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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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142ND MEETING

ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

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THURSDAY, MAY 29, 2003

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ROCKVILLE, MARYLAND

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The Advisory Committee met at 8:30 a.m. at
the Nuclear Regulatory Commission, Two White Flint
North, Room T2B4, 11545 Rockville Pike, Dr. GEORGE M.
HORNBERGER, Chairman, presiding.

COMMITTEE MEMBERS:

GEORGE M. HORNBERGER

Chairman

B. JOHN GARRICK

Vice-Chairman

NEIL COLEMAN

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Member

MILTON LEVENSON

Member

MICHAEL T. RYAN

Member

ACNW STAFF PRESENT :

JOHN T. LARKINS

Executive Director, ACRS/ACNW

SHER BAHADUR

Associate Director, ACRS/ACNW

HOWARD J. LARSON

Special Assistant, ACRS/ACNW

TIMOTHY KOBETZ

ACRS/ACNW Staff

MICHAEL LEE ACNW Staff

RICHARD MAJOR Designated Federal Official;

ACNW Staff

RICHARD SAVIO ACRS/ACNW Staff

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ALSO PRESENT:

JEFFREY A. CIOCCO

NRC Staff

JOHN GREEVES

NRC Staff

TIM McCARTIN NRC Staff

P-R-O-C-E-E-D-I-N-G-S

(8:33 a.m.)

CHAIRMAN HORNBERGER: The meeting will come to order. This is the 142nd meeting of the Advisory Committee on Nuclear Waste. My name is George Hornberger, Chairman of the ACNW. The other members of the Committee present are: John Garrick, Vice-Chairman; Milton Levenson; and Michael Ryan.

Today the Committee will: (1) hear presentations and hold discussions with representatives of the NRC staff on the changes incorporated in the draft final Yucca Mountain review plan, Revision 2; (2) discuss the results of the Committee's 2003-2004 ACNW research report; (3) prepare ACNW reports on recent Committee reviews.

Richard Major is the designated federal official for today's initial session. This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's sessions. Should anyone wish to address the Committee, please make your wishes known to one of the Committee staff.

It is requested that the speakers use one

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1 of the microphones, identify themselves, and speak
2 with sufficient clarity and volume so that they can be
3 readily heard.

4 So let's see. Our agenda for the day says
5 that we are going to hear about the Yucca Mountain
6 review plan, YMRP, Revision 2. And I think that Jeff
7 Ciocco is going to be here. There he is. Jeff?

8 MR. CIOCCO: Yes. Good morning. My name
9 is Jeff Ciocco with the Office of Nuclear Materials
10 Safety and Safeguards. Thanks for having me back. I
11 guess it's been since last September. It is always
12 good to be back, particularly since we are here to say
13 that we incorporated all of your comments on the Yucca
14 Mountain review plan.

15 Let's go to page 2 of the handout. That
16 is the outline for this morning's presentation. We
17 are going to talk about the chronology of the Yucca
18 Mountain review plan development. I will go through
19 the changes to the review plan in response to your
20 comments. I will go through a summary of other
21 changes to the Yucca Mountain review plan. And then
22 I will discuss the path forward for the Yucca Mountain
23 review plan development.

24 Page 3 is the chronology of the Yucca
25 Mountain review plan. As you know, on March 29th last

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1 year, we issued draft revision 2 for public comment.
2 On August 12th of last year, in 2002, the extended
3 public comment period ended. And throughout the
4 public comment period, we did conduct public meetings
5 in Las Vegas and surrounding areas.

6 On September 25th of last year, we
7 presented a summary of approximately the 1,000 public
8 comments that we received to you in Las Vegas. And in
9 March 12th of this year, the Yucca Mountain review
10 plan as well as the response to the public comments
11 was submitted to the commissioners for review and
12 approval.

13 On March 24th this year, we issued an
14 information-only version. It's a draft final revision
15 2, which was publicly released, put on the Web site,
16 as well as the press release. And that's the document
17 here. I think all of the members have it. It's got
18 a footnote on it saying that "The Commission is
19 releasing the draft final revision 2. It has not yet
20 received Commission approval. It's subject to change
21 and is not for public comment. The NRC staff expects
22 to issue a final revision 2 of the Yucca Mountain
23 review plan later this year."

24 So that is kind of an introduction. As we
25 go through these responses to comments, we have to

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1 keep in mind that it is still under consideration by
2 the commissioners and under their review right now.

3 On page 4 is the comments from the ACNW.
4 You provided four comments. And they were in the form
5 of observations and recommendations. I've kind of
6 summarized them and grouped them as comments to the
7 commissioners on August 2nd of 2002.

8 These comments received the immediate
9 attention of the NRC staff. And on September 18th
10 last year, we provided the ACNW our response to those
11 comments, knowing that at that time we agreed with the
12 comments, but we hadn't really developed our complete
13 response yet. That's what happened between September
14 last year and March of this year.

15 So let's get into it on page 5. Let's get
16 into the specific ACNW comments. And I'll go through
17 the responses as well. The first ACNW comment is that
18 the review plan is very repetitive. Although this
19 repetitiveness supports uniform reviews, it adds to
20 the length and complexity of the review plan.

21 Finally, you suggested that tables,
22 charts, graphics could be used to communicate the
23 completeness and improve the understanding of the
24 Yucca Mountain review plan.

25 Our response to that is we certainly agree

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1 that the review plan is certainly lengthy and
2 sometimes redundant. Our goal was to provide staff
3 reviewers with sufficient information to conduct the
4 reviews in very discrete areas. So a lot of that
5 redundancy still remains.

6 We have talked to the staff. And they
7 felt that it was very important. They had experience
8 on the Yucca Mountain review plan. They were writing
9 the integrated issue resolution status report. So a
10 lot of that still remains. We felt that it was very
11 important.

12 We did add two figures to the new Appendix
13 A. I am going to go through both of these. The first
14 is a figure on the licensing process, and the second
15 is a hypothetical review of a typical license
16 application section. We added the text, a narrative,
17 to really explain these two. And I'm going to go
18 through those now.

19 This is the licensing process figure. So
20 let's start here where the U.S. Department of Energy
21 submits its license application that the staff would
22 treat the application as tendered and begin an
23 acceptance review of the application to determine if
24 it is sufficiently complete to begin a detailed
25 technical review.

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1 The staff could reach different
2 conclusions at this point in time as a result of this
3 acceptance review. The application could be
4 determined to be substantially incomplete, in which
5 case it would be rejected and returned to the U.S.
6 Department of Energy with an identification of these
7 deficiencies.

8 And, really, this box should be a triangle
9 because this is a decision point. I think there is
10 actually another block I need to add, and that's in
11 this case, that if there is a complete rejection of
12 the application because it is substantially incomplete
13 or if the staff defined that the license application
14 is sufficiently complete and a detailed technical
15 review could begin down here but additional
16 information is needed in limited areas. That kind of
17 gets you into this loop here.

18 In this case, the staff would docket the
19 application, proceeded with the detailed technical
20 review in other areas, and prepared the request for
21 additional information in areas that are insufficient.

22 The staff could determine that the license
23 application is complete in all respects. In this
24 case, the application would be docketed according to
25 10 CFR Part 2. And a detailed technical review would

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1 begin.

2 Moving on now, if the tendered license
3 application is found to be acceptable for docketing,
4 the staff would begin its detailed technical review
5 using the review methods and acceptance criteria of
6 the Yucca Mountain review plan.

7 If this review identifies areas where
8 additional information is needed, -- once again, this
9 is another decision point -- the staff would prepare
10 a request for additional information and transmit them
11 to the U.S. Department of Energy.

12 The failure of the Department of Energy to
13 provide the request for additional information within
14 a specified period of time could result in a notice of
15 denial of the application pursuant to Part 2.108.

16 If the staff receives the requested
17 information in a timely basis, the staff will continue
18 its detailed technical review leading up to the
19 publishing of the safety evaluation report.

20 The staff conclusions and evaluation
21 findings on the license application would be
22 documented and the safety evaluation report issued on
23 the application. This provides the basis for the
24 staff recommendation as to whether a construction
25 authorization or license should be granted and would

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1 identify any license conditions or license
2 specifications required to ensure regulatory
3 compliance.

4 At this point, the safety evaluation
5 report will be made publicly available. And we're
6 also required to put it up on the licensing support
7 network at that time that it is published.

8 At that time, after that, staff would
9 participate in any hearings held and in ruling on
10 contentions admitted in a proceeding regarding the
11 issuance of a construction authorization, the Atomic
12 Safety and Licensing Board would consider evidence
13 admitted in the proceeding, including the staff's
14 safety evaluation report, and then issue an initial
15 decision before a Commission review and decision.

16 So we added this as the general licensing
17 process. So now we're going to burrow in a little bit
18 deeper. We added this to kind of explain. This is a
19 hypothetical review of a typical license application
20 section.

21 In response to your second comment that we
22 add an example, we are going to take this down into
23 even further detail.

24 VICE-CHAIRMAN GARRICK: Jeff, I agree with
25 your comment earlier that if you change the shape of

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1 some of these blocks, some of the typical logic
2 shapes, such as a diamond for decisions and what have
3 you, that it would improve it a little.

4 Is there any chance that on the critical
5 blocks, you could indicate a range of time that is
6 involved in order to telegraph the fact that some of
7 these boxes happen, take hours, and some of them take
8 months?

9 MR. CIOCCO: Certainly, yes, yes. And
10 that's a good point. For instance, the acceptance
11 review is a 90-day --

12 VICE-CHAIRMAN GARRICK: And you could do
13 it in the --

14 MR. CIOCCO: Yes, yes.

15 VICE-CHAIRMAN GARRICK: So it wouldn't box
16 you in. But you've got a constraint. You've got,
17 what, three years to do this job.

18 MR. CIOCCO: Yes. Actually 18 months to
19 get to the staff's safety evaluation report and then
20 3 years with an optional fourth year to get to the
21 final decision.

22 VICE-CHAIRMAN GARRICK: Yes. Okay.

23 MR. BAHADUR: Jeff, in this licensing
24 process, where do you anticipate the review from the
25 Advisory Committee? At what stage? In which

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1 particular time frame would you be --

2 MR. CIOCCO: The ACNW?

3 MR. BAHADUR: Yes.

4 MR. CIOCCO: You know, I really don't know
5 what your plans are and the details of your
6 involvement in the licensing review. I mean, I have
7 heard that discussion at the ACNW would be involved
8 somehow in the license application process review.
9 What we are really following here, the Part 63 and the
10 Nuclear Waste Policy Act requirements for conducting
11 a licensing review and Part 2, Subpart J.

12 I guess I would have to know a little more
13 about what your plans are to really say where you're
14 -- I mean, we know that this review, the acceptance
15 review, is to see if there is enough detailed
16 information to conduct if we can docket a tendered
17 application.

18 We know this review down here is our
19 detailed technical review, getting into each section
20 of Part 63, 21. And, as Dr. Garrick said, we know the
21 time frames of each of these. So, really, I mean,
22 whether you get into a review at the level of the
23 acceptance review or the detailed technical review,
24 those are the 2 opportunities along an 18-month time
25 frame.

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1 EXECUTIVE DIRECTOR LARKINS: I think
2 ordinarily it would be after you have prepared your
3 safety eval. If we use the same model that we use for
4 the other committee, it would be after you prepare
5 your draft safety evaluation report basically.

6 I had another question, though.

7 CHAIRMAN HORNBERGER: Before we leave that
8 point, I would like to just follow up a little bit,
9 Jeff. I know the Chair is trying to pin you down to
10 something you don't want to be pinned down to, but
11 John just suggested that we are way out on the right
12 side of the second line there. My question is, do you
13 see any --

14 MR. CIOCCO: This line?

15 CHAIRMAN HORNBERGER: No. I'm sorry.
16 Down to where the SER is. John just said that maybe
17 we would get involved after you had proposed a draft
18 SER. Back here where you're requiring or requesting
19 more information and doing the additional technical
20 review, it strikes me that the ACNW might have an
21 important role working with you to look at material
22 being provided by the Department of Energy, as we have
23 throughout the whole procedure. And at the risk of
24 putting words in your mouth, do you agree with me?

25 MR. CIOCCO: I think you're right. I

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1 certainly don't want to be pinned down in your
2 licensing review. There are going to be points where
3 staff is going to prepare if there are, assuming that
4 there are, requests for additional information --
5 maybe there isn't. Maybe all of the agreements are
6 successful. And maybe this moves on.

7 MR. GREEVES: John Greeves, NRC.

8 I don't think these are questions for Jeff
9 to answer. I think today's presentation is pretty
10 much an opportunity for staff to give you an idea of
11 what the boundary conditions on the staff review are.

12 I think it would be quite fruitful for us
13 to get together separately and talk about the
14 questions you are asking Jeff. I don't think Jeff is
15 the right person to be answering these questions. So
16 I would be happy to schedule a time to talk to you.

17 I think what John said is typically an
18 expectation once the safety evaluation is put forward.
19 That's a logical entry port. That is not to say we
20 don't do something else in front of it. I mean, we
21 have a pattern in this program where you look at
22 targeted issues and we come and brief you on targeted
23 issues.

24 I don't want to do a lot of it right now
25 but I would expect that kind of a pattern. There is

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1 a huge number of issues associated with this topic.

2 How much of the pre-closure surface
3 facilities does it make sense for you to buy into and
4 investigate? Which of the post-closure issues do you
5 want to put your energy on?

6 I think that's a good topic for a future
7 meeting and how to do it over time because what Jeff
8 I think is presenting is kind of the boundary
9 conditions. We need to complete this review in the
10 18-month time frame.

11 And somewhere during that process, we need
12 to be smart about how we interact with you. And I
13 would enjoy a separate session on it. Does that make
14 sense?

15 VICE-CHAIRMAN GARRICK: Yes. Thanks very
16 much, John. In fact, we knew that Jeff wasn't the
17 right person to ask, but that hardly ever stops us.
18 Actually, you did answer my question. So thank you.

19 CHAIRMAN HORNBERGER: Yes. And I think
20 this kind of road map you have here, maybe an expanded
21 view of it, would be an excellent template for us to
22 examine with respect to our role. We are wrestling
23 right now with what our role should be. And so I
24 think this could contribute to that effort.

25 MR. CIOCCO: Very good.

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1 MEMBER LEVENSON: Especially once there
2 are times on it because that gives us some knowledge
3 as to where there might be time for us to get involved
4 without interfering with your schedules. I think
5 adding the times is an important --

6 MR. CIOCCO: Very good. Yes. I took that
7 as a --

8 VICE-CHAIRMAN GARRICK: Back to your
9 question, John.

10 MR. CIOCCO: Yes.

11 EXECUTIVE DIRECTOR LARKINS: See if it's
12 appropriate or not. Often in licensing, you have open
13 items which don't get closed right away, but the
14 licensing process continues. If you consider the
15 situation where you may have open items and will --

16 MR. CIOCCO: Yes. It's actually --

17 EXECUTIVE DIRECTOR LARKINS: -- pick those
18 up later on in the process?

19 MR. CIOCCO: Yes. Actually, right now I
20 think it's in Appendix B now, in the acceptance
21 review, where there could be open items and not to
22 confuse them with the open items that we have in the
23 pre-licensing stage. Yes, it's been identified.

24 EXECUTIVE DIRECTOR LARKINS: So you can
25 actually move forward and still have them?

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1 MR. CIOCCO: And still have the open
2 items, yes, as in other licensing actions.

3 Okay. Let's go through the hypothetical
4 review of license applications. The first block here
5 -- so now we're getting into some of the details here.

6 First, the project manager would examine
7 the nature of a specific section of the license
8 application and identify the staff and contractor
9 disciplines needed to conduct the review. Once
10 assigned, this team would study the associated Yucca
11 Mountain review plan section, applicable regulatory
12 areas of requirements, and other relevant technical
13 background information.

14 We all know that the Yucca Mountain review
15 plan will not be used in isolation. No standard
16 review plan is. So at this point, we would expect our
17 staff to look at the integrated issue resolution
18 status reports, other issue resolution status reports.
19 So that is going to happen before the team.

20 At this point the team members will
21 conduct a detailed technical review of the specific
22 section of the application using the review methods
23 and acceptance criteria of the Yucca Mountain review
24 plan.

25 If the reviewers find that the approach

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1 used in the application is not consistent with review
2 methods in the Yucca Mountain review plan -- and this
3 is a possibility because the applicant does not have
4 to follow -- this is a staff guidance document. They
5 do not have to follow the Yucca Mountain review plan.

6 So if this happens, the staff would be
7 directed to notify the project manager and then
8 establish applicable review methods and acceptance
9 criteria appropriate for material in that section of
10 the application. This is important because of the
11 potential that the review schedule might be affected
12 by this, which is certainly one of the reasons why
13 we're getting out the Yucca Mountain review plan early
14 enough so the potential applicant can look at this as
15 a format and guide for the application.

16 Coming down here now, as the review team
17 reviews the section of the application using the
18 review methods in the plan, they would compare the
19 review results with the acceptance criteria in the
20 Yucca Mountain review plan.

21 At this stage, the reviewers may discover
22 that insufficient information has been provided in the
23 application to support the conclusions as to whether
24 acceptance criteria have been met.

25 So once again we come back down here. If

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1 the information is needed, the reviewer would inform
2 the project manager and prepare a request for
3 information to be sent to the U.S. Department of
4 Energy.

5 If the U.S. Department of Energy responds
6 adequately to any requests for information, the
7 reviewers would prepare the safety evaluation report.
8 And now we're getting back to the conclusion of the
9 other slide, where the applicable safety evaluation
10 report section is issued.

11 So this one just gets down into a little
12 bit more detail where the project manager is actually
13 getting together the appropriate staff, NRC staff and
14 contractors, with the appropriate disciplines. So
15 those are the two figures we added in response to your
16 comments to really aid the reviewers and others in
17 using the Yucca Mountain review plan.

18 Okay. The second ACNW comment --

19 MEMBER LEVENSON: Jeff?

20 MR. CIOCCO: Yes?

21 MEMBER LEVENSON: From your last slide --

22 I know you're not the right person to make the comment
23 to, but you're standing there.

24 MR. CIOCCO: Yes, sir.

25 MEMBER LEVENSON: Maybe an appropriate

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1 place for us to get involved is not when the final SER
2 is issued. That is kind of late. But what might be
3 an appropriate time is as soon as each section is
4 finished. It might be an appropriate time. I just
5 throw that out.

6 MR. CIOCCO: Okay. The second ACNW
7 comment that the review plan reflects the risk
8 perspectives of Part 63 and allows the applicant the
9 flexibility in demonstrating compliance; however, the
10 manner in which the review plan is applied will
11 determine whether a risk-informed performance-based
12 process is really used in a licensing decision.

13 A review example of a specific issue would
14 help reviewers and the applicant understand how the
15 review plan would be used. The example should
16 illustrate how data items, such as data sufficiency
17 and model adequacy, are determined at the detail
18 level. So that was your comment.

19 The staff response, staff agrees. A
20 review example and documentation of these results has
21 been incorporated into Appendix A of the Yucca
22 Mountain review plan. Appendix A is what was formerly
23 Chapter 1, which was the introduction. I will explain
24 that a little bit later.

25 For this example, -- and it is a

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1 hypothetical example; I want to emphasize
2 hypothetical, and I will explain why -- what we did is
3 we used a radionuclide transporter to saturate a model
4 abstraction. And we applied review method 3 and
5 acceptance criteria 3 for this example.

6 This acceptance criteria is saturated that
7 uncertainty characterized and propagated through the
8 model abstraction on matrix diffusion. This model
9 abstraction addresses the features and processes that
10 would affect movement of radionuclides in the
11 saturated zone from the area beneath the repository
12 site to the proposed 18-kilometer compliance boundary.

13 So what is in the example? First, it
14 describes the integration with other model
15 abstractions. Those other abstractions, which are
16 described in this example, kind of safety evaluation
17 review, includes radionuclide transport through porous
18 rock, radionuclide transport through the alluvium,
19 radionuclide transport through fractured rock, nuclear
20 criticality in the far field. And the list goes on.

21 There are a lot of areas related to this
22 that are very important. Unsaturated and saturated
23 flow, fracturing and structural framework of the
24 geologic setting, et cetera, as well as total systems
25 of performance assessments.

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1 And then after we describe the integration
2 with the other model abstractions, -- and this is what
3 I think really captures the flavor of the
4 risk-informed review. There's a section called
5 "Importance to Post-Closure Performance." And it's
6 really another bullet, which will go right in here.

7 What this does, this explains the
8 risk-informed review and really how the model
9 abstraction relates to the U.S. Department of Energy's
10 demonstration of compliance.

11 I want to go through and explain some of
12 these areas for this particular hypothetical example.
13 It goes through and explains that the DOE identifies
14 radionuclide delay through the saturated zone as a
15 principal factor in this current post-closure safety
16 case.

17 And the degree of radionuclide absorption
18 on the mineral surfaces within the rock matrix is the
19 most important process affecting the ability of the
20 saturated zone to act as a natural barrier. They also
21 go through and describe how matrix diffusion is
22 another important process.

23 After that, this evaluation of this
24 hypothetical example goes through a sort of barrier
25 analysis. Okay? So even though we're getting into a

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1 model abstraction, it all begins in the risk-informed
2 review of your barrier analysis.

3 So in this example, we'll go through an
4 analysis of what DOE provides. This is DOE's safety
5 case that we're evaluating. And DOE investigated the
6 importance of the saturated zone transport through --
7 they did a robustness and neutralization analysis
8 where they went through.

9 What they came up with is that the model
10 unsaturated zone barrier in this case is slightly more
11 important than the saturated zone transport case.
12 Nevertheless, the importance of this example because
13 of its status as a principal factor in DOE's safety
14 case gave this example a certain importance.

15 Furthermore, independent NRC staff
16 performance assessment sensitivity analysis concluded
17 that retardation in the saturated zone is important
18 based on much higher model doses than result from its
19 removal from the analysis.

20 VICE-CHAIRMAN GARRICK: Jeff?

21 MR. CIOCCO: Yes?

22 VICE-CHAIRMAN GARRICK: In the conduct of
23 the example, did you learn anything that resulted in
24 your going back into the Yucca Mountain review plan
25 and making some changes in it?

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1 Sometimes when you get down to details,
2 you have visibility into the effectiveness of a
3 strategy or review plan that you wouldn't otherwise
4 have. And I was just curious if there was any
5 feedback from this exercise.

6 MR. CIOCCO: I think that feedback
7 occurred before the example was written because this
8 example, the real basis for this example is in the
9 integrated issue resolution status report. So staff
10 has been applying the acceptance criteria and review
11 methods from the review plan for about the past three
12 years now.

13 So there has been a lot of positive
14 feedback in revising the review methods and revising
15 the acceptance criteria as a basis for these examples.

16 VICE-CHAIRMAN GARRICK: Yes. Well, that
17 was going to be --

18 MR. CIOCCO: So I think the answer is yes.
19 There has been a lot of good feedback. And that is
20 why the staff in its pre-licensing activity started
21 using the review plan a couple of years ago, even
22 before the integrated issue resolution status report.

23 Each individual KTI started applying these
24 review methods. And staff came to us continually --
25 and they still do -- and say, "We need to add risk

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1 dilution here. Do we have enough uncertainty in this
2 area? Do we explain uncertainty enough?" So there
3 has been a very positive feedback.

4 VICE-CHAIRMAN GARRICK: That was going to
5 be my next question, then, and you have answered that.
6 And that is, what was the magnitude of the effort in
7 developing this example?

8 MR. CIOCCO: It has really been a process
9 over about three years. Keep in mind one thing I
10 didn't say, in the ACNW comment observation, when you
11 asked us to go through this abbreviated example, you
12 asked us to include an analysis of the DOE agreements
13 that we have with the NRC.

14 And we couldn't do that because in order
15 to do this example, you have to look at it. We looked
16 at it from the standpoint that the information asked
17 for in the agreements has already been provided. So
18 now we are doing our hypothetical review.

19 If we would have left the agreements in
20 there, there are no findings of evaluation at that
21 point. So we kind of took the agreements out. We
22 said, "Okay. The information has been provided.
23 Let's do an analysis of that information."

24 I know we had talked about that before.
25 It just really didn't seem appropriate to leave those

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1 agreements in there because if you read the integrated
2 issue resolution status report, one of the conclusions
3 is -- and there are no findings of evaluation, but
4 after a review of the agreements, we feel that staff
5 will have enough information if the information is
6 provided to conduct a detailed technical review.

7 Okay. So let me go on, then. I just went
8 through. We know that NRC staff said based on our own
9 analysis that this is important. Then we summarized
10 all the different radionuclide transport processes and
11 technical bases for this.

12 In the technical basis of this example, we
13 go through the uncertainty, an explanation of the
14 uncertainty, in DOE's analysis for matrix diffusion,
15 the effect of diffusing coefficients, flow interval
16 spacing, and radionuclide transport in saturated zone,
17 et cetera, and really kind of lay the technical basis
18 before we get into -- next here is what the staff
19 reviewed and technical conclusions regarding all of
20 these different technical areas.

21 What the staff reviewed for this example,
22 for this hypothetical example, it dates back to the
23 mid 1990s, whenever the first performance assessments
24 and model abstractions and detailed process models
25 started coming off from DOE, all the way up through --

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1 in this example, the issue resolution report came out
2 in April of last year. So this includes process model
3 reports from the viability assessment I guess probably
4 up through the site recommendation performance
5 assessments.

6 And then it goes through what the
7 technical conclusions regarding each of these
8 different areas are. I am going to go through some of
9 these and let you know where the staff came up.

10 Once again, this is just a hypothetical
11 assuming that the information came in from the
12 agreements. But in regard to the sorption
13 coefficients, it goes through an explanation of the
14 laboratory work and literature research regarding the
15 sorption coefficients, the different kD values.

16 And the staff concluded in this area that
17 without the underlying basis for the expert judgments
18 because a lot of the kD values came from the expert
19 solicitations, that the radionuclide transport in the
20 saturated zone does not provide sufficient treatment
21 of data uncertainty. So that is what staff concluded
22 regarding the sorption coefficients.

23 If we look at the next one, groundwater
24 chemistry, this kind of provides the basis for the kD
25 uncertainty ranges. In this case, experiments are not

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1 considered to be influenced by microbial and
2 precipitation dissolution processes. And the effects
3 are not included. So, once again, this was kind of a
4 negative conclusion in that area.

5 Let me go through. Let's go down to
6 complexation in the geosphere. This also talks about
7 the distribution of kD values. Parameter
8 distributions in the current DOE process models do not
9 appear to address adequately the effect of organic
10 complexation on transport parameters, the same thing
11 for the microbial activity in the geosphere.

12 Fault zones. DOE has not adequately
13 accounted for the possible effects of the differences
14 in the different fault pathways in formulating its
15 transport parameter for distributions and so on and so
16 forth.

17 So we go through all of those examples,
18 staff analysis, including work done at the center in
19 San Antonio as well as the staff here, in evaluating
20 each of these parameters. And then we get into the
21 evaluation findings for each applicable regulatory --

22 CHAIRMAN HORNBERGER: Can I interrupt you
23 for just a second?

24 MR. CIOCCO: Yes?

25 CHAIRMAN HORNBERGER: So this example that

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1 you're going through is to show how the risk
2 information is brought into the review. And I just
3 wanted to make sure.

4 MR. CIOCCO: It shows, right.

5 CHAIRMAN HORNBERGER: If I take your
6 example on the previous slide or we could use one of
7 the ones, microbial activity in terms of precipitation
8 dissolution is not adequately accounted for. That
9 finding would be based on the fact that neglect of
10 this process really was important.

11 MR. CIOCCO: Yes. These are parameters
12 that were deemed important by the DOE and by the NRC
13 in this kind of hypothetical example. So we know this
14 model abstraction is important because all of these
15 abstractions have resulted from doing performance
16 assessments over the past I don't know, however many
17 years Tim has been doing them and the NRC and the
18 center. So we know that the saturated zone transport
19 is important.

20 I mean, you have to look at the
21 conclusions of each of these as to how it affects the
22 regulatory requirements in Part 63 before each
23 performance assessment.

24 CHAIRMAN HORNBERGER: Right. I guess what
25 I am trying to understand more fully is the concern

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1 that I would have as a total novice in terms of even
2 considering such a review is that one can always point
3 to these kinds of processes, colloidal transport, as
4 saying there is more research that needs to be done
5 because we don't understand the process fully. And
6 that is not your intent, right?

7 MR. CIOCCO: No, no, no, absolutely not.
8 We are talking about data uncertainty, ranges of
9 parameters, ranges of parameters. Are these ranges
10 reasonable? Is there a basis for the range?

11 And certainly in a real licensing review
12 process, we had the agreements in place to try to get
13 the information that we and the DOE think are
14 important. That is under evaluation. Staff is coming
15 down next month I think to talk to you about the risk
16 insights program as well.

17 Certainly before you get to this point of
18 drawing this kind of conclusion, that whole process
19 that we showed earlier, there are all of these
20 gyrations, you know, requests for additional
21 information isn't as important as the information
22 important that we're asking for. This is just a
23 hypothetical example assuming that we got some
24 information on the agreement, the staff reached a
25 conclusion.

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1 So, finally, we get down to our evaluation
2 of findings. What shows here comes from 63.114, which
3 are the regulatory requirements for the performance
4 assessment. And it goes through all of the different
5 sections.

6 MR. McCARTIN: Jeff?

7 MR. CIOCCO: Yes? Go ahead, Tim.

8 MR. McCARTIN: Tim McCartin, NRC.

9 One quick thing. As you are aware, the
10 review plan has all the potential things that we could
11 be reviewing. And some of those examples are things
12 that we would expect DOE to consider.

13 And then the risk part, colloidal
14 transport, is a good one. You have got to consider
15 it. Depending on how it then looks to potentially
16 affect in a significant way, then our review would go
17 deeper in those areas. But first you have got to at
18 least consider it.

19 And so some of those could be more cursory
20 reviews. Others will go into far greater detail
21 depending on their impact.

22 EXECUTIVE DIRECTOR LARKINS: Quick
23 question.

24 MR. CIOCCO: Yes?

25 EXECUTIVE DIRECTOR LARKINS: In your

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1 hypothetical example, you talk about the sorption
2 coefficients and lack of adequate documentation about
3 how the values are reached based on expert judgment.
4 I guess the expectation there is that there is
5 guidance out as to how to do the expert judgment. If
6 they don't follow that particular guidance --

7 MR. CIOCCO: Absolutely. It cites a NUREG
8 that the NRC staff wrote for the --

9 EXECUTIVE DIRECTOR LARKINS: So the
10 guidance is already out there. It's a matter of
11 seeing how it's used in --

12 MR. CIOCCO: Of applying that, yes. And
13 that's kind of what I was saying earlier, that the
14 YMRP doesn't really stand in isolation. We have these
15 other guiding documents, which really help with the
16 staff review and evaluation. Okay?

17 So that concludes the example that we
18 included back in Appendix A. I thought it was very
19 helpful. The third ACNW comment, third of four, is
20 that the level of detail associated with review of
21 specific subject areas will be determined by the
22 importance of the subject to repository safety.

23 The scope of the review will also be
24 determined, in part, by staff risk, insights, and
25 analysis. The staff should continue to build its own

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1 risk insights about important contributors to risk as
2 a proposed repository. The staff should ensure that
3 all reviewers of the applicant have these insights as
4 common background.

5 Our response, we certainly agree as staff
6 continues to build its own risk insights, independent
7 staff analysis and performance assessments had been
8 vital to the issue process throughout the
9 pre-licensing period.

10 I know that the Committee members have
11 looked at a lot of those reports. Risk insights from
12 this independent work will provide an important basis
13 for the review of the licensing process. I hope that
14 that became somewhat clear in some of my previous
15 slides.

16 Refinement of the risk insights is
17 continuing as a formal process. I think staff, like
18 I said, is coming down next month to give you a
19 presentation on the risk insights.

20 MEMBER LEVENSON: Jeff?

21 MR. CIOCCO: Yes?

22 MEMBER LEVENSON: Jeff, the one small part
23 of the comment that I am not sure is included here is,
24 is there an overt activity to make sure that all of
25 these individual task teams that have been assigned a

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1 specific piece of the problem are provided with the
2 appropriate risk insights relevant to what they are
3 doing.

4 The staff has developed it, but the staff
5 that is developing the risk insights is not
6 necessarily going to be doing the detailed review.

7 MR. CIOCCO: Well, that's true. I think
8 in a lot of cases, the same staff who were doing the
9 risk insights and that have been giving input are the
10 same staff who would be doing the review. I think
11 there are several efforts underway as far as training
12 of the staff on the use of the Yucca Mountain review
13 plan, which includes the use of the risk insights.

14 We have had mandatory training at our team
15 meetings. We have a high-level waste course that is
16 underway. I am not sure what other activities, Tim,
17 as far as involving all of the staff in the risk
18 insights.

19 MR. McCARTIN: Sure. Yes. Part of the
20 risk insights initiative, one of the main goals they
21 looked to continue and improve on in the future is
22 making sure everyone has the same information across
23 the staff in terms of how the system is operating,
24 both with our own risk insights, DOE's, et cetera.

25 As the Committee is aware, we will be

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1 briefing them later. In October, we have the risk
2 insights final documentation of this past effort. And
3 it will continue to evolve.

4 I think that documentation, we have a lot
5 of the staff, if not all of the staff, involved, most
6 of the staff involved in preparing it. All of the
7 staff it will be made available to and provide a
8 baseline of risk information that they can use. I
9 think that should be helpful to accomplishing the
10 goal.

11 MR. CIOCCO: And it is. As part of my
12 licensing process, I think the second figure, where we
13 show before you start to review it that to review all
14 of the applicable background material. And certainly
15 risk insights is one of those areas because who knows.
16 I mean, we don't know who is going to be here if there
17 is a license application to do the review.

18 MEMBER LEVENSON: My question is, if you
19 go back one slide, there is a specific bullet on this
20 point, the last bullet

21 MR. CIOCCO: This one? Oh, I'm sorry.
22 Yes. Okay.

23 MEMBER LEVENSON: In your response, you
24 comment on all of the other bullets. You just didn't
25 comment on that one. That was --

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1 MR. CIOCCO: I understand. Okay. Thank
2 you.

3 Yes, Tim?

4 MR. McCARTIN: Yes. I guess one comment
5 on that. As you are aware, the first part of the
6 post-closure review is associated with identifying the
7 barriers important to waste isolation. The reason it
8 is first is for just that purpose, that we need to
9 look at what DOE is saying; bring in some of our own
10 risk insights; and with that review, provide this
11 common understanding of what is important for the
12 Yucca Mountain system, which then factors in to the
13 rest of the review. And that's why it's first.

14 So I think you're right. I mean, it is
15 very important to develop that common understanding
16 through the staff. We will do it there. One note on
17 that, I think it is somewhat iterative in that you can
18 do it up front, get a good understanding to
19 risk-inform your then review of the 14 model
20 abstractions, at the end of which you need to come
21 back. Having done the model abstractions, do I still
22 believe what was identified as important because maybe
23 there are things you learned in that review.

24 So there is an iterative to come back.
25 Even though we are doing it first, we will come back

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1 to it at the end. But that's why it was put first in
2 the post-closure performance. And it is a critical
3 step.

4 MR. CIOCCO: Mike Lee?

5 MR. LEE: Yes. Not to beat up on risk
6 insights -- and I don't want to steal your thunder for
7 next month's presentation, but the impression I'm
8 getting is that by formalizing the risk insight work
9 later on this fall, are you going to update that on
10 some kind of regular basis? Presumably you are going
11 to have additional insights between the time that you
12 complete the documentation now and the time the
13 license application comes in if it comes in.

14 MR. McCARTIN: We would expect to update
15 it as appropriate. It is hard to say at what
16 frequently just because of the --

17 MR. LEE: As a hypothetical.

18 MR. McCARTIN: It is looked at as a living
19 document, then.

20 MR. LEE: The reason I ask is the
21 impression I'm getting is that you are going to have
22 a cache of information that you are going to apply to
23 the license application review, including the review
24 plan, some kind of knowledge base regarding risk
25 insights and TA insights as well, things like that.

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1 MR. McCARTIN: And other references that
2 we cite, correct. Yes.

3 MR. LEE: Yes.

4 MR. McCARTIN: Certainly. And a prime
5 example, I would say, is that we are beginning our
6 work on testing and evaluating our latest version of
7 the TPA code, 5-0. And we will be using that over the
8 next year, year and a half. Clearly it could produce
9 some additional insights. That would be factored in.
10 It continues to evolve.

11 MR. CIOCCO: Okay. Thank you.

12 The fourth and final issue of your comment
13 is that the staff relied on agency experience and
14 existing programs to develop its acceptance criteria
15 and review methods for the administrative,
16 programmatic, and pre-closure subjects, for which Part
17 63 doesn't provide specific performance objectives.

18 These criteria may not be applicable to
19 the high-level waste repository. The review plan
20 should be revised where appropriate to ensure that
21 nonapplicable criteria are removed from these
22 sections.

23 In addition, for material that is deemed
24 relevant, that which remains, staff should explicitly
25 defend its use and relevance to the Yucca Mountain

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1 review plan.

2 Our response, we certainly agree with the
3 Committee. The Yucca Mountain review plan has been
4 revised to ensure that only applicable guidance or
5 portions of that guidance are identified for use in
6 licensing review for high-level waste repositories.

7 This is I guess really evident I think in
8 the pre-closure section. And I think that was one of
9 Dr. Levenson's comments. There were a lot of
10 references to nuclear power plants and regulatory
11 guides that may not be applicable to the Yucca
12 Mountain review plan. So we went through and did a
13 scrub to get all of the pre-closure people together
14 and the experts in the areas and really removed a lot
15 of that guidance.

16 Some of the examples, there are just lists
17 and lists, but criticality and other interior
18 evacuation signals, Reg Guide 8.5. NUREG 0554,
19 "Single failure proof range for nuclear power plants."

20 Reg Guide 191, "Evaluation of explosions
21 postulated to occur on transportation routes near
22 nuclear power plants. Design basis floods for nuclear
23 power plants."

24 Reg Guide 132, "Criteria for
25 safety-related electric power systems for a nuclear

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1 power plant." So there was a very concerted effort to
2 go through and remove that.

3 Now, your last comment was that the staff
4 should defend what it keeps. Since the review plan is
5 not a regulation and the NRC staff will be guided
6 primarily by information that is actually presented in
7 any license application tendered by the U.S.
8 Department of Energy, the staff does not believe it is
9 necessary to defend its identification of relevant
10 guidance.

11 We have the caveats in there that these
12 guides would be used if appropriate, but we're really
13 depending on what is submitted by the U.S. Department
14 of Energy.

15 So for each and every reference in there,
16 we don't have a specific statement, I guess an
17 abstract or something, defending its use. But they're
18 in there because the staff from its pre-licensing
19 interactions feels that it's relevant and that it
20 could be used or may be used in a staff licensing
21 review or in the format and content of an application.

22 Okay. So that concludes the ACNW
23 comments. The following here is a summary of other
24 changes to the Yucca Mountain review plan that we did
25 in response to public comments, approximately 1,000

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1 public comments, that we received.

2 I've got about two slides. It's kind of
3 a high-level summary. We went through and clarified
4 the scope required to support a construction
5 authorization.

6 There were a lot of comments on what was
7 required in the physical protection and the material
8 for the county. In draft 2, we said only a commitment
9 to the acceptance criteria were required for the
10 physical protection in the NCNA section. We went back
11 and looked at 63.20, a little more information
12 required there than just a commitment. So that was
13 revised.

14 We reduced the prescriptiveness of the
15 acceptance criteria, a lot of what I just explained,
16 but also there was a section in the review plan for
17 general information that was an evaluation of the site
18 characterization information. That was shortened
19 down, not prescriptive, as well as what I just went
20 through in the pre-closure area.

21 We clarified the concept and the use of
22 the representative volume of groundwater. There were
23 some comments received. And I think we did agree that
24 the staff kind of confused the concepts on the use of
25 groundwater in calculating the individual protection

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1 standard versus the groundwater protection standard.

2 So the staff went through. This was
3 clarified in the representative volume model
4 abstraction as well as the calculation of the
5 groundwater protection standard.

6 We clarified the licensing review
7 procedure and the purpose of the acceptance review.
8 We added the charts and figures as well as some text
9 in Appendix B.

10 We removed kind of one of our legacy
11 terms, "safety case," which isn't called for in the
12 regulations, and changed that to the "license
13 application," kind of a relic, as well as we changed
14 "important to performance." We had a lot of comments
15 on what is important to performance to what is in the
16 regulations, important to safety and what is important
17 to waste isolation.

18 These were kind of just some structural
19 changes to align the Yucca Mountain review plan more
20 with the way Part 63-21 is laid out, general
21 information first, followed by the safety analysis
22 report.

23 So chapters 1 and 2, which in most review
24 plans you don't even see, you get right into the
25 safety analysis report, chapter 1 is now the appendix,

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1 which has the example. And chapter 2 is the
2 acceptance review.

3 We went through just kind of another
4 structural -- people had a hard time following our
5 dashes and bullets. Maybe since it's lengthy and
6 redundant in places, this may help. This was another
7 one where we consolidated the 22 quality assurance
8 acceptance criteria into a team.

9 There were some comments received that
10 perhaps a quality assurance section went beyond the
11 requirements of Part 63. So there were criteria 19
12 through 22 in software sample controls, scientific
13 investigation, field surveys.

14 The staff certainly felt that what was in
15 a quality assurance section is consistent with 10 CFR
16 Part 60, Appendix B. And those four criteria were
17 then folded into the existing 18 criteria to be
18 consistent with Part 63.

19 MEMBER LEVENSON: Jeff, can we go back to
20 the previous slide for a minute?

21 MR. CIOCCO: Sure.

22 MEMBER LEVENSON: The last bullet, is the
23 implication that important to safety or important to
24 waste isolation is the same thing or are those two
25 different items in which you have split importance to

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1 performance into two different definitions?

2 MR. CIOCCO: The important to safety is
3 related to the pre-closure and important to waste
4 isolation as in the post-closure, but they were used
5 synonymously.

6 MEMBER LEVENSON: Important to safety is
7 pre-closure. Is that limited to public safety or in
8 one of the very early versions, I think it may have
9 been one of the things we commented on in a meeting.

10 Unlike the reactor field, it was including
11 things that were worker safety, which is really a
12 different order of things. So what is included in
13 important to safety in pre-closure? Is it just public
14 safety?

15 MR. CIOCCO: Go ahead, Tim. Tim McCartin.

16 MR. McCARTIN: It is both public and
17 worker safety. It's just that change was done to the
18 -- you won't see the words "important to performance,"
19 say, in the QA section of the rule. They speak of
20 important to safety or important to waste isolation.
21 And so it was a change.

22 Why have this new term that you don't see
23 in the regulation? And so important to performance
24 was removed. And it was, as indicated, important to
25 safety, which was, as you indicated, pre-closure, but

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1 it's pre-closure both public and worker safety and
2 waste isolation for post-closure.

3 MEMBER LEVENSON: See, that has the
4 potential to really make a significant change in
5 philosophy from what's traditional, at least in the
6 reactor business, because that term gets carried over
7 in specifications for equipment and similar things.
8 Something that can potentially injure an employee was
9 not in the reactor business considered justification
10 for major upgrade in quality of equipment.

11 It was public health and safety that drove
12 the economic factor of spending a lot money on
13 equipment. And duplication and redundancy were
14 important to safety.

15 This is quite a change in the philosophy
16 of the Commission, I think, when you lump worker
17 safety with public safety.

18 MR. McCARTIN: It's not a change in terms
19 of 63. Sixty-three, as I understand it, when
20 important to safety was used, it was with respect to
21 meeting the pre-closure safety objectives, which had
22 requirements for both worker protection and public
23 protection.

24 MEMBER LEVENSON: Yes. Nuclear power
25 plants also have -- it isn't that we're not concerned

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1 about worker safety, but normally it is a different
2 level of what you expect, even all the way down to
3 radiation doses, which are different for workers and
4 for public.

5 And to lump public and worker safety at
6 the level when you're going to be examining details,
7 it seems to me, is something that really needs to be
8 reconsidered because if you go by what used to be
9 worker safety, then you probably overexposed the
10 public.

11 And if you imposed the same criteria for
12 workers as for the public, we clearly recognize that
13 that is not appropriate. We would have different
14 radiation levels for workers and public.

15 So it just seems to me this is an
16 inconsistent approach.

17 MR. CIOCCO: I'm not sure. Are you
18 getting to changes in the rule or to changes that we
19 made important to performance --

20 MEMBER LEVENSON: Nothing that is here
21 needs to be changed. The concern is that when you go
22 to the next step to review things like the actual
23 design of a facility, for people to just automatically
24 say, "importance to safety," which is a significantly
25 defined category of quality assurance and equipment

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1 that is normally applied only to public safety, that
2 that not be carried down another level, is my concern.

3 MR. CIOCCO: I don't think they're lumped
4 together in the pre-closure, the public and worker
5 safety.

6 MR. McCARTIN: I'll go back and look at
7 it, but the way I have seen both DOE explain their
8 approach for pre-closure importance to safety, you
9 would be looking at both worker protection and public
10 health and safety.

11 MR. CIOCCO: Yes.

12 MR. McCARTIN: So they're looking at the
13 requirements for both. They are different criteria
14 certainly.

15 MR. CIOCCO: Yes, right, different
16 criteria.

17 MEMBER LEVENSON: The problem is that
18 "important to safety" are words, but in nuclear
19 safety, they have a very specific connotation.

20 MR. CIOCCO: I think we do that pretty
21 well in the pre-closure section, differentiate it,
22 too.

23 Okay. So now that pretty much concludes
24 the presentation. In the path forward, we will
25 certainly address any Commission direction given on

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1 the review plan and the response to comments. After
2 that happens, we will public a Federal Register notice
3 containing the Yucca Mountain review plan notice of
4 availability, where you can receive it, as well as it
5 will contain our response to the public comments.

6 That concludes my presentation this
7 morning.

8 CHAIRMAN HORNBERGER: Thanks very much,
9 Jeff.

10 MR. CIOCCO: You're welcome.

11 CHAIRMAN HORNBERGER: I'm sure we have
12 some more questions, even though we interrupted you
13 almost interminably.

14 I was just curious. On the last couple of
15 slides where you summarized at a high level some of
16 the other changes you made. I know I think it was
17 last September when you were out in Las Vegas, a
18 meeting with us. We had heard some comments from some
19 members of the public out there that some of the
20 comments that they had sent represented, oh, what I
21 might loosely say were concerns about these steps, the
22 construction authorization, and what would be required
23 before a construction authorization and whether a
24 construction authorization was the final step. Did
25 you take into account anything that might clarify that

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1 for --

2 MR. CIOCCO: I think we did. I think
3 whenever you see the response to comments, we went
4 through and responded to those comments in trying to
5 lay out how the review plan would be used now in
6 construction authorization, how it may be updated
7 later and applied to -- certainly one review plan is
8 meant to cover all of the steps of the licensing.

9 CHAIRMAN HORNBERGER: Mike, anything?

10 MR. RYAN: No comments. Thanks.

11 CHAIRMAN HORNBERGER: John?

12 VICE-CHAIRMAN GARRICK: It is pretty
13 difficult to be critical when you responded to all of
14 our questions.

15 MR. CIOCCO: But?

16 VICE-CHAIRMAN GARRICK: But --

17 (Laughter.)

18 MR. CIOCCO: That proverbial "but."

19 VICE-CHAIRMAN GARRICK: We'll do our best.
20 I was curious. In looking at these last slides about
21 other YMRP changes, I saw essentially nothing on the
22 abstraction modeling process and reviews, therefore.
23 Does that mean that that was pretty well-received by
24 everybody, what you had in the review plan about the
25 14 models and --

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1 MR. CIOCCO: We received various comments
2 on the model abstractions. There were some revisions.
3 I mean, this was a fairly high-level summary.

4 There were some clarifications. There
5 were some additions. There were some deletions in the
6 model abstractions. But for the most part, they
7 remain, the 14 model abstractions remain. And we
8 received comments to the extent that you're not
9 consistent with the seven or nine process model
10 reports that DOE uses, and that's fine.

11 And there were certainly comments that it
12 was too prescriptive. There was too much level of
13 detail through the model abstractions. And in getting
14 back to your comment about the repetitiveness, you
15 could have lumped the five generic criteria up in
16 front and then laid out specifics. So yes, there were
17 certainly quite a few.

18 VICE-CHAIRMAN GARRICK: But no fundamental
19 changes?

20 MR. CIOCCO: No fundamental changes. I
21 mean, overall wholesale restructuring of the model
22 abstractions. And then we have laid out a process to
23 review a performance assessment starting with the bare
24 analysis scenario events, model abstractions through
25 the evaluation of the various protection standards.

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1 So there was some clarification and some minor editing
2 but no wholesale changes.

3 VICE-CHAIRMAN GARRICK: That's good.
4 Okay.

5 MEMBER LEVENSON: I'm not one known for
6 reading regulations, but somebody has just recently
7 pointed out to me that Part 63 has a definition for
8 important to safety as applied to repositories. And
9 it talks about exposure to any individual located on
10 or beyond the boundary of the site. So it is not
11 intended to be applied to workers. So that needs to
12 be corrected.

13 MR. CIOCCO: Okay. Thank you.

14 CHAIRMAN HORNBERGER: Thanks again, Jeff.
15 Your presentations are always packed with information,
16 which gives us thought. And also thanks for being
17 responsive to questions. We appreciate it.

18 MR. CIOCCO: Thank you.

19 CHAIRMAN HORNBERGER: Okay. So let's see
20 where we are here. Oh, my goodness. We're at break.
21 What I want to do is actually not take a break because
22 I think we're going to take perhaps a little longer
23 break after this. So let's talk about the ACNW
24 research report. And, Mike Ryan, you can lead us
25 through this?

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1 MR. RYAN: Okay.

2 CHAIRMAN HORNBERGER: Okay. We're still
3 in session. We're still in session, and we're ready
4 to go.

5 MR. LARSON: Do you need the reporter?

6 CHAIRMAN HORNBERGER: No, we don't. We
7 can go off the official record now. So we don't need
8 the reporter any further for the rest of the day.

9 (Whereupon, at 9:38 a.m., the foregoing
10 matter was adjourned.)

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