Under
16 your law, what did you guys do so far?

17 You have contaminated our water today, not
18 thinking about the future generation at all.

19 As we look at it, as a native people throughout
20 the country, it seem to me that you people, the Federal
21 Government today, don't recognize us as human.

22 Maybe we are not human according to your eyes.
23 Maybe we don't have a law. Maybe you're the only people
24 that's got law to protect yourself, not protecting us at
25 all. Why not?

1 You enjoy our land, each and every one of you.
2 Your forefather came here, made those treaties, peace and
3 friendship.

4 We as a native people have made our agreement with
5 you. We enjoy you people. We've made sure that you have
6 enjoyed your life on this land of ours.

7 In turn, what are you guys doing for us as a
8 land-owner? Seem like you're just treating us like dirt,
9 like if we're nobody at all. Is that what you guys are
10 doing? Is this what the Federal Government is doing?

11 I'm going to ask you again, you people, to show me
12 that document where you own the land. I have asked those
13 questions before. I'm going to continue to ask those
14 questions until, somewhere, sometime, someday, you might
15 give me the answer, the answer, what I'm looking for from
16 you people.

17 You're talking about my land, you're talking about
18 law, you're talking about this and that, transportation over
19 our land, shortening people's life.

20 Now you don't have much water left.

21 Just think about it. Let's think about the
22 younger generation. We talk about future generation. Seem
23 to me like we're not even concerned about them. We're
24 concerned about today, not concerned about tomorrow. Let's
25 all think about this.

1 I want a document from the Federal Government.
2 You are the people talking about how you're going to license
3 people that's going to be bringing this nuclear waste
4 throughout the country, into Nevada here.

5 How many accidents are we going to have happen?
6 If any accident ever happens in the future, what do we do
7 then?

8 Right today, the DOE is not bringing the issue
9 out, they're not talking to anybody it. How much accidents
10 so far happen already?

11 If it didn't happen, we would have clean water, if
12 they didn't happen, but somehow we're searching for clean
13 water. We're selling each other water today. There must be
14 something wrong here.

15 I hope you guys can understand what I'm saying to
16 you. I'm a native person from Nevada here. Under the
17 treaty your forefather have signed with us, it's still
18 there. I hope you people can realize that, if you think
19 we're humans.

20 If you think we're something else, maybe someday
21 you are going to terminate us. Maybe this is what you're
22 trying to do today. Seem to me like you're terminating
23 yourself at the same time.

24 So much sickness developed since 1953, since the
25 testing took place.

1 Now, how many more people is going to lose their
2 life?

3 Think about it. You are the people going to have
4 to make that decision over the land here, not only for us,
5 the plant life, the animal life, the bird life. Those are
6 the things you will have to make a decision on.

7 If you don't want nothing on this planet of ours,
8 wipe everything out, the plant life, animal life, bird life,
9 and so forth. Maybe this is what we want to do. Maybe this
10 is what the DOE is looking at, already contaminating our
11 water, our air.

12 I hope that you, the people, would stand up to
13 your right, think about the future, your own children,
14 grandchildren, and so forth, the unborn, how they're going
15 to survive.

16 We're barely surviving today. We're contaminating
17 all our food with radiation, all the water that we can
18 drink. We're eating some of that today. When are we going
19 to be telling each other truths?

20 This is what I came up to do, to say to you. I'm
21 going to continue to say what I've been saying for many,
22 many meetings that you guys are going to be here, but I
23 don't see my people in this room at all.

24 Are you guys hiding from the native people, trying
25 to talk about their land behind their back, behind the bush?

1 Is this what you guys are doing?

2 So, I want an answer from you people. Write me a
3 letter. Tell me if I'm wrong, where I might write telling
4 you what I think, what I know, what I see so far around the
5 world.

6 The country around us is suffering for water, the
7 land, the food, and so forth. Here we are, listening to
8 somebody that's going to shorten our life for us, already
9 been happening.

10 This is something I'd like to bring out to your
11 attention. I hope each and every one of you understand what
12 I'm saying. I want that treaty to be here.

13 I've been asking my government, because they hold
14 a trust over my land. They say they do. What are they
15 doing? The Federal Government, I'm talking about, your
16 government, what you're operating under.

17 Is there a law protecting the treaty round the
18 world, or are you guys just doing what you think you're
19 going to do without the law? Are you making up your own
20 laws as you're going?

21 This is the reason why the people round the world
22 is suffering today. We're not looking at each other. We're
23 not talking about nothing among each other. We're going
24 along where we think.

25 I hope to talk to you again someday, somewhere.

1 I'm going to continue to talk about what I said to you.
2 Show me the treaty. I have asked for that once before. I
3 asked that DOE show me the document where you own the land,
4 but I got the paper. I own the land, according to your
5 Federal Government law.

6 So, thanks for listening to me.

7 Is there any question among you people? The whole
8 room here should have some kind of question about what I
9 said, or did you guys went to sleep when I was talking, or
10 what happened, or ashamed to ask questions.

11 I was ashamed person one time, now I'm not,
12 because I see things are dying around me. Even the plant
13 life is dying around me. That's the reason why I had to
14 stand up in front of you to say those things.

15 I hope you guys think about it. Thanks for
16 listening.

17 DR. GARRICK: Thank you.

18 [Applause.]

19 DR. GARRICK: All right.

20 Now we can go to our next county, and I had
21 started to say my favorite county. That's because I spent
22 several years of my elementary training in two communities
23 in Lincoln County, one Pioche and another Mackett, and they
24 were very interesting times of our lives, as my father was
25 kind of a miner. We know that county pretty well, and it's

1 changed a lot.

2 Let's hear about it.

3 MR. BOFFMAN: Thank you, Mr. Chairman and members
4 of the committee.

5 My name is Mike Boffman, and I'm a consultant to
6 Lincoln County, to the board of Lincoln County
7 Commissioners, and also to the city council, and I'm here
8 today on behalf of the Chairman of the County Commission and
9 the Mayor, who serve as the Chairman and the Vice Chairman,
10 respectively, of the Joint City/County Impact Committee
11 there.

12 Let me just preface my remarks by indicating and
13 offering some apologies.

14 Let me just begin by saying that I'm really sorry
15 that they're going to ship nuclear waste through Lincoln
16 County and that residents of the county are going to be
17 exposed to shipments for a 25-to-27-year period of time, and
18 coupled with the other kinds of wastes that come through
19 that area, it's going to increase their risks, and the DEIS
20 tells us that two to three dozen people will die as a result
21 of transportation accidents, not exposure to radiation but
22 just simple transportation accidents.

23 I'm sorry that we're going to be impacted. We've
24 done work in that area that demonstrates that, if we were to
25 have an unanticipated accident with no releases of radiation

1 but lots of attendant media amplification of that risk,
2 during the peak season of tourism -- we have five state
3 parks -- that we may lose a million to a million-and-a-half
4 dollars of revenue in a county of about \$4,000 people, very
5 significant impact.

6 And I'm sorry that the rest of the Nation hasn't
7 paid attention to the service that is being asked in Nevada
8 to host this facility, to solve what is a very pressing
9 environmental problem, and that the rest of the Nation
10 hasn't stepped up to the plate and indicated what value they
11 would place on that service that Nevada is being -- not
12 asked but being requested -- or that's not even correct --
13 being forced, if you will, to take.

14 In Lincoln County, there's a growing sense of
15 resolve that this project will come to Nevada. That waste
16 will be shipped through the state. It's uncertain whether
17 it will be by rail, whether it will be truck, and the
18 elected officials in Lincoln County have, I think, taken a
19 rather pragmatic position about all this, and I will tell
20 you that their approach to the repository is really
21 three-pronged.

22 They are focused on understanding and minimizing
23 risks, understanding and minimizing impacts, and
24 understanding and maximizing benefits.

25 In the past year, your staff, I think, did an

1 admiral job of trying to help you as a committee understand
2 risk and how to communicate risk, understand perceived risk,
3 and how to communicate that, perhaps, to the public, and how
4 to factor that into your own decisions and advice to the
5 Commission.

6 And I guess the theme of what I'd like to just
7 touch on here briefly today has a lot to do with risk and
8 where I think the Commission may be going awry in its work
9 and, ultimately, in its efforts to protect public health and
10 safety, and I would remind us all today that that is what
11 the Nuclear Regulatory Commission's mission is, is to
12 protect public health and safety, and everything that we do
13 and every outcome of the licensing process should lead to
14 that conclusion.

15 I'd like to just talk a little bit about the
16 package performance study that's underway. Actually,
17 they've completed a draft of that. They've got it out.
18 They're circulating it. They're getting comments on that.
19 This is the NRC. It's the Sandia report.

20 I've attended a couple of workshops concerning
21 that, and what I find interesting about that is that the
22 NRC, certainly Sandia, and seemingly NRC is moving towards
23 spending unknown quantities of money to demonstrate further
24 the integrity of the packaging system that will be used to
25 ship nuclear waste, and they are doing this at the same time

1 they have recently released their update of the risk
2 associated with transporting spent fuel, and for your
3 reference, that's NUREG/CR-6672, and let me just read one
4 quote out of that study.

5 "The current estimates of risk are less than those
6 estimated in 1977. Year 2000 estimates indicate a
7 confidence that the anticipated increase in spent fuel
8 shipments from reactors to interim storage or to a geologic
9 repository will not entail a greater risk to the public than
10 that considered acceptable in 1977."

11 So, the NRC has concluded in their most recent
12 assessment of risks that the risks are now lower than what
13 we estimated in 1977, and in 1977, the level of risk was an
14 acceptable level of risk.

15 I ask you, then, why are we spending scarce
16 resources to further refine our understanding of the
17 integrity of the package system, which ultimately simply
18 reduces the uncertainty associated with our estimates of
19 performance, which gives us a little better estimate of risk
20 and presumably will lower the risk estimates further?

21 By the NRC's own admission, the levels of risk are
22 already acceptable.

23 I would encourage this committee to encourage the
24 Commission to reconsider the direction they're going.

25 Let me underscore this a little bit with a

1 proposal within the package performance study to perhaps do
2 full-scale testing of casks.

3 The Sandia folks are seemingly leaning towards a
4 recommendation that we do a full-scale test of a cask to
5 demonstrate the cask's integrity, to help us refine our
6 modeling, to calibrate our models, to understand the
7 responsiveness of different components of the cask when
8 they're all assembled together and you have, you know, a
9 severe accident, a beyond-regulatory kind of a scenario.

10 And in the workshops I've been in, it's very clear
11 that the public, you know, whoever the public is, will not
12 accept the results of a single test and will not be willing
13 to extrapolate the results of that test of a single cask
14 across all other casks of a similar model, let alone all
15 other models of casks, and in the NRC report, they are
16 basically -- one of the driving reasons for doing the work
17 that NRC is proposing through the package performance study,
18 or that Sandia is recommending be done, is, and I quote, "to
19 increase public confidence in the safety of spent fuel
20 shipments." That's the reason they're doing the work.

21 A full-scale test of a single cask will not
22 increase public confidence in the safety of spent fuel
23 shipments, and if you want to argue with me on that point
24 then let's take a look at how the results of the Sandia
25 crash test have been used over time and how the results of

1 the European tests have been viewed over time.

2 It's propaganda.

3 So, I really question the merits of the direction
4 we're going, and again, I would encourage perhaps this group
5 to consider do we need to go down the path of, for example,
6 full-scale cask testing and other recommendations in that
7 report to try and better understand the performance of these
8 components in the package and also the risks associated with
9 that.

10 Getting back to the purpose of the package
11 performance study and the proposed studies is to increase
12 public confidence in the safety of spent fuel shipments.

13 I guess an underscoring point, a kind of
14 rhetorical question that I'd like to pose is, is that the
15 role of NRC, to increase public confidence in the safety of
16 spent fuel shipments, or is the role of NRC to increase
17 public confidence in the capability of the NRC licensing
18 process to protect public health and safety?

19 There's a very clear difference, and it would
20 appear to me that the Commission is heading down a path to
21 try and become an educator of the public about the risks
22 associated with things nuclear, and this has a lot to do
23 with risk communication, when, in fact, the public may be --
24 if they are concerned at all -- may be most concerned about
25 the integrity of the licensing process itself.

1 And I guess I would look at that from the
2 perspective of, for example, the KTIs, and we have a current
3 licensing process going on in Utah right now for a facility,
4 and I can tell you that people in Nevada that watch the
5 resolution of these key technical issues or watch the
6 Private Fuel Storage licensing process that's underway --
7 and there is grave concern about the integrity of the NRC
8 licensing process.

9 For example, is the key technical issue resolution
10 process -- and I apologize, Bill, I wasn't hear for your
11 presentation, you probably just nailed this, but is the KTI
12 resolution process going to result in largely the -- making
13 non-relevant the raising of contentions by parties to the
14 licensing process, because in essence, all of the potential
15 contentions, or the ones, certainly, that NRC believes to be
16 important, will have been dealt with through the KTI
17 process, and anything else that anyone raises will be viewed
18 as largely non-relevant, or certainly not a contention
19 that's worthy of pursuing.

20 And ultimately, NRC staff recommend to the board
21 decisions about those matters, and so, from the outside
22 looking in, we have the KTI process, which is not a part of
23 the formal licensing process, per se -- we're not even in
24 licensing yet, but in essence, are we resolving all the
25 contentions that might be raised?

1 Well, the answer, obviously we have to say no, but
2 outside looking in, it sure has that appearance.

3 I would also -- I guess, just finally, just to
4 kind of close up here, because I'm taking way too long, I
5 guess just three recommendations, just to kind of close out.

6 I did talk about the importance of perhaps the
7 ACNW considering whether or not the Commission should,
8 indeed, be trying to educate the public on the safety of
9 things nuclear or whether the Commission should be worrying
10 about making sure the public has confidence in their
11 licensing process. I think that's very important.

12 Second of all, should the NRC be spending its
13 limited resources to further refine or to further understand
14 the performance and the risks associated with the packaging
15 system given the conclusion they've reached that
16 transportation risks are now safer than we ever thought they
17 were before, and before, we thought they were acceptable, so
18 they must be even more acceptable.

19 Finally, I would just ask that this advisory
20 committee begin to consider prospective conditions and how
21 the NRC will view prospective conditions to a license.

22 This is an unprecedented process or project. If
23 you look at the conditions on licenses for nuclear power
24 plants, they are certainly not very creative, they're not
25 very novel, and we would hope, certainly in Lincoln County,

1 that prospective conditions to a license would include
2 minimizing risks, would include minimizing impacts, and
3 would include maximizing benefits.

4 Thank you.

5 DR. GARRICK: Thank you.

6 Questions, comments. Committee? Staff?

7 MR. LARKINS: One question.

8 DR. GARRICK: Yes.

9 MR. LARKINS: You mentioned the revised
10 transportation risk study. What's your views on the
11 adequacy of that and those results?

12 MR. BOFFMAN: My view on the results is that it's
13 NRC's perception of risk. It is nothing more than the NRC's
14 perception of risk.

15 It is not the real risk associated with
16 transporting nuclear waste in a technical sense. I'm sure
17 the preparers of the report think that it is, but the next
18 risk assessor is not going to necessarily agree.

19 So, clearly, it is nothing more than the NRC's
20 perception of risk, and I think it's important that we
21 recognize that and that that perception is going to be
22 different than other people's.

23 Personally, I'm comfortable with that. I'm
24 comfortable with the estimates they've prepared, I'm
25 comfortable with the analysis that's been prepared, and I

1 think we ought to deal more with reducing accident risk that
2 results in fatalities because people have run into a truck
3 or a truck runs into their car and things of that nature
4 than latent cancer fatalities associated with the exposure
5 from an accident.

6 DR. GARRICK: Would you accept the notion of the
7 NRC's calculated risk rather than perception, because it
8 seems to me, when you say perception, you're implying that
9 they have already made up their mind and that they're
10 unscientific in their application of risk tools.

11 MR. BOFFMAN: Well, the risk estimates are based
12 an awful lot on observation and historic data, and I, as an
13 individual, will get on an airplane because of observation
14 and historic data, and I'm not a scientist.

15 So, I consider my assessment of that risk to be as
16 technical, perhaps, as a technical risk assessor's work, you
17 know, so I'm a little bit concerned about that.

18 I would also suggest that I just lost my train of
19 thought, but beyond that -- it's too bad, too, because it
20 was a good point.

21 Anyhow, the answer is no.

22 DR. GARRICK: Any other questions?

23 [No response.]

24 DR. GARRICK: Thank you.

25 MR. BOFFMAN: I'm sorry, Dr. Garrick. I do

1 remember.

2 [Laughter.]

3 MR. BOFFMAN: You know, the NRC has indicated in
4 their report that the levels of risk in '77 were acceptable.
5 By what measure? Is that simply a judgement on the part of
6 the NRC and its staff?

7 It appears to be. I don't know. Maybe it's
8 compared to other levels of risk, like smoking, voluntary
9 risk.

10 You know, there are a lot of voluntary risks, and
11 that seems to be how we determine what's acceptable, is we
12 take a look at what people do voluntarily, and if the
13 calculated risk falls within the realm of voluntary risk,
14 then it must be acceptable, at least to those people that,
15 you know, assume those voluntary risks, but I don't know
16 what the measure of acceptability was that was used.

17 DR. GARRICK: Yeah, but isn't there an important
18 point here that, just because we maybe don't know what the
19 levels of acceptability are, does that mean that we should
20 not try our damndest to calculate them?

21 MR. BOFFMAN: Yes, because the old adage,
22 paralysis by analysis, will set in, and we will end up
23 spending dollars, perhaps, assessing risk to see if we can
24 get it down to 10 to the minus 9 rather than 10 to the minus
25 8, when we could take that money and build a Jersey barrier

1 on the highway and save three lives over the life of the
2 project. For those of you that don't know, a Jersey barrier
3 is what keeps people from running into each other head-on.

4 DR. GARRICK: I think that's perception, too, of
5 the highest order.

6 Well, it's obvious that we have a different view
7 of the scientific process.

8 The scientific process says that we should keep
9 looking for answers to things that we don't understand, and
10 the genuine risk assessor is supposed to do that, be a part
11 of that process, not to use it to cover up lies or to
12 confuse the public or what have you.

13 So, I think that if you're advocating that we not
14 try to calculate these things systematically and
15 deliberately, then it seems to me you're advocating the
16 rejection of logical processes, and I really challenge that.

17 Any other questions?

18 MR. HORNBERGER: As usual, I can't resist
19 responding to a soap-box speech.

20 I'm not sure that what I heard from the exchange
21 -- I didn't hear Mike say the same thing. So, perhaps I
22 should ask Mike to clarify, if nothing else.

23 What I heard Mike say was that, fine, given the
24 calculations that the risks are tremendously low and you
25 face a decision of whether to spend a lot of money doing a

1 full-scale cask test or putting Jersey barriers on the
2 highway, there might be a very logical thought process and
3 analysis that would lead you to do the work on the highway.

4 MR. BOFFMAN: Thank you.

5 DR. GARRICK: I agree with that.

6 MR. BOFFMAN: That's exactly what I meant.

7 DR. GARRICK: I agree with that, but the whole
8 concept here should be one of a decision analysis
9 perspective.

10 What we want as citizens is alternatives and to be able to
11 choose between alternatives, but we also want, as citizens,
12 responsible analyses of those alternatives, and that's where
13 the technical community has, more often than not, failed, is
14 that we don't give our policy-makers and our leaders
15 quantitative information about the alternatives, and the
16 other thing is that our speaker didn't talk about
17 calculations. He talked about perceptions in a way that
18 would suggest an arbitrariness that I do not think exists,
19 and that was what triggered my comment.

20 Any other comments?

21 [No response.]

22 DR. GARRICK: Thank you very much.

23 MR. BOFFMAN: Thank you.

24 DR. GARRICK: Okay.

25 Our next speaker is from Eureka County.

1 MS. JOHNSON: Hi. My name is Abby Johnson. I am
2 the nuclear waste advisor for Eureka County, Nevada. I
3 appreciate the opportunity to address the group, and I'm
4 going to play it safe today. I'm not going to talk about
5 risk. It's way too risky.

6 [Laughter.]

7 MS. JOHNSON: One of my areas of interest and
8 something that Dr. Garrick talked about in his opening
9 remarks which he indicated he might want some feedback on is
10 public involvement.

11 That's a special interest of mine. It's something
12 that our county has committed to do a variety of things on,
13 and I'd like to tell you about a couple of those things and
14 then make some suggestions and observations related to this
15 quandary about how the NRC involves the public and what the
16 public's perception of the NRC is, and then, at the end, I'd
17 like to make a personal comment, not for Eureka County but
18 just as a citizen of Nevada.

19 Just to give you a little background, I think when
20 we were last in the same room, it was last October, and that
21 was during the DOE's environmental impact statement process.
22 We in Eureka County had not yet had our public hearing.

23 Eureka County is one of the ones that looks like
24 New Hampshire and Vermont, looks a little bit like this, and
25 it is the one that has the Union Pacific line running

1 through the northern part of the county, and there's a
2 proposal to build a rail line southwest through Crescent
3 Valley and into Lander County.

4 As part of our program, we do community meetings
5 where needed in the county to explain these complex issues
6 and answer questions.

7 We do a newsletter, and we do the web-site, Yucca
8 Mountain.org, my little advertising here, and that's a
9 challenge to do all that and to take this complex
10 information, the kind of information I hear at these
11 meetings, and then be able to distill it in such a way that
12 I can answer people's questions, and sometimes I can and
13 sometimes I can't, depends on what the information is.

14 One thing that I did this summer was I went to the
15 NRC's Atomic Safety and Licensing Board application hearing
16 for the independent spent fuel storage facility in Salt Lake
17 City related to the Goshute project. I think that's enough
18 big words there.

19 It was very interesting. You have to realize that
20 certainly I and most of us in Nevada are unfamiliar with
21 your licensing process at all, since, of course, we do not
22 have any nuclear power plants in Nevada, and so, it's very
23 educational. It was extremely educational, and one thing I
24 learned was -- actually, I came away appreciating, no
25 offense, the Department of Energy, because when you go to

1 one of their meetings, there's always like tree-killing
2 paper in the back of the room and hand-outs, and you can
3 really follow what's going on.

4 Well, it's a different world at these licensing
5 hearings, I learned, and I took that as an early signal
6 that, if we are to get to the point of licensing a
7 repository at Yucca Mountain, I feel very strongly that the
8 Nuclear Regulatory Commission should look at its public
9 involvement process related to the licensing hearings.

10 I know there's an issue about whether or not to
11 have a formal or informal hearing, and we support a formal
12 hearing process, but that doesn't mean that that the public
13 has to be left out.

14 I think it's essential, especially for a public
15 that's used to the hand-outs in the back of the room and
16 kind of the view-graph kind of thing, the way DOE does
17 things, that they need to understand what's going on, and
18 it's up to the NRC to make that possible and not necessarily
19 to go by the way we've always done it.

20 I think it's really important to think of
21 different ways to do that.

22 Last night, I almost finished my comments on
23 behalf of the county on the Draft Environmental Impact
24 Statement for the private spent fuel storage facility on the
25 Goshute project, and in reading that document, I had a

1 couple of you've-got-to-be-kiddings and a couple of aha's.

2 And one that I hadn't realized until I really sat
3 down to read it is that the proposal is to store up to
4 40,000 metric tons of spent nuclear fuel at the Goshute
5 facility in western Utah, virtually at Nevada's doorstep,
6 which is, you know -- I think I did the math -- 57 percent
7 of the commercial spent fuel that's currently in the law
8 scheduled to go to Yucca Mountain, of the 70,000 metric
9 tons, and the other thing in that document is it's rail
10 only.

11 There aren't any real options, they say. The
12 Commission says rail.

13 Now, here we are, Eureka County, looking at DOE's
14 proposal, reading that EIS, which, as Bart from Clark County
15 well articulated, doesn't have route or mode decisions.
16 Here we are in Eureka County reading NRC's EIS on this other
17 project, also dealing with commercial spent fuel, which says
18 it's going to be rail, we're not going to do any analysis in
19 Nevada, because we're depending on DOE's EIS to provide that
20 analysis.

21 To NRC's credit, I thought they did some very
22 strong comments on that draft EIS, but that's the same EIS
23 that you had serious concerns about, including
24 transportation concerns, that in this document you're
25 relying on.

1 And it's very hard from the standpoint of us as a
2 county, trying to figure out what's going on.

3 The other thing that was very clear to me,
4 knowing, as I do, and hearing Bill Reamer talk earlier about
5 the process with key technical issues, in the NRC's EIS on
6 Goshute, the Department of Energy isn't even listed as an
7 agency that was consulted.

8 Now, in the Yucca Mountain project, you know, you
9 guys are talking all the time.

10 What are we to make of that? If 40,000 metric
11 tons of spent nuclear fuel are actually going to be in
12 Nevada's doorstep in western Utah, that changes a lot of
13 things. That changes a lot of things for the State of
14 Nevada, for the affected counties, potentially for Eureka
15 County, and we're asked to make sense out of that.

16 You know, from the standpoint of the people that
17 I'm trying to explain this to, they're taxpayers, and
18 they're going, well, it's all the Federal Government, isn't
19 it? How come they're not talking to each other? This
20 agency says this and that agency says that.

21 So, I guess my message is your message is very
22 mixed, and I realize you have a number of jobs to do, and it
23 may some flies in the whole organizational structure of all
24 the different things that -- I mean I say you, I mean NRC --
25 that NRC has to do and all that hat-switching, but from the

1 perspective of the public, it's very confusing, it's not at
2 all clear, and I think that NRC needs to be a little --
3 needs to be much more aware of these kind of inconsistencies
4 that appear, and I don't mean that we're talking about just
5 window-dressing.

6 I mean I believe that, fundamentally, it should be
7 corrected, not just make it look better.

8 Finally -- this is the personal comment part. I'm
9 the one that's going to take the bait that Shelley Berkley
10 put out there earlier today.

11 Speaking personally as Abby Johnson, someone who
12 has been involved in this issue since 1983, she said a lot
13 of things in a politician's sort of way that I think are
14 very true, and all of the logical disconnects between what
15 we were told and what's happening to us, it's all true.

16 Every time I come to one of these technical
17 meetings, not just you guys, TRB, as well, as many times as
18 I attend these technical meetings where the flaws of Yucca
19 Mountain are discussed in-depth, if you excuse the pun, I
20 never fail to come away with what I call information
21 vertigo, and that is the clash of common sense with
22 technical justification.

23 I mean, as just a member of the public and
24 possibly a member of the public from back east, if you
25 transplanted them here and you had them sit in this room and

1 they heard that you were seriously talking about the risks
2 from volcanoes exploding and that it's okay, I think they'd
3 be horrified to hear that was happening in their state, and
4 I'm horrified, too, and I know how the game is played, but
5 it's a bad site, and no one has the guts to say it's a bad
6 site, and Congressman Berkley got around to that.

7 It's the emperor's new clothes, but no one says
8 it, because everybody is so into the system that no one
9 really kind of blows the whistle on it.

10 So, that's my personal opinion.

11 Thank you for listening.

12 DR. GARRICK: Thank you.

13 MS. JOHNSON: I feel a little better.

14 Does anybody have questions, like not on the
15 personal opinion, on the public involvement part.

16 DR. GARRICK: No, except we agree, the public
17 needs to be involved, and it's an issue we continue to push,
18 and we're learning as we go.

19 MS. JOHNSON: The affected units of local
20 government have had a very positive meeting with Chairman
21 Meserve, and we're hoping to have more meetings like that.

22 It appears to be a constructive process, and we
23 appreciate that.

24 DR. GARRICK: Milt, do you have a question?

25 MR. LEVENSON: Yeah, I have one comment.

1 You expressed a certain amount of frustration with
2 the difference between different facilities and different
3 licenses, and it was very modest compared to the frustration
4 some of us on the committee have from the same cause.

5 Maybe one of the things you could feed back to
6 your congressman is that a lot of this frustration arises
7 from Congress, that Yucca Mountain has a law that has
8 different requirements than licensing an interim facility,
9 and there isn't anything anybody at this committee or the
10 NRC or anything else can do when Congress gives us
11 conflicting things.

12 In this specific case, this is one.

13 MS. JOHNSON: There's one other thing I didn't
14 mention that I really would like to get on the record, and
15 that is that I have really, really tried to use NRC's
16 web-site, and it drives me nuts.

17 I can never find what I'm looking for, and I end
18 up taking staff time to call people who shouldn't have to
19 answer these little tiny questions of mine. I mean I'm
20 calling people who are making a lot of money an hour, and I
21 shouldn't be having to call them.

22 There should be a way so that I can be -- I can
23 easily find out, for example -- I can easily read the
24 Federal Register notice for when the comment deadline is on
25 the Goshute EIS and figure out if it's received by or if

1 it's postmarked.

2 I should be able to find out when meetings are.

3 It's a maze, it's a mess, and I can't figure out
4 how to use it, and I take up staff time calling when I could
5 get the information on the web, and I think it really,
6 really, really needs to be overhauled.

7 DR. GARRICK: We agree with that.

8 [Laughter.]

9 DR. GARRICK: All right.

10 We have a request for one more county
11 representative.

12 MS. SCHENKLE: Hi. I'm Judy Schenkle. I'm the
13 affected unit of local government representative.

14 Basically, I have a question that would be more or
15 less what our public feel, and as the DOE wants this design
16 to be flexible, new developments arise during various
17 studies on the safety of Yucca Mountain, and new questions
18 will arise -- for example, the degradation of the waste
19 package.

20 At the August Nuclear Waste Technical Review Board
21 meeting, an uncertainty about the corrosion of alloy C-22
22 arose.

23 How can a final waste package be developed if new
24 uncertainties arise?

25 How can the NRC approve a waste package design if

1 there is no final design?

2 This is only one example of new uncertainties that
3 question whether Yucca Mountain is suitable.

4 The DOE should have a final design to be reviewed
5 and tested before it's recommended as a site that is safe
6 and suitable as a repository.

7 Since I've been here, they have gone from a design
8 with no back-fill, hot to cooler design, no drip shields
9 until later, no final design in the waste package.

10 My question is, if I'm going to go out and buy a
11 vehicle, I want to make sure the product is there before I
12 can recommend that I'll buy it or not, and that's my basic
13 question.

14 DR. GARRICK: Does anybody want to answer it or
15 comment?

16 [No response.]

17 DR. GARRICK: The committee has also been
18 frustrated by the lack of stability in the design of the
19 waste package.

20 Thank you very much.

21 All right.

22 I think we're down to Dr. Jacob Powers. You'll
23 tell us a little bit about what you're up to?

24 DR. POWERS: My name is Dr. Jacob Powers, and very
25 briefly, history, I make in Israel atomic bombs and explode

1 them at the Nevada test site, as a background. I'm a
2 self-employed consultant.

3 My concern has been risen several times on the
4 issue of complex mixtures. I raised it up at the
5 environmental meeting reply to EIS and twice with NRC, and I
6 have here a dilemma which I'm going to open to the
7 scientific community to open for debate.

8 The EIS, which addressed risk assessment, is an
9 old model and, in my professional opinion, is inaccurate.
10 It does not take into account the issue of heavy metals
11 mixture and radio-nuclide mixtures.

12 The issue is far more complex. There are EPA
13 guidelines which has been issued in 1996, 1990, 1988, NAS,
14 National Academy of Sciences, and in 1997, there is a
15 presidential commission, congressional commission which
16 address the issue of complex mixture, and it's a matter of
17 concern and important, and the EPA, in 1999, is going to
18 issue revised guidelines.

19 The question is, is this going to apply to Yucca
20 Mountain?

21 We cannot ignore it.

22 Usually, what we have, we have a hazardous waste
23 site first, then we have all the chemicals and so on. Here
24 we have a different situation.

25 We have a situation which we're going to have

1 later on.

2 We create one of the most hazardous waste sites on
3 earth, because what's happened first, you're going to have
4 corrosion of the canister in the plume, and it will increase
5 the toxicity, carcinogenicity, and nobody has modeled it
6 yet.

7 There is very little information in the literature
8 with regard to combination of two or more radio-nuclides
9 and/or heavy metals.

10 I can just mention two Russian works, one which
11 they have irradiated cesium-137 and strontium-189 and they
12 find increasing rate of radio-nuclides. So, this bring to
13 the basic question, what is the mixture of radio-nuclides,
14 together can have an effect.

15 To the issue of synergistic effect, there is a
16 Russian work which took irradiated cell -- I'm sorry --
17 first was adding to cell, cutting with chloride, and then
18 irradiate them, and they have found an increase in formation
19 of free radicals, which suggested synergistic interaction.

20 Second, what they have done, the first irradiated
21 cell, then they cut in chloride, they found out that there
22 is a synergistic effect.

23 The issue for Yucca Mountain -- there are two.
24 One is the ground water pollution, and I was surprised not
25 to see on your agenda to be addressed this issue today,

1 because this is catastrophic event and must be addressed.

2 If you're going to look at EIS at Yucca Mountain
3 project, I am seeing the least scenario, and in between,
4 there is a very big question-mark.

5 With regard to transportation, potentially, in the
6 worst scenario is terrorism, and who knows, it can happen on
7 the waterway, it can happen on soil or air. The end result
8 is unknown.

9 Before I am concluded, there is one French work
10 from 1999. They investigated the effect in staining of
11 actinide. Their conclusion was the following, that
12 lactinide and iridium are highly toxic. The LC-50, which 50
13 percent of the cell was 10 to the minus 5, 10 to the minus 6
14 molar, and they concluded that the study of potential
15 chemical and irradiation interaction should be taken into
16 account.

17 What I'm calling, my approach, I proposed a
18 research to YMP to carry some initial, to address the issue,
19 unofficial. It is basic research. I don't think so,
20 because the model, the methodology already exists for about
21 12 years.

22 Second, it's the regulatory agency to set the
23 standard. My reply to this is that EPA, NRC must interact
24 together to answer this issue.

25 How are you going to address this issue, because

1 all the projection of cancer or toxicity is a very big
2 question-mark.

3 There is one model which exists called
4 physiological pharmokinetic models, and this should be
5 incorporated into the study of Yucca Mountain.

6 I would call again to EPA, NRC, really to look at
7 very closely, because this is a really serious issue from a
8 scientific point of view.

9 I don't want you to start with the politics of
10 science, because the politician would love my results if I'm
11 right.

12 What I'm calling is I'm making some recommendation
13 -- number one is to establish a joint between EPA, NRC,
14 Yucca Mountain, and the state, and maybe also academic, to
15 open this issue, because this is a very serious issue, and I
16 can provide some review of the literature.

17 Number three, have a symposium open to the public.
18 Address the issue of complex mixtures. If you're not going
19 to do it, then it's the politics.

20 What I have found is everybody say you apply this
21 grant, this grant here and there. If you're going to go in
22 licensing and you don't address this issue, this is one of
23 the first things which I go before the licensing board and I
24 will challenge, because there is enough scientific data to
25 support my position, and if I finish it, it may be a joke,

1 but you never know who will explode, and there will be a lot
2 of business.

3 So, please think in all the issues which I have
4 raised.

5 If somebody wants to get some more elaborate
6 information, I have a draft proposal which summarize some of
7 my thoughts. I'm willing to give it.

8 Thank you very much.

9 Do you have any questions?

10 DR. GARRICK: Thank you.

11 Milt, do you have any questions?

12 MR. LEVENSON: I have one question.

13 On the Russian work which you referenced which
14 demonstrated synergistic effects, under what conditions was
15 it done relative to, say, the doses that we're expecting out
16 at the edge where people will actually interact?

17 DR. POWERS: I don't read Russian, so I can't give
18 you complete information.

19 MR. LEVENSON: My question is if it was done at
20 radiation levels that are couple of orders of magnitude and
21 on chemical concentrations that are orders of magnitude
22 higher, then the question of relevancy comes up.

23 DR. POWERS: Okay. The relevancy comes out if
24 you're taking -- I can give you only partial answers.

25 I have done some work in the past, and I think,

1 when you're talking about 10 to the minus 4, 10 to the minus
2 5, you can see some interaction on heavy metals. The issue
3 has not been addressed.

4 The only one which I can address is to show some
5 effect, linearities at about 100 millicurie. I can give you
6 later on.

7 DR. GARRICK: Ray?

8 MR. WYMER: No, no questions.

9 DR. GARRICK: George?

10 I guess your point is the toxicity of toxic
11 mixtures.

12 DR. POWERS: Correct.

13 DR. GARRICK: Now, are you more concerned about
14 the chemical side of the toxicity than the radiation side?

15 DR. POWERS: I have concerned both. I cannot give
16 you, because there is insufficient information to give you.
17 I can give you just hypothesis.

18 If you take just hypothesis -- and I can cite this
19 Russian work -- if you're taking cadmium, which is an
20 important carcinogen, and it's 10 to the minus 4, and you
21 interact it with irradiation, and the same mechanism is
22 involved, formation of free radicals, as a target organ
23 injury, I say this is an example, because we don't have
24 information to answer these questions.

25 There's very little information in the literature,

1 and I think this is one of the first times it comes into
2 effect from the point of view of interaction.

3 DR. GARRICK: Is this a problem you've thought
4 about, Andy?

5 Any comments from the staff?

6 [No response.]

7 DR. GARRICK: Okay.

8 Well, thank you very much.

9 DR. POWERS: Thank you.

10 DR. GARRICK: Okay.

11 We have been asked to allow Mr. William Basconi to
12 make a few remarks.

13 We welcome you back.

14 MR. BASCONI: I assume the benefit of listening to
15 me is I'm the last one, right?

16 DR. GARRICK: No. You are only the last one to
17 asked to be listened to.

18 MR. BASCONI: Very good.

19 Well, I'm a 40-year resident of Nevada, originally
20 from Pennsylvania.

21 I worked 17 years at the Nevada test site as a
22 construction worker, radiation technician, and monitor.

23 I continue to be involved with the test site
24 through employee transition committees, historical
25 foundations, committee to reuse organizations, Nevada Test

1 Site Development Corporation, study committees, etcetera, on
2 preservation of the test site, bringing on new jobs,
3 utilizing the buildings, etcetera.

4 So, you've got the basic feel of why I'm standing
5 here.

6 I am a Nevadan. I love Nevada. I'm an
7 outdoorsman. I spend a lot of time in the hills.

8 Yet, I'm an American, and I just want you folks to
9 know there's a good many Nevadans that look at this in a
10 national issue.

11 The national issue and the respect that, yes, you
12 can talk spent fuel rods from 103 nuclear power houses, but
13 there's a good many of us know that we have nine aircraft
14 carriers, plus one under construction, that's nuclear, we've
15 got 65 submarines, plus five more under construction, that
16 are nuclear.

17 Those are national issues.

18 We've got 83 reactors in universities or medical
19 facilities. That's a national issue.

20 Nevada will say they have nothing nuclear, but
21 they utilize nuclear products.

22 A lot of the electricity that comes in over the
23 grid is from nuclear.

24 Cars from Japan -- they have 59 nuclear reactors.
25 Germany. Even Canada has 14.

1 A lot of the countries in the world have nuclear
2 reactors. There are some 400 of them. It's nuclear.

3 What it means to me is the waste on the nuclear
4 issue would cover a football field 15 foot high after 40
5 years.

6 You know, we move more dirt than that for any of
7 these hotels here in town. We move more dirt than that for
8 any one of these hotels here in town.

9 Nevada -- Nevada says it's not our problem. Well,
10 it might be those Nevadans that feel it's not their problem,
11 but they may well be the solution for problems, this
12 Nation's nuclear problems for many generations to come.

13 We hear terminologies like 10,000 years, the
14 canisters aren't going to maintain themselves. Well, I
15 think that terminology is ludicrous.

16 Ten thousand years? Ten thousand years, it's
17 going to be awful crowded here in southern Nevada, by the
18 time we have that ice age come down across Montreal and New
19 York City and New Jersey, 200-foot ice in New York City.
20 Where do you think them folks are going to move?

21 I'm not so concerned with whether there's going to
22 be grass growing in Amargosa Valley as I am that ice age
23 going to come down here and get all of us anyway, right?

24 What brings you back to 10,000 years -- I give our
25 educational system -- even here in our Nevada, I give our

1 educational system more credit, folks.

2 You're building that place with today's
3 technology, today's metals, today's brains. In 300 years,
4 that may well be a renewable energy resource.

5 You convince this old gray-haired man that oil --
6 I know you pay attention to oil -- you convince this old man
7 that oil and coal is going to be around in 300 years. I
8 doubt that very seriously.

9 Yucca Mountain, consolidation of spent fuel rods,
10 high-level waste -- there's a lot of Nevadans that think
11 it's doable, it's a viable solution.

12 There's a lot of Nevadans -- yes, they'll say,
13 hey, let's maximize ourselves on this, let's do what we can
14 to maximize the benefits to be derived from five decades of
15 nuclear expertise at the Nevada test site.

16 You know, we detonated 928 nuclear devices at the
17 test site. Twenty-four of them was for Great Britain. Nine
18 hundred and four were our own. A hundred of them were
19 atmospheric.

20 We're educated nuclear. We got it figured out.

21 We've got underground right now 904 repositories
22 at the Nevada test site, 904.

23 I was a meeting a while back here, and I said NTS,
24 and somebody says what does NTS mean? Another person in the
25 audience said new to smoking.

1 You ask folks what their concerns are here in Las
2 Vegas, Nevada. You know 50 percent of the people in Clark
3 County have been here less than 10 years? It's 1.3 million
4 people. Fifty percent have been here less than 10 years.

5 They're worried about crime. Crime? There's a
6 murder every other day. There's a rape every nine hours.
7 There's a car stolen every 40 minutes. They're worried
8 about crime. They're worried about water. They're worried
9 about schools. They're worried about jobs.

10 Yucca Mountain is way out there someplace, maybe
11 number 14.

12 You hear about saboteurs, going to saboteur these
13 hauling the high-level waste. Why would a saboteur want to
14 blow up a truckload of waste? Why not go right out here to
15 Nellis Air Force Base where we store 1,450 nuclear devices,
16 weapons guarded by America's finest, 18 and 20 years old,
17 that don't have those drip shield on those out there, by the
18 way? That's all public information, 1,450 nuclear devices
19 stored within a population of 1.3 million people.

20 I don't see the state getting up in arms about it.
21 I don't see somebody saying how did you transport them here,
22 how do you transport them out?

23 Realistically, Yucca Mountain, consolidation of
24 spent fuel rods, yeah, there's a good many Nevadans that say
25 they're all for our country, and that is our state motto.

1 We're all for our country. We know we utilize nuclear
2 products.

3 Yes, the NRC, the EPA, DOE -- you're a bunch of
4 Feds. That's how some folks look at you. We do look to the
5 technical review boards. We do look at the National Academy
6 of Sciences.

7 You guys have got your work cut out for you,
8 because a lot of us good old boys come out of the woodwork
9 and we try to read some of these reports. We can't. We can
10 come down here and ask you questions.

11 We want you to know we believe in you. We believe
12 in what you're doing.

13 We also know that the emergency response, the
14 health and safety of the residents of Nevada is paramount to
15 us.

16 Now, you may not think much of the community up
17 the road here that's got about 8,000 people in the size of
18 the State of Virginia, but that nuclear waste is going to
19 come right through their community where 80 percent of the
20 people live.

21 You might not be concerned about the ranchers up
22 north that say we want transition of Federal lands. Do you
23 realize that Nevada -- the only state that has more Federal
24 lands than Nevada is Alaska? Don't say Texas. They were a
25 country for about six, eight years.

1 Eighty-six percent of Nevada is Federal land.
2 What's wrong with transition of Federal rights to the State
3 of Nevada? What's wrong with water rights? What's wrong
4 with a Superfund, a stewardship trust fund? Never been
5 offered to us.

6 Grants can be taken out by the state or the
7 counties to improve their infrastructure, their school
8 systems, their roads, etcetera. What's wrong with the fact
9 that maybe a railroad system through the center of the state
10 is not the best answer, because after the nuclear waste is
11 hauled, we can open up the centralized part of Nevada for
12 economic development and issues. What's wrong with that?

13 I know I'm carrying on, because I get started on
14 this, and away I go.

15 There's nothing wrong with that.

16 Emergency response initiatives, transportation
17 initiatives -- this is what the folks out in the woods want
18 to talk about. This what your rural community wants to talk
19 about.

20 I'm not paid to stand up here. Some folks are
21 paid to stand up here. Hell, Nevada is so damn important
22 they hire unemployed Russian scientists to make a statement
23 so it sounds good. I can't go along with that either. I
24 think there's people in this country that could take care of
25 it.

1 But I want you to know there are folks that's
2 leaning your way, that we want to get it done, we want to do
3 it right, because we will be your worst enemy if it's wrong.

4 So, get out back in the rural counties, educate
5 us, give us a little credit for being about half smart, and
6 let's get it done.

7 We got the mountain, we got the management, and we
8 got the men to do it right. Let's get on with the project
9 for the United States of America.

10 DR. GARRICK: Thank you.

11 Any comments?

12 MR. BASCONI: Comments, questions.

13 MR. LEVENSON: Let me just comment that I want to
14 thank you for your faith in the integrity of the committee,
15 as evidenced by the fact that you left your wallet on the
16 table here.

17 [Laughter.]

18 MR. BASCONI: Well, that's perception.

19 [Laughter.]

20 MR. BASCONI: That was glasses and a black book.

21 [Laughter.]

22 DR. GARRICK: I think that's the end of the list,
23 unless there's somebody else who would like to add to the
24 commentary of the afternoon, which has been very interesting
25 and will be valuable, as it has been in the past, valuable

1 source material for our deliberations and report
2 preparation. This is the highlight, as I said, of our trip
3 west.

4 [No response.]

5 DR. GARRICK: All right, then.

6 I think what I'd like to do is call a recess, and
7 when we come back, we're not going to be on record. We have
8 completed all of our briefings and presentations. The
9 balance of the day is going to be in committee work having
10 to do with studying -- considering our priorities and
11 examining our action plan and the progress we've made and so
12 on and so forth.

13 So, I think we'll take a 15-minute break, so that
14 the recorder can do what she has to do.

15 [Whereupon, at 4:15 p.m., the meeting was
16 concluded.]

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REPORTER'S CERTIFICATE

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

NAME OF PROCEEDING: MEETING: 121ST ADVISORY COMMITTEE
ON NUCLEAR WASTE (ACNW)

CASE NUMBER:

PLACE OF PROCEEDING: Rockville, MD

were held as herein appears, and that this is the original
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Audrey Johnson

Official Reporter

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