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BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

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123RD MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE

NOVEMBER 27, 2000

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THE LIFE OF THE COMMITTEE**

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TR08

P R O C E E D I N G S

MR. GARRICK: Good afternoon. The meeting will now come to order. This is the first day of the 123rd 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, Milt Levenson and Ray Wymer.

We also have with us some ACNW consultants that will be joining us momentarily, I'm assured, Drs. Jim Clark and Rod Ewing.

During today's meeting, and we already have had discussion of Committee activities and future agenda items. We also discussed to some extent our planned reports.

This afternoon we will be discussing the objectives of ACNW's review of the Center's Research and Technical Assistance Program. We will hear overview presentations by representatives of the NRC staff and the Center on developing review capability and risk information for pre- and post-closure.

We will discuss and hear overview presentations from the Center and NRC staff on progress toward KTI issue resolution. Discuss ACNW's sufficiency review and task action plan.

Lynn Deering is the designated federal official

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1 for today's initial session.

2 This meeting is being conducted in full
3 accordance with the provisions of the Federal Advisory
4 Committee Act.

5 We have received no written statements from
6 members of the public regarding today's session. Should
7 anyone wish to address the Committee, please make your
8 wishes known to one of the Committee's staff.

9 It is also requested that each speaker use one
10 of the microphones, identify himself or herself and speak
11 with sufficient clarity and volume so that he or she can
12 be readily heard.

13 Before proceeding with the first agenda item,
14 I'd like to cover some brief points of current interest.
15 Effective December 1, Mr. Sam Duraiswamy will be assigned
16 as the Acting Special Assistant, ACRS/ACNW.

17 Howard Larson's rotational assignment period
18 has ended and we're fortunate enough to now have him back
19 full time.

20 Bechtel SAIC Company, LLC, was named the
21 management and operating contractor for DOE's civilian
22 nuclear waste program. The \$3.1 billion five-year
23 contract has options for five additional years, which
24 could bring its total to 8 billion.

25 The company represents a teaming of Bechtel and

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1 Science Applications International Corporation. The
2 programs waste M&O contractor is now TRW Environmental
3 Safety Systems, Inc.

4 DOE indicated that Bechtel SAIC will assume
5 responsibility for the waste program on February 12th,
6 2001.

7 A federal appeals court has dismissed U.S.
8 Ecology's lawsuit to force the U.S. Government to sell
9 federal land in California's Ward Valley to the state to
10 use as a low-level radioactive waste disposal site.

11 The U.S. Court of Appeals for the District of
12 Columbia Circuit said site developer U.S. Ecology does not
13 have standing in the case.

14 The Waste Isolation Pilot Plant received its
15 hundredth shipment of transuranic waste from DOE
16 facilities in October. The shipment originated at Rocky
17 Flats in Colorado.

18 Ines Triay, Manager of DOE's Carlsbad, New
19 Mexico, field office, called the shipment "a major
20 milestone for WIPP."

21 Since WIPP began disposal operations March 26,
22 1999, the facility has received 21 shipments from Idaho
23 National Engineering and Environmental Laboratory, 59
24 shipments from Rocky Flats, 17 from Los Alamos and 3 from
25 the Hanford site in Washington State.

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1 And finally, the NRC appropriations request of
2 \$481.9 million for fiscal year 2001 was approved in full
3 on October 27, 2000.

4 And not quite finally, the staff has a new
5 member of the administrative staff. Barbara Whitaker was
6 approved this week and will start work on December 4th,
7 next week or so.

8 All right. I'd like to make a few comments
9 before we start the other part of the agenda. As most of
10 you know, it has become somewhat of a practice of the ACNW
11 to visit the Center approximately once a year to better
12 stay in touch with the Center's activities.

13 The form of the visit that is most efficient is
14 to combine a regular ACNW meeting with a tour of
15 experimental facilities, including discussions with the
16 principal investigators involved.

17 Of course, we try to tailor the meeting agenda
18 to priority topics whose discussions are enhanced by being
19 here at the Center.

20 In this regard, we have two primary objectives
21 for our meeting. The first has to do with NRC's approach
22 and capability to conduct an adequate sufficiency review
23 of the Department of Energy's Site Recommendation
24 Considerations Report.

25 The second is to gather information to support

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1 the annual review of the NRC's waste related research and
2 technical assistance program.

3 On the matter of the sufficiency review, the
4 ACNW's objectives for the oversight of the NRC staff's
5 sufficiency review include:

6 (1), evaluating whether the NRC's guidance,
7 such as from the Yucca Mountain Review Plan, and approach
8 for reviewing the Site Recommendation Considerations
9 Report of the DOE, reflect a risk-informed and
10 performance-based approach;

11 (2), evaluating whether the staff's sufficiency
12 comments are logical, defensible, and focused on the most
13 risk-significant issues;

14 (3), identifying any gaps and strengths in the
15 NRC's tools, its guidance and capability to review a
16 license application; and

17 (4), identifying what the NRC needs to do
18 between now and when the license application is actually
19 submitted.

20 So the focus of the meeting will be on the
21 staff's tools, guidance and capability. Specifically, we
22 are interested in learning more about the staff's pre-and
23 post-closure analysis tools. That is, the total system
24 performance assessment code; and the PCSA code, that is
25 the pre-closure safety analysis code; code capabilities;

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1 and emerging risk insights being used to understand the
2 risk significance of issues and to guide the NRC's issue
3 resolution process.

4 The Committee is also interested in how the
5 technical information across the KTIs and subissues is
6 being integrated and abstracted into the performance
7 assessment.

8 For the research program, in last year's
9 research program review, we noted that we were favorably
10 impressed with specific projects of the high level waste
11 work by the Center and the NMSS staffs.

12 The work, to the Committee, appeared to be of
13 high quality and appropriate to the NRC needs. The
14 Committee also noted that it was concerned about whether
15 adequate resources were available to the research and NMSS
16 programs, and it would review this issue as more
17 information becomes available.

18 Our visit here, of course, is a part of that
19 process. We expect to generate a number of products from
20 this meeting. In the short term, we plan to write reports
21 on: (1), the staff's progress in the KTI issue resolution
22 program; and (2), the NRC's research and technical
23 assistance program.

24 In fiscal year 2001, the Committee will write a
25 report on the staff's sufficiency review of the DOE's

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1 SRCR, Site Recommendation Considerations Report, and one
2 or more letters pertaining to the vertical slice reviews,
3 which we will be discussing quite a bit later on in the
4 program.

5 So with that, I think we'll turn to the agenda
6 and I note that the next two items, the lead member for
7 the discussions is George Hornberger. So George, let's
8 get into our discussions.

9 MR. HORNBERGER: Okay. Our discussions, as you
10 see by the agenda, are focused on the KTI resolution
11 process and in particular some of the tools that have been
12 used.

13 And Joe Holonich is joining us on video con and
14 will give us the overview. Joe.

15 MR. HOLONICH: Why don't we go ahead and start
16 with the presentation if we can get the projector there.

17 Pretty much what I'm going to do is start with
18 our performance goals, which come from the strategic plan.
19 Talk about how we're implementing those goals, the
20 strategy for this particular program, the high level waste
21 program, lay out the regulatory framework that we'll be
22 using in terms of how we implement our program, what the
23 capabilities are that we have available to us in terms of
24 the tools to conduct our review, how we're going to look
25 at the sufficiency review and what we're going to use and

1 what our philosophy is with that.

2 Give you a little bit of background on the
3 facilities there at the Center and then kind of capture it
4 with a summary at the end of the presentation there.

5 The performance goals I'm sure everybody has
6 seen, and I'm not going to spend a lot of time on them.
7 They're the four performance goals that come out of the
8 strategic plan.

9 Essentially, what we're looking to do in this
10 program, like we are in all the waste programs, are
11 maintain safety, protect the environment, preserve the
12 common defense and security.

13 We want to increase public confidence so that
14 folks have a good idea what NRC does and has confidence in
15 the job we do.

16 We want to make our decisions more effective,
17 efficient and realistic. And we want to reduce
18 unnecessary regulatory burdens on all the stakeholders,
19 not just the applicants, but members of the public and all
20 the stakeholders in the program.

21 The strategy that we have on the high level
22 waste program is that we're in transition phase. We're
23 moving from a pre-licensing consultative phase into our
24 licensing mode.

25 With that transition, we're starting to look

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1 towards being more like -- running our program more like
2 the Agency historically has run its licensing programs.

3 That includes beginning to use the review plan;
4 categorizing issues within the KTI program, and these
5 categories parallel what we've done in other licensing
6 activities.

7 For example, when we go to a reactor safety
8 evaluation report, they have three classes of issues,
9 open, closed and confirmatory.

10 And we have a parallel for that. We have open,
11 we have closed, and we have closed-pending. And what
12 those categories mean essentially is, open, we haven't
13 come to resolution with DOE. We still have questions.

14 Closed means that they've answered all the
15 questions. We have no more comments in that area. And
16 closed-pending means that we have a commitment from DOE to
17 provide additional information.

18 And so we've paralleled our program now to what
19 NRC has historically used on other major licensing
20 initiatives.

21 We're hoping to publish an integrated issue
22 resolution report. Throughout the past five years we've
23 published individual IRSRs.

24 What we'd like to start to do is, as a second
25 piece of integrating the program, is pull together the

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1 individual issues and provide an integrated report that
2 addresses all of the issues, plus documents where we are
3 on the various subissues within a KTI.

4 That, coupled with the review plan, begin to
5 bring the NRC staff review together. Review plan
6 integrates across in terms of what is in the review and
7 the integrated issue resolution report documents in an
8 integrated manner what's been done within the individual
9 KTIs.

10 Finally, what we're hoping to do and what we're
11 planning to do and have been doing is get out more public
12 outreach, get out to the public, have meetings, talk with
13 the public and lay out this philosophy and hopefully, get
14 feedback from the public on what we can do to improve,
15 plus as we're out there, increase the public confidence in
16 terms of what we're doing as a regulatory Agency.

17 The framework for the program essentially
18 starts from the basic regulations, 40 CFR 197, and when
19 it's issued, 10 CFR, Part 63.

20 From that, we come to the Yucca Mountain Review
21 Plan, which documents how the staff will conduct its
22 licensing review and lay out the safety goals.

23 Within the review plan or in support of the
24 review plan are the modeling tools that we have, the TPA,
25 total system performance assessment, and the individual

1 investigations, the research work that is done by the
2 Center for us to help us lay out what we need to be doing
3 and understand better what other phenomena that we should
4 be reviewing.

5 That feeds into a repository safety evaluation
6 process and allows us to give comments on the viability
7 assessment, the site recommendation, ultimately use all
8 those tools to conduct our licensing review, and finally
9 prepare the staff's product in this effort, which is a
10 safety evaluation report.

11 What I'd like to do now is address several of
12 the components within that regulatory framework, starting
13 with Part 63.

14 Part 63 is a risk-informed performance based
15 regulation. It lays out for DOE as the applicant the
16 performance objectives we want the Department to meet,
17 "we" being the Commission, not just the staff, the
18 performance objectives that we want DOE to meet.

19 It doesn't prescribe particular requirements on
20 DOE but, rather, lays out performance-based requirements
21 that DOE can choose how it wants to meet.

22 It requires quantitative analyses of system
23 performance. For post-closure, there's the performance
24 assessment, total system performance assessment; and for
25 pre-closure, there's an integrated safety assessment.

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1 And finally, it has a requirement for a system
2 of multiple barriers in it, which is the Commission's
3 cornerstone of its safety philosophy, defense and depth
4 multiple barrier requirements.

5 Part 63 right now is in the process of being
6 finalized. It's with the Commission. The Commission is
7 reviewing the regulation and at this point we're waiting
8 to hear from the Commission on what to do in terms of
9 finalizing the regulation.

10 Once we get that commitment or that direction,
11 we will issue the final regulations and then after that
12 we'll hold public meetings to lay out for the members of
13 the public and the stakeholders what is in the regulations
14 and how we're going to be implementing those regulations.

15 In terms of implementing the regulation, the
16 key piece is the Yucca Mountain Review Plan.
17 Historically, the Agency uses review plans to help insure
18 that there is a consistent breadth and depth of review
19 across multiple applications.

20 Though we only have a single application here,
21 it's important to have that same consistency as we move
22 forward toward a license application.

23 We want to make sure that as we go to site
24 recommendation, as we work towards closure of key
25 technical issues, we're giving to DOE a consistent view of

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1 what we'll be considering in our licensing review.

2 So we want to make sure that we develop the
3 review plan and begin to use it and use it with DOE so
4 that it has an understanding, "it" being DOE has an
5 understanding of what the staff will be expecting and what
6 the staff will be reviewing whenever a license application
7 is submitted to the NRC.

8 This gives us the ability then to say to DOE
9 today, "Here's what we're going to do," so that when the
10 application comes in there's not a different set of ground
11 rules that DOE will have to deal with.

12 Where we are is, we've got a draft revision
13 one, which has been submitted to the Commission and in
14 parallel with Part 63, the Commission is looking at the
15 review plan.

16 As with any review plan in the Agency, the two
17 keys pieces are the review methods or procedures that
18 direct the staff on how to conduct its review and the
19 acceptance criteria on what the staff believes is
20 necessary to demonstrate compliance with the regulations.

21 I'm saying it often, but as with any review
22 plan, DOE can always come up with its own approach to
23 meeting the regulations. This lays out what the staff
24 thinks are the appropriate ways to meet the regulations.

25 Milestones are, we're expecting to get the

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1 review plan comments back from the Commission. Where we
2 need to, we'll make changes to incorporate Commission
3 direction and any changes that come out of the Commission'
4 review of Part 63 and then we're hoping to publish the
5 review plan for comment and get input from all the
6 stakeholders, give us some guidance and help on developing
7 the review plan.

8 The structure of the review plan essentially is
9 there are four main pieces to it. There's an introduction
10 which lays out the approach, the philosophy and the
11 background on how to conduct the licensing review.
12 There's a chapter dealing with the acceptance review,
13 which is the first hurdle DOE has to pass through in terms
14 of getting the application docketed.

15 There's then a review plan for general
16 information and finally, the safety analysis report. That
17 safety analysis report is broken into a number of
18 different components and the one component there, the
19 second-from-the-left, repository safety after permanent
20 closure, shows how that is broken down even further into a
21 number of discrete pieces, and then belonging to those
22 pieces are -- well, below the model abstraction are a
23 number of lines which would represent the acceptance
24 criteria.

25 That's one typical view of how the review plan

1 is broken down. The remaining sections within the review
2 plan also have a similar breakdown and go down to the
3 individual acceptance criteria.

4 The support tools that the staff has available
5 to it in conducting its reviews, both today as we work
6 towards KTI closure, and once an application arrives is
7 that we have our confirmatory audit capability.

8 This is essentially the integrated performance
9 assessment, total system performance assessment capability
10 that we have.

11 We use this in two ways. Number one, the
12 performance assessment gives us insight as to what are the
13 important aspects of long-term repository performance and
14 allows us to know where to focus our reviews. This is one
15 of the key ways that we're making sure our reviews are
16 risk-informed.

17 In addition, it's used to confirm our safety
18 review. What must be done when the application arrives
19 and, in fact, as we work towards KTI closure, is that the
20 staff must look at what DOE has laid out in front of it.
21 It must look at the safety case that DOE has made in its
22 application and make a judgment on that safety case using
23 the review plan.

24 Then as part of its confirmation of that
25 review, the staff will use its modeling capability and

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1 confirm what the staff's conclusions are in its safety
2 evaluation report.

3 In addition, the independent investigations
4 which the Center is doing, the laboratory work and the
5 field work, helps us better understand what's going on at
6 the repository, helps us understand what we need to be
7 doing in our reviews, and both the confirmatory audit
8 capability and the independent investigations feed into
9 and help us develop the review plan, helps us lay out what
10 our procedures are that we should be following and the
11 methods we should be using, as well as what would be
12 appropriate acceptance criteria for determining compliance
13 with the regulations.

14 So hopefully, you get a sense that it's sort of
15 a circular activity. You've got a review plan, which
16 leads the staff on what it needs to be doing. You've got
17 modeling capability and you've got independent
18 investigation, all of which feed back into that review
19 plan, and that review plan uses those to help us conduct
20 the safety reviews that we need to in making a
21 determination on the application when it arrives.

22 The sufficiency review strategy, which was
23 provided to the Commission earlier this year defines the
24 scope and the approach that the staff is going to use
25 whenever the site recommendation arrives.

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1 What that approach is, is that we will be using
2 the review plan as a guide to help us know what kind of
3 information we think is needed to support a license
4 application.

5 We're not going to use the review plan with the
6 same level of rigor that we would or apply it in the same
7 way that we would when we get an application.

8 It's not a direct application of the review
9 plan, not a direct use of the review plan, but rather, the
10 review plan is a guide to say here are the kind of
11 findings and here are the kind of criteria that we're
12 going to be using whenever the application arrives.

13 Does DOE's program have and will it collect the
14 kind of data that we need to be able to make a judgment
15 using the criteria and the methods that we have laid out
16 in the review plan.

17 It talks about the relationship to our
18 licensing strategy and I want to discuss that just a
19 little bit about the objectives and as an approach for
20 interacting with the stakeholders.

21 The guidance document, which was submitted to
22 the Commission two weeks ago implements that strategy and
23 essentially what it says is the guidance for the review
24 will be the review plan, and it uses a risk-informing
25 sufficiency review, which includes support from our

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1 modeling capability, the total system performance
2 assessment.

3 What's involved in the sufficiency review and
4 why we're doing a sufficiency review is to fulfill our
5 statutory obligations. We must provide preliminary
6 comments on the sufficiency at-depth site characterization
7 and waste form proposal.

8 What the question before us is, is the
9 information sufficient for license application. That's
10 why we felt that the use of the review plan was an
11 appropriate guide as we did the sufficiency review.

12 It tells us what we'll be looking for in terms
13 of making a judgment on a license application. So if you
14 have that information and you use it, you'll be able to
15 give DOE comments which say whether the information that's
16 collected or the data it plans to collect has enough to
17 support a license application.

18 The relationship with a sufficiency review to
19 the ongoing staff effort on issue closure is that as we
20 continue to work the issue resolution process, we have a
21 number of reviews that are ongoing, we know what DOE's
22 plans are for additional information, or we have
23 commitments from DOE to provide specific information.

24 All of those help us understand what's in the
25 program and it's a support for our review of the site

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1 recommendation.

2 Independent -- well, the issue closure process
3 is independent of sufficiency review. We will continue
4 that process and use the review plan more rigorously as we
5 work toward issue resolution than we would in the site
6 recommendation review.

7 But essentially, a lot of what's being gained
8 through the issue resolution effort help us build a better
9 foundation on what we need to be able to make comments on
10 the site recommendation.

11 So we're gathering information from a number of
12 different pieces to support our sufficiency review
13 comments.

14 The sufficiency review, as I noted earlier,
15 provides our comments on whether we think DOE is
16 collecting the right information to support a license
17 application for the particular areas of at-depth site
18 characterization and waste form.

19 There's a difference between the sufficiency
20 and the license application review, and essentially, what
21 it boils down to is the sufficiency review looks at is
22 there enough information for a license application.

23 The licensing review is where the staff makes a
24 determination as to whether compliance with the
25 regulations has been demonstrated.

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1 It's a big difference. One says, "Do you have
2 enough?" The other says, "Have you met the safety
3 requirements?"

4 And although the two are closely related, we
5 have to remember and keep in mind that as we do the
6 sufficiency review, we are not doing a compliance review,
7 and that's why I noted earlier we're not using the review
8 plan in the same manner that we would if an application
9 were submitted.

10 That's kind of the overview of the program, and
11 I wanted to spend just a few minutes to talk about the
12 support we get. Not only do we have, of course, the
13 technical staff up here, which gives us a lot of depth,
14 but we also use the Center.

15 And as you noted in the introductory remarks,
16 the Center has large laboratory facilities where they are
17 conducting much of the independent investigations that we
18 need so that we have an understanding of the phenomena out
19 there.

20 They are also assisting us with our model
21 development and they have fairly elaborate computer
22 facilities which allow them to run these models and also
23 do a number of different activities, such as GIS.

24 They also support field studies. I have been
25 to several sites throughout the world that are analogs, as

1 well as support us on our observation of DOE's
2 inspections.

3 We usually do observations of quality assurance
4 audits and inspections that DOE does and the Center has
5 provided us support there.

6 So what we think we've got is a pretty strong
7 program with the strong technical staff here at NRC, as
8 well as the necessary support from the Center for those
9 areas where we can't always do the things that a lab needs
10 to do, but also support us in the routine regulatory
11 issues like inspections and field studies.

12 Just to look over where the Center pulls its
13 staff from, over 80 percent of it are full-time Center
14 staff. It chooses its parent organization, Southwest
15 Research Institute about 6 percent of the time, and then
16 it has contractors and subcontractors to make up 11
17 percent of its staff.

18 The areas of expertise that are provided by the
19 Center are listed here. I'm not going to go into detail
20 of them, but you can see the different breakout.

21 They've got earth sciences, engineering, rock
22 mechanics, systems engineering and administration, and
23 they give us the support we need in those areas.

24 In summary, we've put together what we think is
25 a risk-informed performance-based draft regulation and

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1 we're waiting to hear from the Commission on that.

2 That risk-informed performance-based philosophy
3 has also moved into our strategies for the major reviews.
4 We've got the tools we need and have tested them on a
5 schedule consistent with what NRC will have to have to
6 support the U.S. program.

7 And we've got the staffing at the NRC and the
8 Center, along with field and analytical capabilities
9 sufficient to support our reviews.

10 That's kind of a quick overview of the program
11 and I'm ready to take any questions if you have any
12 questions.

13 MR. HORNBERGER: Great. Thank you, Joe.
14 Obviously, this is -- we're going to get into more detail
15 in the next presentations, so I ask if we have questions
16 in keeping with the overview nature of Joe's presentation.
17 John?

18 MR. GARRICK: Well, I think it was pretty
19 complete. I was curious about your comments about
20 sufficiency versus compliance and questioning in my own
21 mind whether having a sufficiency milestone puts undue
22 pressure on you to make your decisions based on the
23 information that you have rather than going after more
24 information on a repeated basis if you need it.

25 I can see the advantage of the process, but I

1 guess I'm raising the question, does the process impose
2 any undue pressure on you during the license -- during the
3 compliance phase, undue pressure to make a decision maybe
4 not with the additional information that you might like to
5 have?

6 MR. HOLONICH: I don't think it does. And if I
7 understand the question, Dr. Garrick, our view is that
8 what we're looking for in the sufficiency review is to
9 make sure that DOE either has the information available to
10 it or has plans to collect the information to be able to
11 support a complete and high quality licensed application.

12 We docket many, many applications that
13 oftentimes don't survive the review process, but they're
14 complete enough to allow us to start our detailed review.

15 Simply because we say at this phase, at this
16 point, we think you've got enough information to make a
17 high quality complete application doesn't mean -- or we
18 shouldn't feel, the staff shouldn't feel that that makes a
19 preliminary decision on compliance within the regulations.

20 So I certainly don't feel that pressure and
21 I've got no indication from any staff members as we meet
22 and talk about the sufficiency review that they're feeling
23 like if they make decisions today on the completeness of
24 information, that's going to be pushing them into a
25 decision on whether compliance with the regulation has

1 been achieved.

2 MR. GARRICK: And you don't think --

3 MR. HOLONICH: Was that your question?

4 MR. GARRICK: Well, partly. And you don't
5 think this inhibits you in any way in requesting
6 additional information?

7 MR. HOLONICH: No, absolutely not. In fact, as
8 we do acceptance reviews, one of the things we would often
9 say in the letters documenting the acceptance review was
10 that, "We have found your application sufficient for
11 docketing."

12 That doesn't mean that as we get into our
13 detailed review, we won't come forward and ask for more
14 information and ask questions. It just says at this point
15 we think you've got the information to allow us to start
16 the review.

17 So even today, as we work towards and say to
18 DOE, "It looks like you've got what you need in place. It
19 looks like you've got plans to collect the data that
20 you've got gaps on."

21 Once we get into the application and we're
22 finding that the information isn't sufficient, I don't
23 feel like we have any reason not to go back and say to
24 DOE, "What about this? How is this addressed? How have
25 you handled that?"

1 And I've seen it played out in multiple
2 applications that we've found acceptable for docketing,
3 but still have had questions about the information in the
4 application.

5 MR. GARRICK: Just one more question. DOE, of
6 course, has a schedule that they're trying to implement.
7 Has the NRC made any attempt to look at that schedule in
8 terms of the requirements for implementing the whole
9 sufficiency and licensing process and developed a more
10 detailed understanding of what they're facing with respect
11 to the tasks that have to be done and in what kind of time
12 frame?

13 MR. HOLONICH: I quite don't understand the
14 question. Are you asking have we laid out -- okay.

15 MR. GARRICK: I'm really asking how realistic
16 the DOE schedule is, given what you have to do. Have you
17 attempted to embed the NRC effort into the DOE schedule to
18 do a reality check on their schedule?

19 MR. HOLONICH: In terms of the sufficiency
20 review, which is the schedule that we've got facing us
21 right now, we've told DOE that we need six months to do
22 that review.

23 Now, their date right now is about a month
24 later than they originally anticipated. They were
25 anticipating the middle of this month. They're talking

1 about the middle of next month.

2 Whether we can compress our schedule or not, I
3 don't know. We haven't taken that look yet. In terms of
4 the application, our whole effort has been built around
5 making sure that we comply with the three-year application
6 review requirement. I don't think we're going to be
7 wanting to ask for the fourth optional year that we've
8 got.

9 So I think in terms of the application, our
10 whole effort is to make sure we can do that review in
11 three years.

12 Whether DOE has got the information it needs to
13 get an application on the schedule it says it is, I've got
14 to really tell you, you've got to ask DOE that question.
15 I'm not going to be able to answer that question.

16 MR. GARRICK: Thank you.

17 MR. HORNBERGER: Joe, just a quick one to make
18 sure I understood this. You're saying that the
19 sufficiency review comments, nobody has told you that it's
20 not May 1st?

21 MR. HOLONICH: Right.

22 MR. HORNBERGER: Okay.

23 MR. WYMER: You alluded a couple of times to
24 this whole procedure being risk-informed, and I suppose
25 the risk-informed nature of it is embedded in what you're

1 doing, but it didn't come shining forth from anything that
2 you said, or I wasn't perceptive enough to pick it out.

3 MR. HOLONICH: Well, I think Tim McCartin is
4 going to get into a lot more detail in terms of how we use
5 performance assessment and how it makes us more risk-
6 informed.

7 I don't want to steal his thunder, but maybe to
8 give you the *Reader's Digest* version. One of the things
9 we do is we've done our performance assessment codes. We
10 run those codes. We run sensitivity analysis. We run
11 uncertainty analyses. We run importance analyses.

12 And those analyses tell us what are some of the
13 things that are more important to performance, what are
14 the things that are more sensitive, that performance is
15 more sensitive to, and those are the areas then where we
16 say we need to go in and we need to look at those areas in
17 more detail than we do on some other areas because those
18 are the things that could in fact affect the outcome the
19 most and those are the areas where if you don't have the
20 uncertainty better understood or you don't have the model
21 better understood, you could end up with some questions
22 about whether you're meeting the criteria or not.

23 So that's kind of how we use the performance
24 assessment to help us get a little more risk-informed in
25 the kind of reviews that we do.

1 MR. WYMER: Okay. Thanks.

2 MR. HOLONICH: Tim, you're in the background
3 there. Do you have anything you want add?

4 MR. McCARTIN: That said it well, Joe. I'll
5 just -- as you indicated, my presentation later tomorrow,
6 I'll get into it in more detail, but that sounded fine.

7 MR. HORNBERGER: Joe, as you indicated in your
8 overview, we are interested -- the ACNW, that is, is
9 interested in these linkages amongst the Yucca Mountain
10 Review Plan and your progress moving toward a licensing
11 review and the site sufficiency and how the issue
12 resolution process gets folded in, and you alluded to all
13 of this going on.

14 My question is, you have some experience in how
15 things are working. Can you give us any ideas about
16 whether you've run into any problems? Is all of this
17 going smoothly?

18 MR. HOLONICH: Well, it's going well.
19 Obviously, we hit our bumps in the road and we have to
20 overcome those bumps, but I think since we started the
21 transition early this year, January, February time frame,
22 it seems to have picked up and it seems to have momentum
23 behind it.

24 I think the first and major step was our
25 meetings in the spring where we laid out for DOE where we

1 were on each KTI. Here's what we had. Here's where we
2 were on the subissues and here's what we needed.

3 That general meeting seemed to help DOE get
4 focused better, and that focus has helped us have a number
5 of technical exchanges where we've reached agreement with
6 DOE on what needs to be done, have gotten commitments from
7 DOE on what needs to be done to close it.

8 So we're moving forward in terms of laying out
9 for DOE what needs to be there and DOE understands it.
10 DOE is coming back to us with the necessary commitments.

11 I think the review plan went well. We hit a
12 bump. Our original revision, we believe was risk-
13 informed. We had some meetings with the technical
14 assistance at the Commission level.

15 They believed we were still too prescriptive in
16 the review plan. We had to go back and rethink that.
17 We've got it up in front of the Commission now. We've not
18 heard anything back yet in terms of whether they think
19 we've hit the mark this time.

20 But that was a bump in the road. So we've had
21 some problems, but I think we're making progress in
22 overcoming those problems.

23 I feel very good about where the program is
24 moving. My understanding is that the staff here has
25 better focus and the staff is feeling better about where

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1 the program is moving.

2 So I think overall there are no major problems,
3 but yes, we've hit our bumps in the road. We've had to
4 overcome those, but we seem to be working around those and
5 being able to keep the program on course.

6 MR. HORNBERGER: Joe, tying that response back
7 into Ray's question about the risk-informed aspects, I
8 know that early on in this process, perhaps as -- well, as
9 late as perhaps last spring when you began these
10 discussions with DOE, there were some comments back from
11 DOE that some of the issue resolution requirements seemed
12 to fall in the more prescriptive range.

13 And I think that you actually have gone back
14 and modified, taken a hard look at some of these and
15 actually modified some things and are thinking along those
16 lines in terms of issue resolution. Is my perception
17 correct and do you consider that progress along the way
18 here?

19 MR. HOLONICH: Yes, your perception is correct
20 and yes, I do consider that progress. As a matter of
21 fact, when we met with the TA's, vulcanism was one of the
22 areas where they focused us on, and they said, "You know,
23 if I go into the review plan, you have a very prescriptive
24 requirement written here. We'll use the Holonich's method
25 for predicting vulcanism."

1 That's very prescriptive. What you need to do
2 is lay out what are the attributes that you're looking
3 for, any acceptable methodology, not say that you've got
4 to use this particular methodology, but what are the
5 attributes that would make any methodology acceptable.

6 And those are the kind of changes that we've
7 made based on the feedback we've gotten from the TA's, as
8 well as the information and feedback we've gotten during
9 the technical exchanges.

10 But that feeds right into what you're saying.
11 We had some prescriptiveness in it. We've got some
12 feedback from all the stakeholders and we've taken that,
13 we've listened to it, we've made some changes, and I think
14 we're getting more performance based as we move forward
15 with the program.

16 MR. HORNBERGER: Thanks. Any other questions?

17 MR. LARKINS: Yeah, just a quick question.
18 During your presentation on the sufficiency review
19 strategy, you talked about scope and approach and the
20 waste form proposal.

21 Can you give a feel for how firm the
22 description of the waste form has to be in terms of being
23 acceptable, say, as part of your sufficiency review, DOE
24 is well enough along in that area?

25 MR. HOLONICH: John, are you talking about a

1 hot versus cold repository or what?

2 MR. LARKINS: Well, you used the phrase "waste
3 form proposal." I assume that that meant waste package
4 and things associated with that.

5 In other words, does DOE have to have a fairly
6 firm waste package description?

7 MR. HOLONICH: Well, DOE has got to have a
8 description to us that we can look at and say, "If you're
9 collecting data for this particular design, you're
10 collecting the right data for a high quality complete
11 application.

12 If DOE has two or three different designs it
13 hasn't chosen yet from one of those designs, then it needs
14 to be able to show us that until it comes to a decision on
15 which design it wants, it's collecting the information
16 that it will need to be able to support any of those
17 designs in a license application.

18 MR. LARKINS: Okay.

19 MR. HOLONICH: So I really can't say I need DOE
20 to go to one design. I want to say if DOE wants to
21 maintain its flexibility and have multiple designs laid in
22 front of us, then we're going to have to look to see if
23 it's got the information to support any of those designs
24 in the license application.

25 Now, eventually, it may pick one and be done

1 with it, but until it does that, we'd better be able to
2 make sure it's collecting the right data for any design
3 option it's got in front of it.

4 MR. LARKINS: Thank you.

5 MR. HORNBERGER: Other questions or comments?

6 [No response.]

7 MR. HORNBERGER: Thanks very much, Joe. What
8 I'd like to do is not go to our next schedule, which is a
9 break, but to leap right into the next topic, "Progress
10 Towards KTI REsolution," but that all depends on whether
11 James Firth is there and ready to go.

12 MR. HOLONICH: He's sitting right here.

13 MR. HORNBERGER: James, I'm going to let you
14 start then.

15 MR. FIRTH: This next presentation is going to
16 be a combination of the sufficiency review strategy and
17 guidance and how that fits into other pre-licensing
18 activities, as well as progress towards KTI issue
19 resolution.

20 I do want to add that we are going to flow
21 through a little bit quickly on the sufficiency review
22 information because we are not prepared at this time to be
23 able to go into details of what's in the sufficiency
24 review guidance.

25 So what Joe Holonich has earlier said in the

1 overview is covering a lot of the information that I was
2 planning on giving.

3 There will be a couple of points that I will
4 make. Then Jim Anderson is going to be going through the
5 status of the KTI issue resolution information.

6 To re-emphasize, the goal of all of our pre-
7 licensing activities are focusing on the information that
8 DOE needs in a license application if DOE were to submit a
9 license application.

10 So we're not trying to ask for new information
11 now, but to judge sufficiency of is this enough for DOE to
12 recommend the Yucca Mountain site. Our consideration is
13 on does DOE have or will they have the information that we
14 would need to review a license application.

15 As Joe said before, the Nuclear Waste Policy
16 Act does limit the scope of what we are doing in the
17 sufficiency review. So there are some things that DOE
18 would need to include in a license application that are
19 not within the scope of the sufficiency review.

20 We are interested in DOE's at-depth site
21 characterization analyses and their waste form proposal.
22 And in looking at their waste form proposal, there's also
23 the question about how DOE's waste package and waste form
24 interacts with the surrounding geology.

25 And the question for sufficiency in our minds

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1 hinges on two points. One is, does there appear to be
2 enough information so that we could do a licensing review,
3 and is the type of information that is there, is that
4 going to be appropriate.

5 So if the information does not look like it
6 would fit into DOE's safety case, then it's not really
7 contributing to the question of sufficiency.

8 Joe has gone over these points, so I'm not
9 going to take the Committee's time. And what's going to
10 come out of the sufficiency review is going to be a
11 progress report on the sufficiency of DOE's data, analyses
12 and plans, DOE's understanding of the interactions between
13 its waste package and its waste form and how those are
14 going to interact with the geology and the status of the
15 KTI issue resolution process.

16 So what's going to come out of the sufficiency
17 review is not necessarily a pass/fail. It's indicating
18 where DOE stands and whether DOE has the information in
19 hands now, whether they have plans to collect the
20 information.

21 Again, we're interested in what's happening and
22 what we'll have if DOE were to submit a license
23 application.

24 So the comments are going to provide a progress
25 report on where DOE is at this point. And to re-emphasize

1 the point that Joe made earlier, is that for the
2 sufficiency review, the question is sufficient for
3 inclusion in license application, not making the
4 compliance determinations. Those would be made in a
5 licensing review.

6 And at the end of the presentation, I'll take
7 any questions in terms of the strategy and the guidance
8 and we are working on trying to provide the information to
9 the Committee that would provide the linkage between how
10 we're using the Yucca Mountain Review Plan and how that
11 fits into our sufficiency review.

12 I'm going to turn it over to Jim Anderson.

13 MR. ANDERSON: Good afternoon. My name is Jim
14 Anderson, as Jim mentioned, and I'm a project manager in
15 the High Level Waste Branch. I have been helping
16 facilitate the key technical issue technical exchange
17 meetings which have been recently conducted.

18 During the next few minutes I will be
19 discussing an overview of the issue resolution process and
20 the status of key technical issue technical exchanges
21 which have been held to date.

22 This briefing is somewhat of a follow-on to the
23 briefing King Stablein gave to you in July. During that
24 meeting, King covered the objective of issue resolution;
25 the history of issue resolution and the development of the

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1 key technical issues; the role and results of the April
2 2000 technical exchange meeting which Joe briefly
3 mentioned; the definitions we use for the issue
4 resolution, which again Joe covered to some degree; and
5 the path forward for issue resolution.

6 Today I would like to discuss the progress the
7 NRC and DOE has made in the key technical issue resolution
8 area.

9 During this briefing, I plan to briefly cover
10 some of the same issues King discussed in July and then
11 discuss in more detail the approach the NRC and DOE is
12 using for these key technical issue technical exchanges,
13 the status of the issues we've already had meetings on,
14 and the plans for future meetings.

15 I had intended this briefing to be concise and
16 informal and I believe we have a number of technical folks
17 representing most of the KTIs in the audience here or in
18 San Antonio, so that if members are interested in
19 particular technical issues, we may be able to get you an
20 answer to those questions. I can also address any
21 questions you might have on the process itself.

22 The objective of issue resolution is to
23 complete issue resolution for the nine KTIs before DOE
24 submits a license application.

25 By saying "complete issue resolution," I'm not

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1 saying the NRC has made a final determination on a
2 specific issue. Issue resolution at the staff level is
3 reached when the DOE's approach and available information
4 acceptably address staff questions such that no
5 information beyond what is currently available will likely
6 be required for regulatory decision making at the time of
7 any future license application.

8 The rationale for the objective is to support
9 the congressional mandate for the NRC to review any DOE
10 license application in a three-year period.

11 Issue resolution history. King discussed this
12 in some detail during the July meeting, but as a quick
13 reference, issue resolution has been an ongoing focus of
14 the staff activity for over ten years with specific
15 attention to the key technical issues since 1996.

16 Issue resolution status reports, or IRSRs, have
17 been issued for the nine KTIs and the IRSRs contain
18 information on the scope of the specific KIT and
19 subissues, the importance of the subissues to repository
20 performance, the technical basis for the review, and the
21 status of resolution.

22 A meeting was held in April 2000 to move the
23 resolution process forward. During the April meeting, the
24 NRC staff summarized the resolution status of each key
25 technical issue and stated what information we needed from

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1 DOE to close the issue.

2 DOE discussed its plans and schedule for
3 providing the needed information, as well as indicating
4 whether, in its view, sufficient information was already
5 available to close particular key technical issue
6 subissues.

7 The April meeting set the stage for technical
8 exchanges for each of the nine KTIs. Since August, six
9 additional meetings have been held covering four key
10 technical issues in their entirety and parts of two other
11 KTIs. I will discuss those further in a few minutes.

12 The remaining KTI meetings are tentatively
13 scheduled to be completed by February 2001.

14 The approach the NRC and DOE are taking for the
15 key technical issue meetings is to focus on specific
16 concerns or questions the NRC has expressed in prior
17 meetings, specifically the April 2000 meeting, in the
18 specific IRSR report or in pre-meeting telephone
19 conversations.

20 During the meeting, DOE presents the status of
21 key technical activities related to each KTI subissue,
22 specifically discusses questions the NRC has had and the
23 path forward items planned.

24 Based on the DOE presentations and responses to
25 staff's questions, the NRC staff identifies what

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1 information is needed from DOE to enable the NRC to make a
2 regulatory decision at the time of any future license
3 application. This may include additional justification
4 regarding a certain issue or more testing in a certain
5 area.

6 The NRC and DOE then discuss the NRC's
7 information needs and reach formal agreement on what
8 information, and its schedule, DOE will provide. The
9 schedule for the information is prior to any license
10 application and the agreement is formally documented in
11 the meeting summary.

12 The meeting summary is prepared and signed
13 immediately after the meeting and includes a matrix of KTI
14 subissues and the specific agreements for each subissue.
15 The matrix also includes the status of each subissue; for
16 example, closed, closed-pending or open.

17 As I previously mentioned, we have held six
18 meetings with DOE covering four key technical issues in
19 their entirety and parts of two other KTIs.

20 The unsaturated and saturated flow under
21 isothermal conditions KTI was discussed during two
22 meetings, one in August and one in the October/November
23 time frame.

24 Igneous activity was discussed in August,
25 container life and source term was discussed in September,

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1 and structural deformation and seismicity was discussed in
2 October.

3 The meeting on criticality covered subissues
4 within three key technical issues. Those are container
5 life and source term, radionuclide transport and evolution
6 of the near-field environment.

7 Of the 20 subissues discussed to date, 16 are
8 now listed as closed-pending, three are closed and one is
9 open.

10 The one open subissue is in the igneous
11 activity KTI under the consequences of future igneous
12 activity subissue. The open question within this subissue
13 deals with DOE's approach for addressing magma-repository
14 interaction and the effect on the waste packages.

15 Two of the three subissues which are closed are
16 in the unsaturated and saturated flow under isothermal
17 conditions KTI and specifically relate to future climate
18 changes.

19 The remaining closed subissue is in the
20 structural deformation and seismicity KTI and specifically
21 relates to the tectonic framework of the geologic setting.

22 The subissues which are closed-pending all
23 require additional information from DOE, and DOE has
24 formally agreed to provide the information.

25 In the meeting summary, the NRC and DOE have

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1 also agreed to the schedule to provide the information.
2 The schedule for the specific agreements varies, with
3 roughly half due in fiscal year 2001 and half due in
4 fiscal year 2002.

5 The NRC and DOE are actively tracking these
6 agreements and plan to periodically update the status and
7 identify any problem areas at least once a quarter at the
8 quarterly NRC/DOE management meetings.

9 The individual NTC KTI leads will be following
10 and discussing the specific issues within theirs and the
11 other related KTIs on a more frequent basis.

12 At this point, there are five additional
13 meetings planned to discuss the remaining KTIs. The
14 radionuclide transport meeting is next week in Berkeley,
15 California.

16 The thermal effects on flow and the evolution
17 of the near-field environment KTIs will be discussed
18 together the week of January 8th.

19 The repository design and thermal-mechanical
20 effects KTI will be discussed the following week in
21 January. And the total system performance assessment and
22 integration KTI is currently planned for February.

23 There is an additional meeting planned for
24 December 19th. The objective of this meeting is for DOE
25 to describe and explain the results of the total system

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1 performance assessment - site recommendation analysis. I
2 believe that meeting will be held in Las Vegas with a
3 video link to Rockville.

4 We are also looking to schedule a meeting to
5 discuss the pre-closure issues, maybe sometime in late
6 February.

7 Regarding the status of the remaining 18
8 subissues to be discussed, 2 are now closed-pending, 15
9 are open and 1 is closed. The one closed item is in the
10 repository design and thermal-mechanical effects KTI and
11 specifically relates to the implementation of an effective
12 design control process within the overall QA program.

13 This concludes the formal part of my briefing.
14 I would like to now open it up and address any questions
15 you may have.

16 MR. HORNBERGER: Thank you, Jim. Let's start
17 at the other end of the table this time. Ray?

18 MR. WYMER: No, I don't have any questions.
19 It's pretty straightforward.

20 MR. HORNBERGER: No? John?

21 MR. GARRICK: I just wanted to raise the
22 question a little bit about the KTI resolution issue. In
23 particular, you talk about resolving the KTIs prior to the
24 license application.

25 I just wonder if there's some conditions on

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1 that that would allow one to take advantage of some of the
2 unique characteristics of this project.

3 One unique characteristic of this project is
4 the very long operating time associated with it before
5 closure. We talk about anywhere from 50 to 300 years or
6 maybe even more.

7 And one of the things that strikes me is that
8 the repository itself provides a very interesting
9 laboratory within which to make certain kinds of
10 measurements that would increase your confidence in the
11 long-term performance of the repository.

12 I guess my question is, is there any
13 flexibility or any conditions on these resolutions that
14 would allow the applicant to take advantage of the long
15 operating time to deal with some of these issues?

16 I'm thinking particularly of issues in the near
17 field having to do with the waste package and its
18 performance.

19 It just seems that -- it sounds awfully final
20 to have these very broad sweeping technical issues and
21 require resolution prior to even receiving a license
22 application.

23 In a first-of-a-kind project such as this, I
24 guess I'm just curious as to whether this is realistic,
25 particularly given the slowness with which the design is

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1 freezing.

2 Have you got any reaction to those, that
3 commentary? All I'm saying is that there seems to be an
4 opportunity here to address some of these issues in the
5 context of a real and the best laboratory of all, namely
6 the operation of the repository itself. Is there any
7 allowance for that in the sufficiency review and licensing
8 application process?

9 MR. ANDERSON: The focus for issue resolution
10 is on the license application and making sure we get
11 enough information in the license application to make a
12 decision at that time.

13 There is room. These meetings, we typically
14 discuss what DOE's current design is to date. They
15 present their path forward of activities where they'll get
16 the information relating to the specific design we're
17 dealing with.

18 But there's always room up to the point that
19 the license application, if DOE changes its design or the
20 laboratory, as you mentioned, produces other information,
21 that we can change the approach and modify -- or DOE can
22 modify its approach in designing the waste package or et
23 cetera.

24 So I'm not sure I'm answering your specific
25 question. The issue resolution process is really focused

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1 at the time of the license application, and I expect
2 modifications based on new data or new analysis from now
3 until that license application time frame.

4 For these meetings themselves, clearly focused
5 on what the current design is today. Jim, do you want to
6 add something?

7 MR. FIRTH: Yeah, I want to add a couple of
8 things. For the sufficiency review, we're focused on the
9 information that we would need for license application
10 that would allow us to give a construction authorization.

11 There's going to be the performance
12 confirmation period that would allow DOE to take advantage
13 of the time if a repository were licensed as it's being
14 constructed, to use that information.

15 The time there is part of the performance
16 confirmation period before an amendment was submitted for
17 receive and possessing nuclear material and again before a
18 decision was to close a repository.

19 So again, the sufficiency review is only
20 focused on the information we would need at this initial
21 license application.

22 MR. GARRICK: Thank you.

23 MR. HORNBERGER: Do you have something?

24 MR. LEVENSON: I have a question based on
25 ignorance. Most of the licenses that we look at, reactor

1 licenses and the certification of WIPP, et cetera, are for
2 finite time periods.

3 Does this license have some chill limitation or
4 does it go on forever? It's somewhat related to John's
5 question.

6 MR. McCARTIN: Do you want me to answer that,
7 Jim?

8 MR. ANDERSON: Yeah, Tim, why don't you go
9 ahead and answer that.

10 MR. McCARTIN: As proposed, Part 63 has a --
11 it's a multi-stage process and as Jim indicated, first,
12 there will be a construction authorization. Then a
13 license to receive and possess, and ultimately at the end
14 there's a license to terminate the license, at the very
15 end.

16 MR. LEVENSON: Between the beginning and the
17 end, there might be 150 years.

18 MR. McCARTIN: That's correct.

19 MR. LEVENSON: So that the phase is not
20 limited? The license to receive and store goes on
21 indefinitely as long as they want to keep it open?
22 There's no requirement to review at some point in time or
23 crank in new information?

24 MR. McCARTIN: Well, there's always the
25 requirement if they learn something new that changes

1 anything they've told us or the ability to meet the
2 performance objectives, they have to come in and notify us
3 of that and evaluate that, but it's those types of things.

4 MR. LEVENSON: But unlike reactor licenses,
5 this is not perceived to be for a finite period?

6 MR. McCARTIN: Well, at this time, no.

7 MR. LEVENSON: I'm not implying there should
8 be. I'm just trying to understand what we're looking at.

9 MR. McCARTIN: The one important thing is that
10 at each particular stage they have to give us sufficient
11 information to allow us to make a finding for what's
12 required at that particular instant in time.

13 MR. FIRTH: This is James Firth. I'd like to
14 add a couple of things to that. As part of the license
15 application, DOE will likely specify how long the
16 performance confirmation is going to go on, so that's
17 giving indicates of how long construction will take place
18 and then when they want to receive and possess.

19 Also, NRC has the opportunity to provide or to
20 put in licensing conditions that could put a limit in
21 terms of how long DOE would keep the repository open
22 without amending it to close the repository and terminate
23 the license. So there is that option as well.

24 MR. HORNBERGER: Jim, I have a couple of fairly
25 simple questions. I'll try to distinguish between Jim and

1 James. I'm talking to Jim, and not you, James Firth.

2 Jim, if I was keeping my tally correctly, you
3 said that there are 9 issues that we know about, that
4 there have been 20 subissues discussed and 18 subissues
5 remaining. So that means there are 38 total subissues; is
6 that the right calculus?

7 MR. ANDERSON: By my count, yes.

8 MR. HORNBERGER: And that is the official
9 count? There's no recount going to be involved here?

10 MR. ANDERSON: There's none that I believe. I
11 believe the thermal effects and flow may have, in the new
12 IRSR that's coming out, may condense three to two, but at
13 this point I think 38 is the number.

14 MR. HORNBERGER: All right. Somewhere along
15 the line I somehow recall 27 subissues, and we wound up
16 with more than that.

17 My real question has to do with the 18
18 remaining subissues. You have 15 that are now currently
19 open and I'll ask you an unfair question, but just tell me
20 your gut level feeling. Are there any in there that are
21 likely to be really problematic, and if so, which?

22 MR. ANDERSON: Unfortunately, I can't really
23 answer that question. We have just started holding some
24 of our pre-meeting tel cons with DOE just to kind of
25 clarify our positions or clarify their approaches. At

1 this point, I don't know of any, but again, we're very
2 preliminary in some of our discussions and some of these
3 future KTI meetings coming up.

4 MR. HORNBERGER: No, I wasn't asking you for a
5 final answer for the record. You gave me your answer,
6 which is a gut level feeling that you don't have any on
7 the horizon that you're losing sleep over right now?

8 MR. ANDERSON: Me, personally, no.

9 MR. LESLIE: This is Bret Leslie from the NRC
10 staff. Unfortunately, he didn't read his e-mail before he
11 came down here.

12 There is one that may give him heartburn and
13 this has to do with the waste package chemical
14 environment, and this is in the near field KTI.

15 And it's something that we're struggling with
16 right now. Is without a complete design, it may not be
17 possible to define the environment, which could impact the
18 performance of the drip shield in the waste package, and
19 so we're looking at the implications of level of design
20 detail necessary to define the environment. So I'll put
21 that out on the table.

22 MR. ANDERSON: I guess I'll retract.

23 MR. HORNBERGER: Well, it's good to know that
24 Bret isn't sleeping, anyway.

25 James, can I switch a question back to you and

1 perhaps I should have asked this from Joe when he was up
2 in terms of overview.

3 You talked about the sufficiency review and I
4 know it's clear that every time we talk about this we're
5 very careful to point out that it really is just
6 sufficiency of the information for a complete license
7 application and we're not making any determination.

8 Having said that, with the relatively short
9 time to review it, I'm just curious as to -- the statutory
10 requirements are for the Commission to offer comments on
11 the sufficiency. First of all, is that correct?

12 MR. FIRTH: Yeah. There's no statutory
13 requirement for how long NRC has to develop its
14 sufficiency comments.

15 MR. HORNBERGER: But they are comments? It's
16 not an approval; is that correct? They are comments on
17 sufficiency, which undoubtedly will be taken as either an
18 approval or disapproval, but there's no statutory
19 requirement for approving the -- it's not an application,
20 in other words?

21 MR. FIRTH: That is correct. We're not
22 approving the site recommendation. All that's required,
23 going back to your earlier question, is that the NRC
24 comments will accompany DOE's site recommendation.

25 So all we're doing is giving our perspective

1 and anyone who reads the site recommendation, if DOE were
2 to make one, will see what our comments are on the
3 sufficiency of in-depth site characterization and the
4 waste form proposal. We are not approving the site
5 recommendation.

6 MR. HORNBERGER: Okay. Again, the other
7 related question that I asked Joe. It seems to me that in
8 the relatively short time frame you have to look at the
9 site characterization, you're almost bound to rely very
10 heavily on these exchanges that you have been having on
11 issue resolution, and this gets tied back in with how the
12 issue resolution feeds into the Yucca Mountain Review
13 Plan, feeds into sufficiency comments.

14 Do I have this basically right, you are going
15 to rely pretty heavily on what you have discussed and
16 learned in the issue resolution in evaluating the site
17 sufficiency?

18 MR. FIRTH: Both the sufficiency comments and
19 the issue resolution process all rely on the same
20 information. So at that level, they're relying on the
21 same thing.

22 If we get agreements from DOE or determine that
23 we need additional information, that's information that we
24 would use in developing and writing our sufficiency
25 comments.

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1 So we will rely heavily on the meetings, but
2 it's at a more fundamental level of reviewing the same
3 information and the meetings just help further clarifying
4 where we are today.

5 MR. GARRICK: I just want to follow up with
6 that very briefly on the obvious question, and that is,
7 are you satisfied that the issue resolution process and
8 the technical exchange meetings are an effective way or
9 perhaps the best way to approach this whole issue of
10 sufficiency?

11 Is there another way? Is there any change that
12 you could imagine that would enhance the overall process?

13 MR. FIRTH: The meetings are the outcome of
14 having conducted a review of the underlying information
15 and have been following DOE's work on developing a waste
16 package, a waste form proposal, as well as characterizing
17 the Yucca Mountain site.

18 So the meetings are an effort to try and
19 clarify these are the issues in terms of the information
20 or analyses that we need. So they are a very useful part
21 of being able to develop our sufficiency comments.

22 But I guess they're not the only means that we
23 have of doing the review. They're an obvious part of the
24 end of the process of reviewing the documents and getting
25 agreements, but that's not the only thing that we're

1 doing. We're also doing work outside the meetings
2 reviewing the DOE information.

3 MR. GARRICK: But you're satisfied with the
4 process?

5 MR. FIRTH: The meetings serve a useful
6 purpose, but it's, again, the underlying review that is
7 critical for the sufficiency review.

8 The meetings help further that, but without the
9 review effort, the meetings would not be very useful. So
10 I guess the meetings are useful, but they're not the
11 process, just part of the process.

12 MR. HORNBERGER: Other questions? John?

13 MR. LARKINS: Just a quick question. As part
14 of your confirmatory audit plan using a TPA code, is there
15 a linkage between the KTI resolution process and the TPA
16 audit plan, your analysis I mean? Does one drive the
17 other?

18 MR. FIRTH: The issue resolution for the total
19 system performance assessment and integration KTI are
20 focused on methodology. So in that respect, they're not
21 directly linked.

22 However, the plan for reviewing TSPA LA is
23 focusing on helping us make compliance determinations at
24 the time of licensing, and before that of informing our
25 review so that we're focusing on the important

1 information.

2 So in terms of evaluating DOE's TSPA, there are
3 parts of the review that would be useful, but a lot of it
4 is more focused on the license application review.

5 MR. McCARTIN: Could I add one thing on that?
6 Tim McCartin, NRC staff.

7 Also, as part of these meetings, one of the
8 things we're trying to understand -- obviously we have our
9 TPA code and we run it quite a bit. We understand what
10 drives our code, what's important for our code.

11 However, the emphasis is on what is DOE doing
12 and we're trying to get from them in these meetings
13 questions of, "Well, you're collecting this information.
14 How does it relate to performance?" We're trying to get
15 from them.

16 They know their code better than we do at this
17 particular time. Part of the process is trying to get
18 from them, how does this relate to performance, et cetera,
19 and so...

20 MR. LARKINS: Part of the reason for the
21 question was to find out whether as issues get resolved or
22 unresolved or pending in the KTI process, does that become
23 part of the driver for certain analyses that are done or
24 requests for additional work by DOE?

25 Earlier today we were talking about the

1 linkages between KTI and referring to plans, the Yucca
2 Mountain Review Plan and all those different things. And
3 I was trying to get a picture as to how all these things
4 fit into an integrated decision-making process.

5 MR. FIRTH: This is James Firth. John, let me
6 address that. One of the things that we're doing in the
7 sufficiency review is to look at trying to risk-inform our
8 review. And to risk-inform the review, it takes two
9 components.

10 Part of the component, one component is the DOE
11 information. The other part is the NRC information. And
12 each of those operates at several different levels.

13 There's a system level information which
14 predominantly comes out of a TSPA, but then there's also
15 the risk insights from the process level information
16 analyses.

17 So it's combining all of those so you would get
18 a picture of where do we need to focus in terms of what
19 information is important and why. Is it a function of
20 whether it's the models or the underlying data, and that
21 information is something that gets factored into the issue
22 resolution process.

23 It's not in terms of we have this result;
24 therefore we have to ask for that specific information.
25 But it's looking at everything holistically in terms of

1 what is important, what's DOE's basis for that and is
2 there going to be additional information that we would
3 need to review a license application.

4 And then after we have a license application,
5 we will use the TPA code and reviewing DOE's TSPA to
6 determine do they have enough information to make their
7 case.

8 But that compliance determination is taking
9 place after we have the license application and when we're
10 conducting that review.

11 MR. LARKINS: Thanks.

12 MR. HORNBERGER: An ACNW consultant, Jim Clark,
13 has joined us. Jim, do you have any questions for Jim or
14 Jim?

15 MR. CLARK: [Shakes head.]

16 MR. HORNBERGER: Anyone else?

17 [No response.]

18 MR. GARRICK: Thanks very much, James and Jim.
19 I think with that we will take a break.

20 James, do you have a closing comment?

21 MR. FIRTH: No, thank you.

22 MR. GARRICK: Okay. A break, 15 minutes.

23 [Recess.]

24 MR. GARRICK: If we've finished with the KTI
25 issue resolution discussions, we can move to our next

1 item.

2 MR. HORNBERGER: Okay, good. Next we're going
3 to hear about the DOE perspective on the issue resolution
4 status. Is Dennis here? There he is.

5 MR. WILLIAMS: I guess this is DOE's kind of
6 view of how the KTI issues and the KTI meetings are going.
7 I'm Dennis Williams. I'm Deputy Assistant Manager for the
8 Licensing and Regulatory Compliance Group.

9 A lot of this will be kind of a repeat of what
10 Jim and James have said before, so I'll go through some of
11 the early part pretty quickly, but this is the listing of
12 some of the technical exchanges that we've had.

13 And in reality, it should be technical
14 exchange, slash, management meetings because we do make
15 these formal agreements during this meeting and that,
16 according to protocol, is a management meeting.

17 The upcoming ones have also been mentioned.
18 Thermal effects on flow and evolution of the near-field
19 environment, radionuclide transport, repository design and
20 thermal-mechanical effects and TSPA.

21 One of the questions that was asked in the
22 earlier session, where could potential hard spots be, and
23 I think someone had mentioned the near field. I guess in
24 DOE's opinion, probably -- or in my opinion, the near
25 field is probably one of our most difficult areas because

1 a lot of that will depend on the design and how it
2 interacts with the natural environment in that area. So
3 we'll see how that comes out early in January, the meeting
4 in Berkeley.

5 We did go through a listing of the number of
6 subissues, issues closed, issues closed-pending and open
7 for your future benefit of looking at these, and Mike
8 Scott has assured me that our numbers tallies up with the
9 NRC count. So hopefully, we won't have any problems with
10 counting.

11 We do have a status here by individual K
12 technical issue. Here shows the unsaturated and saturated
13 flow under isothermal conditions. It has a listing of the
14 various subissues.

15 Likewise, for igneous activities, the various
16 subissues. Again, I'll go through this real fast because
17 the other folks mentioned it. If you want to have more
18 dialogue on it, we can have that.

19 Container life and source term is probably one
20 of the more difficult ones we've had to date. We've got a
21 lot of subissues.

22 We had a large number of agreements that we
23 came to with regard to container life and source term, and
24 I think you'll see in a few minutes when I show how we are
25 trying to get additional testing into our program to

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1 satisfy some of the agreements that we've made, I'll show
2 some details of how we track that.

3 MR. HORNBERGER: Dennis, I have just one quick
4 question before you leave the subissues. I had meant to
5 ask this of James or Jim.

6 That is, in terms of the one open issue in
7 igneous activity, it's my understanding that there is a
8 clear path forward. It's not the magma waste
9 interactions. It's not just open hanging out there. You
10 people do have a path forward?

11 MR. WILLIAMS: Yes. We've got a path forward.
12 What we're trying to do, I think we're going to probably
13 end up having a little bit more dialogue with the NRC on
14 whether or not the path that we're taking is appropriate
15 to close-pend the issue.

16 But one of the things that we get into a lot
17 with the NRC in these technical exchanges is we tell them
18 what we would like to do as far as the path forward, but a
19 lot of times they have said, "Justify your approach."

20 So what they're doing is they're putting the
21 onus on us to justify the approach so we can give them
22 confidence that we are in fact doing the right thing.

23 And I think this bears on the question of how
24 prescriptive they are being and in our mind that is not a
25 prescriptive approach whenever we are just asked or

1 requested to justify what we are doing.

2 What we do whenever we come up with the
3 agreements from these technical exchanges, and as it has
4 been noted, we have a signed document at the end of each
5 of these technical exchanges.

6 That is signed before we all go away,
7 regardless of whether it's 6:00 o'clock or 10:00 o'clock
8 at night on the last day that we are there.

9 We have the signed agreement. We have a matrix
10 that has the agreements that we've covered with regard to
11 the subissues, but we also have a rather extensive summary
12 of the meeting.

13 This summary gives insight, gives us later
14 insight onto how we arrived at that particular agreement.
15 So we find that to be very helpful. We keep that in our
16 documentation and that way we can always go back...

17 [Pause for equipment adjustment.]

18 MR. WILLIAMS: Okay. I'm on page 10. What we
19 do with these agreements from the technical exchanges, we
20 basically put them in a tracking system down here,
21 condition and issue identification, and reporting/
22 resolution system.

23 We update that or we look at the status of that
24 every other week. One of the things that this system does
25 for us, it gives us a clear linkage to a particular

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1 subissue.

2 It keeps track of the activity to be performed,
3 the status of the activity and the planned or funded
4 status of each of them.

5 And of course, the planned and funded status
6 becomes a significant issue. We have the 2001 budget and
7 plan in place. However, some of the agreements that we
8 have made have caused us to go back and revisit that and
9 provide some additional funding in some areas.

10 The next page, page 11, is an example of that.
11 This has to do with container life and source term
12 subissue 1: The effects of corrosion processes on the
13 lifetime of the containers. Item 8 was the long-term
14 passive film stability of the canister material.

15 Again, when we track this, we have the text of
16 our agreement. We have the management items, which would
17 be the specific work scope that we would look at, the
18 current status and planning or funding status.

19 I will jump ahead to the actual example that
20 comes out of our agreement log on this particular item.
21 Again, each of these items will have something that
22 resembles this.

23 The agreement over on the left side, Item 8,
24 provide the documentation for Alloy 22 and titanium, et
25 cetera. It notes where the documentation will be whenever

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1 we revise an AMR. This is as part of the agreement.

2 What we try to do is get to some level of
3 specificity whenever we are getting into an agreement with
4 the NRC, not only what the item is that we need to
5 increase confidence on, but also where that information
6 will be, where that justification will be, and then, of
7 course, the date on when it will be available to the NRC.

8 In column two we have who the various managers
9 are, some of the things that they have to keep track of as
10 we move forward on resolving a particular item.

11 We have intermediate schedule items here in the
12 third column, getting the columns straight here, what we
13 are doing with regard to our change request funding and
14 how it goes through our PORB, or Program Operations Review
15 Board, which actually reviews all of this and then decides
16 whether or not we can do it. We will do additional
17 testing, provide additional funding.

18 And then, of course, in the final column there,
19 whether or not it's planned, funded, action or not. And
20 page 13 is a continuation of that particular status item
21 from our book of status of agreements.

22 Page 14, summary page, technical exchanges from
23 our point of view have been productive. I think that
24 question came up in one of the previous discussions with
25 Jim and James.

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1 One of the things that DOE likes about these
2 technical exchanges is we have the opportunity to sit
3 across the table from the regulator and actually get into
4 a dialogue on what we have, what we don't have, what is
5 needed, what is needed to build confidence in the
6 regulator such that DOE can move forward whenever we make
7 a decision that, that we can go back and we have a basis
8 for putting more work into the plan or developing better
9 justification for how we will provide more confidence to
10 the NRC.

11 What I said here in bullet form, beneficial in
12 clarifying NRC expectations. And as I said earlier, the
13 summary of these meetings is very helpful in that, in
14 addition to the actual text of the agreements that are
15 reached in the matrix that's attached to the summary.

16 It's effective in establishing a path forward
17 on the agreements. We feel the DOE and the NRC teams are
18 working well together.

19 We have had higher levels of management from
20 both DOE and NRC at all these technical exchange
21 management meetings. I've been present at five of the six
22 that we've had so far, and we'll be there for the next
23 four.

24 We feel it's been effective because we have
25 changed the status on 75 percent from open to closed-

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1 pending and only one subissue remains open of those that
2 we've covered so far.

3 And one of the things that we do, as we move
4 along, we will go back and look at subissues or criteria
5 that we haven't come to complete closure on in an earlier
6 meeting and try to pick that up so we can keep a running
7 dialogue going on not only the closed-pending but also the
8 open issues.

9 So in my mind it has been very effective. My
10 boss, Steve Brochum, has been an avid supporter of this
11 process. He believes it's the right thing to do and so
12 we're continuing.

13 Thank you.

14 MR. HORNBERGER: Thank you, Dennis. Ray?

15 MR. WYMER: What's the formal mechanism for
16 introducing new things? This may not be a good example,
17 but such things as the effects of trace elements on
18 corrosion of C-22.

19 MR. WILLIAMS: What we -- now, if that happens
20 to be -- it would be unlikely that something like that,
21 that kind of detail would be in an agreement with the NRC.

22 But if that's a way that we choose to pursue
23 resolution of that particular problem, we would have a
24 champion in the DOE organization that would probably be
25 either an investigator in the laboratory or a product

1 manager within the DOE.

2 They would put together a position paper called
3 the PORB position paper. They would take it to the
4 Project Operations Review Board with their rationale for
5 doing this work.

6 They would get either a thumbs up or a thumbs
7 down on this particular proposal, and usually in those
8 proposals it has not only a synopsis of what the work
9 would entail, but also the reasons why we would want to do
10 the work, and cost and schedule associated with it.

11 And these folks have -- in some cases they have
12 quite a bit of power now because if they can refer back to
13 a KTI agreement that says that we need more effort in a
14 particular area, then they use that as a justification to
15 help move it through that process.

16 The PORB rules on it, either positive or
17 negative. If they rule on it positive, it goes to the
18 project manager, who approves it, and then we go through a
19 change request process to get the scope and the funding
20 into the program.

21 MR. WYMER: One other question. To what
22 extent, if any extent, do subjective things, like
23 perceptions of the public or the stakeholders, on an
24 issue, quite apart from the technical merits of the issue
25 figure into your decisions?

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1 MR. WILLIAMS: Lately that hasn't come up, but
2 there's been cases in the past where public perception has
3 come into play.

4 The fluid inclusion program that we're involved
5 in, that had probably more public perception, more
6 confidence building than real technical merit, if you
7 will.

8 Some of the work with Wernicke out of I think
9 it's Cal Tech is kind of in that particular category.
10 Anytime something like that comes up, of course, it is
11 addressed. It is considered.

12 It then becomes a matter of whether or not the
13 cost and the schedule ramifications outweigh the benefit,
14 even from a public perception standpoint.

15 MR. WYMER: Thank you.

16 MR. HORNBERGER: Milt?

17 MR. LEVENSON: Just looking at this example
18 table you've got, there's basically nine items, eight of
19 which are not funded. Does that make you nervous? What
20 happens if the PORB does not approve funding for one of
21 those? What happens to the agreement that you have with
22 the NRC staff?

23 MR. WILLIAMS: Well, the agreement there is in
24 Item No. 8, that we provide documentation for Alloy 22.
25 Again, it's provide documentation, provide justification.

1 The second column is things that we think we
2 need to do to provide that documentation or provide that
3 justification. We may after our deliberation say that,
4 hey, we may prefer to proceed at risk with regard to one
5 of these items and not do that.

6 But in the case of this one on passive film
7 stability, I believe that's one that our PORB has already
8 acted on and I think we put one-and-a-half million dollars
9 of extra funding and scope into our program in an effort
10 to address some of those issues.

11 MR. LEVENSON: I can visualize, you know, a
12 real public relations aspect. You put out a document that
13 says these are nine types of data we'd like to have, and
14 then you come back and say, because we couldn't get it
15 funded, we're going to try to convince you three are
16 adequate. You're going to have a tough sell.

17 MR. WILLIAMS: Well, part of being open is
18 showing what we've got in our system that allows us to
19 keep track of what we're doing.

20 Now, over here on the far column, I don't have
21 it up there any -- but on the far right column, that was
22 the status before the PORB acted on this in the middle of
23 November.

24 I couldn't tell you exactly how the rankings
25 come out right now on whether or not all of these got

1 funded or if they are the next round on container life and
2 source term, which may entail another \$5 to \$6 million is
3 necessary for the 2001 program.

4 MR. LEVENSON: It seems to me, a couple of
5 people have asked are there some downside risks, are there
6 some problems, and I'm not sure there are specific items
7 that are issues, but it seems to me that agreement over
8 provide documentation is a little bit open-ended as to --
9 is there a good understanding as to how much is necessary,
10 et cetera?

11 MR. WILLIAMS: Well, and that's why --

12 MR. LEVENSON: Do you have the feeling that you
13 know what you need to provide?

14 MR. WILLIAMS: Yes, and we get a lot of that
15 feeling, again, from the summary of the meeting, which has
16 insight to what is behind the specific agreements.

17 And then the agreements try to capture what we
18 think we need without being specific as far as the
19 techniques on how to do that.

20 We may have a list of several items that we
21 think is necessary to satisfy that particular agreement,
22 but then in the end we may choose to do two or three and
23 feel that we are covered by other types of things for the
24 remainder.

25 So again, there is some risk for the DOE

1 associated with this. In the end, the NRC may say, "Hey,
2 we don't believe that approach. We don't agree with you."
3 And then we'll have to go back to not square one but maybe
4 square five on the process of doing this.

5 MR. LEVENSON: I guess another way of phrasing
6 my question -- I think you've answered it -- is, as the
7 KTI resolutions progress, you think you do have a good
8 understanding of what you have to produce?

9 MR. WILLIAMS: I think we have a good
10 understanding of what we have to produce. I think that we
11 understand that it's going to be difficult in a lot of
12 cases, and I think that we're trying to be as effective as
13 we can in using our money and our time to cover the major
14 part of the problem.

15 MR. GARRICK: I realize that these
16 presentations today have been mostly process related
17 rather than resulted oriented, but since my colleague on
18 my right raised the question of what issues have been
19 found to be maybe the most challenging -- and I don't know
20 exactly what the words that were used -- or have the
21 potential maybe of being showstoppers or what have you,
22 and of course that's an overstatement.

23 He asked that of the NRC and they answered it,
24 and then you more or less confirmed that that was the
25 primary issue, and I'm a little puzzled by that, and let

1 me tell you why.

2 The NRC rules and regulations stress the fact
3 that the safety of Yucca Mountain has to come from both
4 engineered systems and from the natural setting.

5 My impression is that one of the most important
6 lessons we've learned in the Yucca Mountain Project so far
7 is the difficulty with which it is to characterize
8 mountain to a level at which we can really make high
9 confidence engineering calculations about its performance
10 under different conditions.

11 On the other hand, I think the near field, and
12 the waste package in particular, is pretty straightforward
13 in terms of being able to come up with a specification and
14 building something to that specification.

15 That seems to me to be a lot easier task than
16 characterizing a mountain to a level that would come close
17 to the quantitative content of an engineering
18 specification.

19 So I guess my question is, I'm surprised that
20 we would identify the waste package or the near field as,
21 let's me call it for now, the primary area of concern.

22 I would think that the primary area of concern
23 is going to be to quantify the contribution to the long-
24 term safety of the repository from the natural setting.

25 That's where I think the whole performance

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1 assessment is currently weakest and so I must be missing
2 something. Maybe you can illuminate it.

3 MR. WILLIAMS: Well, a lot depends on how you
4 look at the tally sheet to come up with your opinion on
5 where the problems may lie.

6 As you noted, what we have been doing is more
7 process than technical. With regard to the UZ and the SC,
8 whenever we've gone through and had the preliminaries, had
9 the discussions, talked about it, when it came down to
10 actually getting down to what are the agreements that are
11 necessary in order to have confidence to move forward,
12 when we're talking about the things associated with the
13 natural system, we're only in a matter of three or four or
14 a dozen agreements at the most for any particular KTI.

15 When we get to the area of the waste package,
16 we had over 40 -- I think there was 41 or 42 agreements
17 that we had to reach in order to get container life and
18 source term on track towards closure or closed-pending of
19 some of these issues.

20 So if you do that just simplified process
21 approach and a matter of trying to instill confidence that
22 we are headed in the right direction, I think we're
23 finding that the natural system is easier to deal with
24 than container materials.

25 And we still haven't got into the near field

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1 yet, but near field is where all the coupled processes
2 take place and I, you know, just looking ahead, I feel
3 that that's going to be one of the more difficult areas to
4 deal with.

5 One other point I might raise with regard to
6 how things are developing. We've been doing a great deal
7 of work and putting a lot of time and money into the
8 natural system for quite a long time.

9 We haven't put that kind of effort into
10 container life and source term areas, into waste package
11 materials, those types of things.

12 So to me, it all depends a lot on your
13 perspective on what you're saying needs the most or is
14 going to be the most difficult to deal with in the coming
15 days.

16 MR. GARRICK: This is too big a subject to take
17 up now and this is not the real purpose here, but you've
18 triggered something and I just want to push it a little.

19 If you were taking the position that I want to
20 build my case principally on the basis of the performance
21 of the waste package, then I can see how this could be.

22 But that doesn't seem, to me, to be an option
23 that you have. Of course, you want to do as much as you
24 can. I still think that, as I look at the performance
25 assessment and the sources of uncertainty from a

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1 standpoint of specifications and designing and doing
2 things against a set of specifications, my feeling is that
3 the uncertainties continue to be far greater in the
4 natural setting than they are in the waste package.

5 That may be just that I'm not up to speed, but
6 there's something about this whole thing, and I know we
7 won't get it resolved today, that bothers me.

8 I just don't buy the fact that there's a bigger
9 concern with respect to the waste package -- with respect
10 to safety, not compliance, than there is with respect to
11 quantifying the contribution to safety from the natural
12 setting.

13 I think this is another issue that's in the
14 middle of all of this, is that we tend to get in a
15 compliance loop here and sometimes get decoupled from the
16 real bottom line performance measure of concern, namely
17 the health and safety of the public. When we do that,
18 then sometimes things get out of context, and maybe a
19 little of that exists here.

20 But I was curious by your observation and the
21 NRC's observation, and I don't happen to believe either
22 one of you. But that's for another time.

23 MR. WILLIAMS: That's quite all right. It's
24 not necessary that you believe us, just that you have
25 confidence that we'll do the right thing.

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1 MR. HORNBERGER: Inasmuch as I just delight so
2 much in disagreeing with John, let me followup his comment
3 and a point that you raised in terms of the near field.

4 MR. GARRICK: The problem is simply answered.
5 You're an earth scientist. You have much more confidence
6 in the earth science than I do, and I'm an engineer and I
7 have much more confidence in our ability to engineer
8 something, et cetera.

9 MR. HORNBERGER: Actually, I wasn't even going
10 to disagree with you on that fundamental level. I was
11 really in the near field and more earth surface processes
12 than engineered, per se, but still, your answer had to do
13 with the near field.

14 And it does strike me that things like coupled
15 processes, like formation of secondary minerals that we
16 know precious little about and -- at any rate, I do have a
17 question. Let me back up.

18 My question has to do with how this issue
19 resolution process is going forward, and in particular how
20 coupled processes are being handled.

21 The ACNW has been critical of the key technical
22 issue approach that the NRC has taken, or we have some
23 concerns. Not necessarily critical, but our concern had
24 to do with whether or not the stovepipes would actually
25 prevent or at least hinder the full consideration of

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1 coupled processes, and that has been a concern for us.

2 And here DOE and NRC are now marching along
3 resolving key technical issues, and my question for you is
4 sort of along the line of the question Ray asked, how do
5 you consider new things?

6 How do you make sure in this process that
7 you're not missing out on some critical things, like
8 coupled processes?

9 MR. WILLIAMS: Well, how you make sure that
10 you're not missing something is obviously a very difficult
11 question. With regard to the near field environment where
12 it will -- that's a natural place for coupled processes to
13 be addressed, and we haven't got to that particular
14 exchange yet.

15 I think after we are done with that, then we
16 can take a good hard look at what we've done with -- you
17 know, what are the critical issues associated with the
18 near field environment, and I think, in my mind, coupled
19 processes will be one of them.

20 If we don't thoroughly address that through our
21 technical exchange, I think it's incumbent upon DOE to
22 address that.

23 It doesn't necessarily have to be in the forum
24 of a technical exchange management meeting with the NRC
25 for the DOE to address something.

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1 We could do our own thing. We can go out and
2 look at whatever we feel needs to be looked at without our
3 regulator telling us to do that. We're supposed to be a
4 responsible agency.

5 One of the reasons why again I go back to near
6 field environment, we don't know for sure how it will turn
7 out, but in my mind, because of the uncertainty associated
8 with coupled processes, I think that, again in my mind,
9 the near field environment may be a very difficult
10 technical exchange.

11 MR. HORNBERGER: Just a comment that we've
12 called into question. Because we advise the NRC, we've
13 mentioned our concerns to the NRC about a couple of
14 processes.

15 But I do know that those who advise DOE also
16 have pointed to DOE that perhaps their treatment of
17 coupled processes has not been without concern, shall I
18 say.

19 MR. WILLIAMS: And we've got some dialogue
20 going on that right now.

21 MR. HORNBERGER: Okay. I do have another
22 question. That is, again at least early on I know that
23 DOE was concerned about the resolution of issues, in
24 particular the prescriptive nature or potentially
25 prescriptive nature of some of the things that I gather

1 from what you've said and from what James said earlier,
2 that a lot -- or I guess it was Joe earlier, who said that
3 a lot of that has been resolved.

4 I have still a residual concern, I think, and
5 that is a question for you as to the extent to which DOE
6 is pushed to make conservative assumptions to close issues
7 and whether or not this is a concern in the long run in
8 terms of having the best repository possible.

9 What's your take in this issue resolution
10 process? You said you'd been to five of the six. Is the
11 NRC staff, is there still a tendency, as we anticipate a
12 regulatory to have this tendency, to push for conservative
13 assumptions or bounding assumptions?

14 MR. WILLIAMS: I don't really detect that. I
15 guess oftentimes the way I feel about the way these
16 exchanges have gone, we've got a technical staff DOE,
17 we've got a technical staff NRC, and I think both staffs
18 are more inclined to want the realistic representation of
19 what's going on.

20 I think that some of you who have watched the
21 program recently have noted that we've taken some
22 conservative bounding approach in some cases. It hasn't
23 been that good for us in some arenas. There's a push on
24 to have a more realistic representation.

25 Anything that I've seen with regard to the NRC

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1 over the last several months, I don't see them pushing
2 conservative bounding as a major issue.

3 Sometimes I get the impression that the
4 technical staff feels that that could be a fall-back
5 position, but it's not really the way that you would take
6 it on the first cut.

7 I mean, NRC in the audience and on the tube can
8 state otherwise, but that's my impressions.

9 MR. HORNBERGER: I just wanted your
10 impressions. I'll get their impressions.

11 MR. WILLIAMS: And again, as far as the
12 prescriptive nature of doing things, I think it is -- for
13 people who have lived in more of a prescriptive arena for
14 a long period of time, it's hard to break out of that
15 mold.

16 But I think the management on the NRC part, as
17 well as the management on DOE, we have a lot of discussion
18 about this. Is this overly prescriptive? Why don't you
19 allow us the flexibility to get the answer the way that we
20 deem is best and then you can rule on whether or not you
21 think the answer is correct?

22 And over the past few months, I think that's
23 worked out very well for DOE.

24 MR. HORNBERGER: Jim, any questions? John?
25 Andy?

1 MR. CAMPBELL: Part of Bret's concern is about,
2 if I'm reading him right, listening to the little bird
3 that was whispering in my ear a little while ago, is in
4 leaving the design open, the materials you're putting into
5 the repository, the chemistry of that system will be
6 buffered by those materials, not so much by the rocks
7 surrounding the crypt and the water coming in, but
8 actually the materials that you put into that crypt.

9 So by leaving the design open, you are
10 introducing into the process an uncertainty that, as John
11 points out, could be resolved from an engineering
12 perspective, but is not because you don't have a final
13 design in place.

14 What kind of schedule do you have as you go
15 into SR and LA to tighten that up so those uncertainties
16 that are introduced by a decision about design are
17 reduced?

18 MR. WILLIAMS: I really couldn't tell you about
19 the schedule for resolving where we are at on the design.
20 I've been out of the office for about three weeks and --

21 MR. CAMPBELL: You don't know the results of
22 the election yet.

23 MR. WILLIAMS: I don't know the results of the
24 election on that one. Sorry. But again, I think that
25 brings into -- or gives us some insight on how people view

1 this differently.

2 I mean, you were given this insight to the
3 design associated with the near field environment. I'm a
4 natural systems person, so whenever I answered the
5 question on the near field environment, my immediate
6 concern was coupled processes, where other people, if
7 they're more design oriented in their background and their
8 education, it may be the materials part of it.

9 So again, that's the difference that you're
10 going to get, or the different perspective on the answer
11 to that particular question.

12 MR. CAMPBELL: Well, a couple of processes do
13 come into play. It's just that the couplings of the
14 materials, and that also couples with the natural systems.
15 It gets very complicated very fast, and I think Dr.
16 Garrick's point is that that is just one area that you can
17 specify up front.

18 You can change it. You can modify it to meet
19 certain needs. You can't really do that with the natural
20 system. I think that's part of the difference between the
21 uncertainties in the natural system and the uncertainties
22 in the system of materials.

23 MR. WILLIAMS: Well, the only way you're going
24 to get through the natural system part of that is through
25 greater understanding of what you're dealing with, whereas

1 on the design part of it you can do some changes.

2 But how do you know what changes to make if you
3 don't understand what's going on with the natural system.

4 MR. GARRICK: Excuse me. I just want to follow
5 up on that a little bit. We have, of course, talked a
6 great deal about doing the kind of analysis that would
7 allow us to get a good handle on what the contribution is
8 of different engineering barriers to the overall
9 performance.

10 And of course, ideally from an engineering
11 standpoint, we'd like to design a million year container
12 and not have to count on the geology, which is somewhat
13 analogous in the reactor game of building a perfect
14 containment so that you wouldn't have to count on the
15 meteorology for safety. I certainly don't like counting
16 on meteorology for safety. And I don't like much more to
17 count on geology for safety either.

18 But on the other hand -- and so I am really in
19 favor of a waste package design that really does
20 essentially provide the protection that's needed.

21 But have you considered looking at the
22 performance of the natural system in the absence of a
23 waste package?

24 MR. WILLIAMS: I think some of our TSPA runs
25 show that. It has to do with the contribution of the

1 different barriers.

2 MR. GARRICK: It seems to me if you did some
3 comparing of that with the presence and the absence, you'd
4 probably find that -- of course, the NRC doesn't specify
5 how much of the safety is supposed to come from what,
6 whether it's the waste package or the natural setting, but
7 it seems to me if you really did that and you looked at
8 the uncertainty curves, you'd probably conclude that 90
9 percent-plus of the safety will in fact come from the
10 engineered systems. I'd be very curious as to --

11 MR. WILLIAMS: But I seem to --

12 MR. GARRICK: Over the time of compliance.
13 Over the time of compliance.

14 MR. WILLIAMS: Well, but I seem to go back to
15 some of the things that I tend to recall in an anecdotal
16 fashion, but 99 percent of the radionuclides are basically
17 immobilized by the natural system.

18 So I mean, your 90 and my 99 don't seem to --

19 MR. GARRICK: But in the field of
20 radionuclides, 99 percent may have little or no meaning as
21 far as doses are concerned.

22 MR. WILLIAMS: I guess to go back to the final
23 word on this, I think the regulation requires for us to
24 have a repository that considers both the natural and the
25 engineered system and I think that's what we're trying to

1 do.

2 MR. GARRICK: Yeah, I understand that and I'm
3 just looking for clarification and your perspective.

4 MR. WYMER: What you're really walking all
5 around here is the whole concept of defensive depth.

6 MR. LEVENSON: For clarification, when we're
7 talking about the business of John's original question
8 about overestimating consequences, I refuse to use the
9 word "conservative" for that because it generally isn't.

10 But your response, you discussed somewhat the
11 matter of prescriptive versus non-prescriptive, and that's
12 not really, I don't think, our concern.

13 I mean, prescriptive things can require
14 overestimating consequences just as much as analytical
15 means, and so I don't think the issue of whether it's
16 prescriptive or non-prescriptive is our concern.

17 Our concern is if you're overestimating
18 consequences, it almost never is really conservative
19 because it forces you to do something else, which has its
20 own risk attached to it, that you otherwise wouldn't do.

21 So really, the question is whether it's
22 prescriptive or non-prescriptive, do you feel you have the
23 freedom to produce a best estimate type calculation or
24 analysis that then subsequently people can add safety
25 margins to.

1 MR. WILLIAMS: I believe we've got the freedom
2 to do that.

3 MR. LEVENSON: Okay. Because your response
4 discussed the prescriptive versus non, and I don't think
5 that -- this question applies either way.

6 MR. WILLIAMS: Well, I took your question in
7 the context of our relationship with the NRC and whether
8 or not they were being overly prescriptive and also how
9 they felt about --

10 MR. LEVENSON: The question really wasn't
11 overly prescriptive, I don't think. It was in the context
12 of maybe in your terminology, overly conservative.

13 MR. WILLIAMS: I took it as a two-part
14 question. That's why I answered it in two parts.

15 MR. HORNBERGER: Thanks very much, Dennis.

16 MR. WILLIAMS: Thank you.

17 MR. HORNBERGER: Mr. Chairman, I'll turn it
18 back to you.

19 MR. GARRICK: Okay. I don't think we need the
20 court reporter for these next two sessions, do we? The
21 next one is the ACNW sufficiency review and task action
22 plan and I know we don't for the discussion of the report,
23 do we?

24 MS. DEERING: Well, for the vertical slice
25 discussions we thought it might be a good idea to try to

1 keep it recorded so that we recall what we said.

2 MR. GARRICK: All right. That's fine. Then
3 we'll carry on with the court reporter.

4 We're now going to talk about ACNW's
5 sufficiency review and our related task action plan and
6 staff member Lynn Deering is going to lead off that
7 discussion.

8 MS. DEERING: Okay. I'm going to go to Tab 7
9 and just kind of lead us through.

10 MR. GARRICK: Move that microphone.

11 MS. DEERING: I was going to say that we have
12 some material that I handed out this morning that is
13 inserts to Tab 7, and I'll note that as we go through.

14 What I'm going to do is first talk a little bit
15 about a reminder of where we stood last month, what we
16 agreed on in the way of our vertical slice and I'm going
17 to actually read some excerpts from a new insert that I've
18 written just to get us oriented. And I'm going to talk a
19 little bit about our revised approach.

20 I've updated the Task Action Plan, which is in
21 the notebook, but what I'm suggesting, what I'm going to
22 suggest is that we sort of abandon that lengthy document
23 at this point and we start using the one page that we have
24 from here on out to kind of guide us because this Task
25 Action Plan is filled with lots of material and I do try

1 to keep it updated on a monthly basis, but there's a lot
2 of tables, some of which I don't think we need anymore.

3 MR. GARRICK: Now, you handed out two things.

4 MS. DEERING: Yes, and I'm going to talk about
5 those in a minute. Then we'll go over the vertical
6 slices, the individual vertical slices, and each member
7 with the support of a staff person can kind of toss around
8 what they're proposing and kick around some ideas just to
9 see if it might fly.

10 We don't have to get a whole lot more firmer
11 than that, but I think a lot of this is still a little
12 experimental.

13 When it becomes my turn and George's turn to
14 talk about our vertical slice, which is the saturated
15 zone, we're going to have Jim Clark, our consultant, who
16 attended the technical exchange with us, to chime in on a
17 little summary and a few ideas he would like to offer.

18 And then I hope we can talk about schedule. If
19 we think we have a good idea here and it's going to work,
20 where we might -- what we might commit to with getting
21 these things wrapped up.

22 We can also talk about individual products.
23 I've heard a few ideas that some of the members thought
24 they might write a letter on their vertical slice and that
25 would be fine, but we might want to just get a handle on

1 what the overall intention is.

2 Do we want four letters on each vertical slice?
3 Do we want -- so we'll discuss that idea also. Does it
4 sound reasonable? Okay.

5 Last month, as you recall, just briefly remind,
6 we discussed the vertical slice idea and we were all going
7 to come here today with a little more thought given to
8 what issue or subissue we might do something more in depth
9 on, and that's about all we agreed to.

10 But I'm going to remind us what we even mean by
11 vertical slice. You can refer to one of these handouts.
12 It's called "Draft 5," dated 11/21, "Revised ACNW
13 Approach." It's newer than the one in the notebook.

14 You recall that we got some concerns brought to
15 our attention that perhaps we were not clear. We changed
16 course and the Commissioners and their staff were not
17 aware that we switched.

18 I have extras for those that don't have it.
19 And this one pager was designed with the idea of using it
20 to communicate to those that want to know what we're doing
21 and why we might not be doing a full-blown review of the
22 SRCR.

23 So what I've clarified in here, and I'm just
24 going to read a little bit from this. We're no longer
25 planning on conducting an independent review of the DOE's

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1 SRCR or providing separate comments as part of our general
2 oversight of the staff's sufficiency review.

3 Instead of evaluating the SRCR independently,
4 this committee plans to use a vertical slice approach for
5 evaluating the staff's KTI issue resolution process, in
6 addition to conducting a review of staff's sufficiency
7 comments.

8 So we've kind of got two pieces to it now. And
9 the committee will report to the Commission on both its
10 evaluation of the issue resolution process and licensing
11 capabilities, and we're going to report on -- we're going
12 to have a look at what NRC is putting together in its
13 sufficiency review and we're going to comment to the
14 Commission on whether we think the staff is basically on
15 target with that. So there's at least two products right
16 there.

17 And we -- to kind of clarify here, again we're
18 communicating to the Commissioners. The ACNW believes
19 that placing its focus on evaluating the NRC staff's
20 activities and capabilities is a more effective use of
21 resources, rather than focusing on reviewing and
22 evaluating DOE's documents. So that's just a slight shift
23 in our emphasis.

24 And the idea here is that we're going to trace
25 some of these resolutions in the issue resolutions

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1 process. We're going to select issues that are open,
2 closed or closed-pending and/or even subsets of those
3 issues because each of those subissues have a number of
4 acceptance criteria, which also get a closed -- I don't
5 know if it's official, but in these tech exchanges they're
6 discussed in terms of whether they're open or closed or
7 closed-pending.

8 So there's many levels of refinement that we
9 can select here. But the idea would be to get a hold of
10 one of those, attempt to use -- find out how well
11 documented and well founded that finding -- I won't call
12 it a finding -- that resolution is and whether or not
13 using the Yucca Mountain Review Plan, the documents from
14 DOE, such as PMRs and AMRs, and whatever other tools and
15 resources we have to see whether we feel comfortable that
16 those are well founded and defensible resolutions.

17 And in doing that, we think, we believe we're
18 going to get some insights about the staff's overall
19 capability and their tools and how they're using their
20 confirmatory analysis tools and their overall capability.

21 So that's the strategy and our objectives, I
22 know, have not changed. We still intend to do the things
23 John mentioned in his opening remarks.

24 We're going to evaluate whether the guidance,
25 the YMRP, is risk-informed. We're going to evaluate

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1 whether the staff's sufficiency comments are defensible,
2 logical, focused on the most significant issues.

3 We're going to identify any gaps if we see any
4 in tools, guidance and capability to review an LA, and
5 we're also going to point out strengths that we see so the
6 Commissioners understand, and we're going to identify what
7 the NRC needs to do between now and when an LA is
8 submitted if we notice any, again, gaps.

9 Now, does anybody have comments or suggestions
10 to refine or improve upon these?

11 MR. HORNBERGER: Not a comment to refine or
12 improve upon.

13 MS. DEERING: Or any other comments.

14 MR. HORNBERGER: But I do have a comment on
15 sort of interpretations.

16 MS. DEERING: Sure.

17 MR. HORNBERGER: And that is that I accept what
18 you said, Lynn. I think it's an accurate reflection of
19 what we agreed to do.

20 However, the vertical slice, in my mind, the
21 top of it is at the SRCR. Do you want me to get a
22 microphone? I'll just sit closer to that mike.

23 At any rate, because it goes, the top of it, in
24 my mind, is at the SRCR, that means that we will in fact
25 be looking at the SRCR along with the PMRs and the related

1 AMRs associated with the vertical slice.

2 And another way to look at this, again it
3 doesn't change what you said, but it is almost an audit
4 kind of approach, not only to the staff's capabilities,
5 but our window into the SRCR and then interpreting how the
6 staff is approaching it.

7 So in some ways it's as much an audit of the
8 DOE documents as it is an audit of the staff's
9 capabilities. It's almost both.

10 MR. LARKINS: That's what I was thinking. When
11 we look at it, we're going to be looking at many of these
12 DOE's products, PMRs, AMRs and the SRCR.

13 It seems as though you could almost comment on
14 those parts that you're looking at similar to what we did
15 on the VA because we didn't do the whole VA. We were
16 selective in those areas that the committee chose to focus
17 on and provide comments.

18 So I think this is a natural expansion upon
19 what Lynn has outlined.

20 MS. DEERING: Without doing any extra work,
21 practically.

22 MR. LARKINS: Practically, except you've got to
23 write an additional document.

24 MR. HORNBERGER: And I'll even say we can
25 withhold our judgment on that, but let it open. We

1 wouldn't preclude writing an extra document.

2 MR. LARKINS: It may be very useful if we
3 selected the vertical slices correctly in terms of risk-
4 informed or those risk-significant issues.

5 MR. HORNBERGER: But then we'd only do the
6 natural environment.

7 [Laughter.]

8 MR. GARRICK: I'm still chairman now.

9 MS. DEERING: I think that's a very good
10 refinement of what we we're doing and a little bit of
11 expansion to possibly include separate comments on the
12 SRCR and supporting documents.

13 MR. LARKINS: It might also satisfy the
14 Commission also because I think that some of the
15 discussions that Lynn has had with some of the TAs and
16 some of the discussions I've had, there may be an
17 anticipation or expectation on their part that we were
18 doing more than what we're outlining in this new vertical
19 slice approach.

20 And one of the things we need to do is on
21 point, and I guess we're going to do it now during the
22 January 18th Commission meeting, is to inform the
23 Commission of the overall approach and what type of advice
24 they're going to receive from the ACNW.

25 MR. GARRICK: Yeah. We'll do a mini-version at

1 the Commission meeting.

2 MS. DEERING: So some of us have developed a
3 little more thought to a specific technical area or
4 subissue and Ray wrote something which is in the notebook
5 that I wanted to give him an opportunity to talk about.

6 And I think Rich and Milt put something in the
7 notebook on thermal effects, and then George and I can Jim
8 Clark can talk a little bit about the saturated zone.

9 And John can talk about TSPA and some ideas he
10 is thinking about for the group, and he might develop that
11 a little bit. So Ray, or whoever wants to go from here,
12 go ahead.

13 MR. WYMER: I don't mind starting.

14 MS. DEERING: Thank you.

15 MR. WYMER: Andy Campbell, who is the ACNW
16 staffer who is working on this issue with me, and I have
17 decided that a good way to handle the areas of interest to
18 us, and I'll tell you what they are in a second, is
19 through a workshop which we'll hold in February.

20 The origin of our particular tack is that we
21 observed and it seems obvious to us that DOE has changed
22 its emphasis from geology to the near field repository,
23 where they're now turning their attention and where many
24 of the remaining problems are and we had quite a bit of
25 discussion a few minutes ago about that.

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1 So in particular, we're concerned with the
2 corrosion resistance of the C22 alloy, which has become a
3 cornerstone of the repository safety analysis and it's
4 supposed to last something like 11,000 years before it
5 begins to leak at all.

6 So we decided that it would be a good idea to
7 look at that and then more broadly, we think that if it
8 turns out that you can't really guarantee to the
9 satisfaction either of the technical community or to the
10 public -- so the reason I asked the question earlier about
11 how much do you take public reaction into account.

12 If you can't satisfy one or both of those
13 audiences, then you'll have to look a little deeper for
14 other barriers that can be relied on to get the definitive
15 depth that's required.

16 It seems to us that one of the obvious areas to
17 look is an area of chemistry in the near field and
18 chemistry of the radionuclides that will be released if
19 and after corrosion takes place.

20 It seems to us that there are quite a few
21 possible avenues that could be explored that would provide
22 additional definitive depths in the chemistry area.

23 So we are planning a meeting comprised of Andy
24 Campbell and myself and three consultants in February and
25 the goals of the meeting will be to -- I'll read it here

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1 since they're my words anyway. To evaluate evidence on
2 corrosion of C22 alloys proposed for the outer barrier;
3 evaluate the evidence of the corrosion of the titanium
4 alloy proposed for the drip shield; and arrive at a
5 position on the likelihood that DOE will need other
6 chemical barriers to radioactivity release and transport
7 than simply reliance on corrosion resistance.

8 In addition, we'll look at waste form
9 degradation, second phase formation as its contained in
10 the literature for the most part, and the feasibility of
11 deliberate chemical reduction of neptunium and/or
12 technetium to limit the transport of radionuclides.

13 And the product of this work will be to report
14 to the Commissioner, who also will get the attention of
15 the NRC staff and the DOE staff and the Center here, who
16 might have avenues that are fruitful for pursuit.

17 I'd like Andy now to pick up and add to this.

18 MR. CAMPBELL: The mechanism of how we're going
19 to do this is we're considering this a twofold slice, a
20 vertical slice focusing on the C22 and also, titanium
21 corrosion issues and look at that in detail. We have a
22 consultant on board to do that, who was at the October
23 meeting.

24 Then a more, if you will, a horizontal slice of
25 chemistry issues, both from the near field that will

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1 impact the source term, the release from the waste forms.
2 That has a big impact in the end on those.

3 That will look across several, if you will,
4 KTIs and subissue areas. And we have again a couple of
5 consultants on board for that part of the thing.

6 We are planning on getting together, as Ray
7 said, in February, but prior to that we're planning on
8 attending various and sundry of these tech exchanges and
9 also reviewing several large doorstops of documents that
10 have arrived on various people's doorsteps recently.

11 And so that's basically how we're doing this.
12 At one point I think Ray and I had talked about bringing
13 this whole group of consultants in to an ACNW meeting, and
14 originally we were thinking January.

15 That may be too full, but the next meeting
16 after February is that March. Have a series of reports to
17 the Committee on the findings of the group.

18 MR. LARKINS: Comment. What I heard you say
19 sounds a bit ambitious, particularly in terms of maybe
20 coming out with some type of recommendation for additional
21 coatings or something.

22 It seems like -- this is just a suggestion --
23 that one of the key questions is going to be, is there an
24 adequate program to address these issues of corrosion, of
25 modeling or accelerated aging or accelerated corrosion?

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1 How do you do that, you know, with the uncertainties
2 involved?

3 It seems to me that you might want to rethink
4 about your objective and what type of product you're going
5 to generate which would be most useful to the Commission.

6 MR. WYMER: John, I think a lot depends on what
7 we come up with in our discussions just exactly how we
8 approach what the product is, exactly what the details of
9 the product are.

10 To use an old southern expression, if we blow
11 up some snakes, we'll have quite a bit to say. If we
12 don't, we'll have a good deal less. Either we will decide
13 that things are in pretty good shape and if so, that's
14 what we'll say.

15 MR. LARKINS: Like you and I discussed earlier,
16 this question of accelerated aging and how do you model
17 that is really an issue that needs to be addressed.

18 MR. WYMER: I think we will almost certainly
19 say something about the need for understanding, a better
20 understanding of the mechanisms of corrosion of C22.

21 MR. CAMPBELL: Another thing to keep in mind is
22 that, at least in my mind anyway, was that we weren't
23 going to suggest design changes to DOE, but rather suggest
24 ways in which they're currently doing their modeling that
25 may not be addressing properties of the system that

1 they're intending to include in their design already.

2 And just off the top of my head, an example is
3 the drift invert, which currently they only model as a
4 diffusion barrier of some sort, but they don't include any
5 chemistry in that.

6 It's not saying to DOE, change your design.
7 It's saying, get a little more realistic in what you're
8 actually going to put in place there in terms of what its
9 performance is going to be.

10 That, at least, is kind of the tenor of how I
11 was thinking about it. Certainly something like how you
12 take short-term testing, aggressive short-term testing,
13 and convert that into a long-term projection is not unique
14 to corrosion, but it's certainly a big issue. That's
15 certainly worth looking at.

16 MR. WYMER: I think the white paper that we
17 produced on the chemistry of the near field will be sort
18 of a baseline that we'll start from, John, as we build on
19 that. We made quite a few recommendations.

20 MR. LARKINS: Well, I'm sure this will evolve
21 as you start to go through it and iterate on your tack,
22 but do not set your expectations too high.

23 MR. HORNBERGER: Yeah. Whether it's
24 expectations or not, I think I heard some of the same
25 things that John heard. I would urge not to get into

1 chemical backfill revisited or ceramic coatings on the
2 drip shield or anything like that.

3 I think that you should stick to the plan,
4 which is a vertical slice, to look at adequacy of the DOE
5 program and the staff capability to review these things,
6 and focus on the DOE documentation and what DOE is
7 planning, and not really go off into sort of new ideas.

8 MR. WYMER: I think Andy said we'll be looking
9 at KTIs for particular guidance, but if we do come up with
10 something, we're going to say it.

11 MR. GARRICK: Okay. Milt and Rich, I guess.

12 MR. LEVENSON: Rich has done part of the work
13 so far. I think it's 99-plus percent, but let me just
14 give you my perception of what we're going to try to do in
15 a vertical slice.

16 I don't know that we can achieve this, but
17 basically the KTIs, the PMRs, the AMRs, all of are no
18 particular importance or value on their own.

19 They are only a mechanism to assure ourselves
20 that the SCRC addresses all issues, et cetera. So my view
21 of vertical slice is not what I intuitively might feel is
22 an important PMR or AMR, but start out at the SCRC and
23 pick one point and just try to follow that all the way
24 down through the PMRs, AMRs and KTI resolutions.

25 We'll be attending one of the meetings to see

1 whether we feel that the staff is in fact taking that
2 approach to these reviews, or do they get very involved in
3 interesting details on KTIs and pursue other things or is
4 the system really working for what we think is the
5 objective.

6 MR. MAJOR: This one is pretty much a clean
7 sheet of paper right now. The staff did redraft the IRSR.
8 We're into draft three now. They consolidated it so there
9 are just two subissues.

10 Both of those subissues are open. So when we
11 go to the technical exchange, we really will be hearing
12 how this thing comes to closure for the first time.

13 The only other thing that I can mention is that
14 I've listed the two open issues and when I consider the
15 vertical slice, what I tried to do is trace it into the
16 Yucca Mountain Review Plan.

17 So you'll see that some of this KTI stuff goes
18 into four different abstractions so you only have to
19 resolve the KTIs once. The KTIs are going to feeding
20 material into four different abstractions within the Yucca
21 Mountain Review Plan.

22 So our next step is go to the meeting and see
23 what's up.

24 MS. DEERING: I wonder, because I'm not clear
25 on it, I wonder, Rich, because you did a little more work

1 with the Yucca Mountain Review Plan than I did, those
2 abstractions...

3 MR. HORNBERGER: How much can we discuss?

4 MS. DEERING: Well, no. No, I'm not going to
5 get into the details of it, but I'm wondering if you guys
6 understand how you go from KTIs and subissues to the 14
7 model abstractions in the AMRP.

8 And I've seen crosswalks, you know, between how
9 one subissue might correlate to three model abstractions,
10 but beyond that, I get confused how that works in making
11 findings and acceptance criteria and all that.

12 MR. MAJOR: In each of the model abstractions,
13 you have different KTIs that go into it as well, so that
14 it is something we need to look at.

15 MR. LEVENSON: In fact, Lynn, your question is
16 one of the things which I think we've got listed to look
17 at and that is, are the people negotiating the KTIs aware
18 of how it's used. If not, how do they know what they're
19 doing?

20 Well, I'm just concerned about the NRC's side.

21 MR. MCCARTIN: Tim McCartin, NRC. They are
22 virtually the same people working on developing the review
23 plan and the KTI --

24 MR. LEVENSON: I didn't mean to imply that you
25 don't. Our job is to identify that they are doing, not

1 that we think they're not.

2 MR. HORNBERGER: To a certain extent, Lynn, I
3 think that the proof of this pudding really is going to be
4 in the eating. That is, I was talking with Deborah
5 Knockman several months ago and Deborah is convinced that
6 one can't do it by starting at the SRCR and going down.

7 She contends that you have to all the AMRs and
8 try to figure out how they fit into the PMRs and try to
9 figure out how they all fit into the SRCR.

10 And we're not going to do that. We know we're
11 not going to do that. But we don't know whether or not we
12 can do the process that Milt outlined, and I think that
13 what we have to do is get stuck into it and see where the
14 problems are and identify those problems to our own
15 satisfaction anyway, and basically acknowledge that we may
16 not be able to complete the whole linkage.

17 MR. LEVENSON: If she's right, we can't do a
18 vertical slice.

19 MR. HORNBERGER: That's correct.

20 MR. LARKINS: The other thing is contingent
21 upon the availability of SRCR sometime when you're ready
22 to get started. You may actually be bottom up as opposed
23 to top down.

24 MR. HORNBERGER: The good thing is, of course,
25 we can start with the issues and the issue resolution and

1 we can try to follow some of those things through the
2 PMRs.

3 We have a better understanding there, and then
4 when the SRCR comes available, perhaps starting somewhere
5 in the middle and working both ways, and maybe that's a
6 better way to do it. It's not a simple task.

7 MR. LARKINS: Again, this sounds like a very
8 challenging vertical slice.

9 MR. LEVENSON: I wouldn't give you good odds on
10 our ability to really do a vertical slice.

11 MS. DEERING: You mean the way you're going
12 about it or at all, period?

13 MR. LEVENSON: Well, it's partly a matter of
14 what you define as a vertical slice. What I define as a
15 vertical slice is there's all kinds of activities going on
16 and we're just taking a cut down through here to see at
17 each stage does it appear to be functioning properly, is
18 the staff doing the right things, et cetera, not start
19 tracing, chasing things which happen to interest me or
20 that we think even are important.

21 We're not doing a complete audit. The
22 objective, as I view it, is to not do a complete audit,
23 but that's why we've gone away from that to a vertical
24 slice.

25 MS. DEERING: Right. I think there's a lot of

1 room for creativity in how we go about this, and if we try
2 different ways, I think in the end we're going to come up
3 with that much more to put together and make some
4 recommendation to the Commission.

5 MR. GARRICK: Were you going to talk more about
6 your vertical slice?

7 MS. DEERING: Yeah. We can go over some ideas
8 we have now unless you want to talk about TSPA.

9 MR. GARRICK: Well, I'll just maybe make a
10 couple of comments about it.

11 MS. DEERING: Okay.

12 MR. GARRICK: Of course, the TSPA is a little
13 bit of a different animal from anything we've been talking
14 about, and I don't know how relevant it is to talk about
15 AMRs and PMRs with respect to TSPA.

16 But I can imagine two distinct strategies for a
17 vertical slice with respect to TSPA. One would be a
18 process strategy.

19 Just looking at it from the standpoint of does
20 the process make sense and are all the necessary steps
21 being taken? Is there consistency along the way? Are we
22 applying the rules of uncertainty analysis and bounding
23 analysis and approximations in a way that is consistent?

24 Another way, from a results standpoint that we
25 can think about a vertical slice is that we all know that

1 spent fuel has some 300 to 400 radionuclides in it that
2 has to be dealt with in one way or another.

3 But the good news is that we only have to worry
4 about approximately three and that's technetium 99, iodine
5 19 and neptunium 237.

6 So one way to think vertical slice would be to
7 take those radionuclides and ask the question at the
8 critical group level, how did that get there, and just
9 peel the onion away and challenge the issues of the
10 critical steps, such as in the case of neptunium you'd
11 probably really want to challenge the assumptions and
12 models that were used surrounding the issue of solubility
13 of neptunium, for example.

14 So I can imagine either of those ways as being
15 very productive in terms of focusing the TSPA and the
16 steps that are involved.

17 The fact that there are only three
18 radionuclides that end up dominating the risk makes the
19 strategy of working from the final result backwards a
20 possibly realistic one. So that's just some thoughts.

21 MS. DEERING: Some good ideas.

22 MR. CAMPBELL: Ray and I were planning on
23 narrowing our efforts to about four radionuclides. We are
24 going to add plutonium into that, but we certainly didn't
25 have any intention of looking at the chemistry of 300-

1 some-odd radionuclides.

2 MR. GARRICK: Well, in the early years if you
3 were going to look at it. It's a function of time. You
4 might want to look at that recently too, but these are the
5 ones.

6 MR. CAMPBELL: Those are the drivers in terms
7 of compliance.

8 MR. GARRICK: Right.

9 MR. GARRICK: But I'd welcome some thoughts
10 from the committee.

11 MR. HORNBERGER: Actually, your thoughts are
12 attractive. I'm just trying to figure out whether or not
13 it's going to be feasible in terms of time and effort to
14 peel away the onion because if you take something, if you
15 just take one of those, you take neptunium and you wind up
16 dealing with all the chemistry issues that these guys are
17 going to deal with and you're talking about all of the
18 radionuclide transport issues.

19 In other words, it's all there, which is what
20 TSPA should be anyway, and so your argument is you have to
21 deal with everything. But then the question becomes,
22 well, how deep would you go.

23 I can think of yet a third way that one could
24 approach it. I'm not sure this would work, but by asking
25 the question and that is the question that has concerned

1 us for a long time is how one identifies the contributions
2 in quantitative terms of each of the components of the
3 total system.

4 And one could say, all right, is this going --
5 is the DOE approach -- does the DOE have an approach
6 that's suitable to do this.

7 MR. GARRICK: Well, I think there's a number of
8 ways to do it. Another way would be to pose the problem
9 that the TSPA is coming under a little bit of fire from
10 the public and the other sources as being too complex and
11 too abstract and too dependent on expert elicitation and
12 other things that contribute to the uncertainty, and
13 therefore it has a genuine credibility problem.

14 So one could take the position, well, what
15 could I do or what could be do as regulators to have
16 greater confidence in the PA and, of course, this has been
17 an issue we've talked about from the beginning, several
18 years ago when we were talking about trying to come up
19 with some simplified performance assessment model,
20 affectionately known as SPAM.

21 So that issue has always been something that we
22 thought to be critical to getting a buy-in, if you wish,
23 on the part of the TSPA.

24 So I think there's a tremendous opportunity
25 here for us to be creative and figure out a way how to

1 characterize this model in the manner that people are more
2 willing to consider it as real evidence on the performance
3 of the repository.

4 I think there's a lot of misunderstanding as to
5 what it is because the question that if you don't use the
6 PA, then what do you use?

7 All the PA is really trying to do is aggregate
8 everything that's been done into some sort of form that
9 will allow the calculation of some critical performance
10 parameters.

11 You know, we don't need to call it performance
12 assessment, but sooner or later we have to go through that
13 exercise, and how to be able to describe that exercise in
14 such a way that, (a), we understand what's going on and
15 can turn up the microscope on specific sections that are
16 suspect to us or of interest to us; and (b), to be able to
17 satisfy also the public's interest here.

18 MR. WYMER: I think another aspect of it you
19 have to really consider is this whole business of model
20 abstraction and what do you lose and how much of the
21 coupling process can you carry through to abstraction
22 realistically.

23 So it's an extremely complicated thing. I'm
24 not sure how thoroughly you can do it.

25 MR. GARRICK: Well, the truth is, the TSPA

1 issue cross-cuts everything we've talked about and so we
2 may have to treat it as a kind of a different case.

3 MR. LEVENSON: That's why the term vertical
4 slice can maybe be applied. The opportunities here
5 greatly exceed the resources, so you're going to have to
6 select what you want. For this purpose, you're going to
7 have to be highly selective.

8 And if I want to do something like the
9 abstractions, maybe you pick one in the group and follow
10 it through. You just can't do the whole lot.

11 MR. GARRICK: Well, one of the perspectives
12 that appeals to me a little bit that maybe we can talk
13 about some more is this business of trying to get a better
14 handle on our consistency in the way we've set up the
15 various models, particularly with respect to the different
16 realizations and the uncertainty.

17 You know, in some cases we have, to get over
18 this step in the calculation, we have done a bounding
19 analysis. In other cases, we have input probability
20 distributions.

21 So some sort of consistency check that would
22 give us some sense of whether or not we're missing
23 something or whether or not there is some aspect of the
24 calculation that really drives the results would be an
25 appealing approach as well. So I think we've identified

1 three or four possibilities.

2 MR. HORNBERGER: It strikes me in thinking
3 about these things -- my conscience here, Milt to my
4 right. I think he's right and I think that maybe we
5 should have an idea in terms of how we're going to
6 approach all of these things.

7 The idea that I would have, along with what
8 Milt is saying, is that we should keep in mind what the
9 Commission has to do in terms of sufficiency comments, and
10 we should again not necessarily pursue things that are of
11 interest to us or that we think might be important or
12 advice that we might give to DOE.

13 In the short run, what we're doing this for is
14 to say that the Commission has to decide whether or not
15 the information currently is sufficient.

16 So for example, in terms of TSPA, it almost
17 argues for the first pitch that you made, and that is the
18 process. Is the process sufficient to go forward with it
19 into licensing.

20 MR. LEVENSON: Not how to improve it.

21 MR. HORNBERGER: No, not how to improve it.
22 And perhaps if we approached all of them with that
23 thought, we might both maintain a little consistency
24 across the ones that we do and perhaps be most responsive
25 to what the Commission could use.

1 MR. GARRICK: That's what I named at first.

2 MR. LARKINS: Are you going to have some help
3 on this?

4 MR. GARRICK: I hope so. Yes, Andy is going to
5 help.

6 MR. HORNBERGER: Andy is going to send John all
7 the documents.

8 [Laughter.]

9 MR. LARKINS: Do you have some idea of whether
10 you want a consultant's help or not?

11 MR. GARRICK: Well, that's right. I think
12 between Andy and if we can recruit maybe Chris and get the
13 benefit of his review of the TSPA, that would be a good
14 start.

15 MR. LARKINS: Well, Andy is going to be in
16 overload, I think, after this next month, so I'm going to
17 have to find a way to do some workload leveling and try to
18 balance it out.

19 MR. GARRICK: Just cancel all his other
20 projects.

21 Okay, Lynn, it's back to you.

22 MS. DEERING: All right. I wondered if, Jim,
23 you might want to talk about your report. But you need a
24 microphone.

25 MR. CLARK: I was actually going to offer to

1 stand, since most of you don't know me, and I promise I
2 won't do it again.

3 MR. GARRICK: We've got to give him a mike.

4 MR. CLARK: Can you hear me in the back?

5 MR. GARRICK: Give him a lapel mike.

6 MR. CLARK: Okay. My name is Jim Clark and
7 Lynn and I did attend the meetings in Albuquerque on
8 saturated zone flow.

9 I did prepare a brief report, which all of you
10 should have in front of you. It pretty much speaks for
11 itself, I think. I would like to just walk you through
12 some of it.

13 The main focus of the meeting was on the three
14 subissues on the bottom of the first page, and really,
15 most of it was on subissues 5 and 6. As you heard
16 earlier, those issues are considered to be closed-pending.

17 There were a number of technical issues. It
18 was a lively two-and-a-half days. The meetings were very
19 well attended. I have some observations which reflect the
20 fact that this was my first meeting and I'm new to this.

21 But technical exchange was lively, at times
22 spirited. I say that very positively. It was a good
23 technical exchange.

24 I think I should tell you, and I'm sure you
25 know, that the work that the Nye County group is doing, I

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1 think, is a real contribution to this effort. I think the
2 information they're providing is very valuable.

3 I was impressed with the capabilities from all
4 the participants, all the different groups that were there
5 and their contractors.

6 I guess I would say that there are clearly some
7 technical concerns that are lingering that may be
8 unresolved at this time.

9 I kind of left the meetings thinking that the
10 process would go a long way towards resolving a lot of
11 that, but I should say that clearly the emphasis of these
12 meetings, it struck me the emphasis was on resolution and
13 understandably the emphasis was on resolution.

14 But nevertheless, my main concerns were the
15 process strikes me, again as very new to this, as very
16 fragmented, and I came away wondering about integration
17 and wondering about how it's going to be put together.

18 I think when all of the issues are closed,
19 there's still going to be some technical uncertainties,
20 and it's a very complex system, undoubtedly.

21 And so as I left the meetings and thought about
22 all of this, and Lynn and I had talked about what might be
23 an appropriate topic for a vertical slice, my initial
24 response was the flow paths and I would support that. I
25 think the flow path issue is a very basic, very critical

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1 one.

2 As I thought about it more, I started to think
3 more in terms of, I guess, a horizontal slice, kind of
4 along the lines very much that John was just speaking to.

5 I left with wondering about how uncertainties
6 are going to be handled and how consistently they're going
7 to be handled, and that struck me as an area that would
8 provide valuable information on integration as well.

9 I did hear bounding a lot. I heard the word
10 "bounding" used often in those meetings. In fact, I heard
11 it enough that I began to wonder what the word meant to
12 the person saying it and the person hearing it and started
13 to get a little uneasy that that might be a term that
14 there might be merit to clarifying.

15 Now, maybe I'm off base here. Again, I'm very
16 new, but I did hear this term a lot. And in fact, the
17 code that's going to be applied to model radionuclide
18 transport in the saturated zone and the unsaturated zone
19 does have a number of parameters, a number of inputs.

20 Those inputs will be treated either in a
21 deterministic way, and that was always described as
22 bounding, or they will be treated stacastically. So
23 again, I think this is an area that the committee would be
24 wise to look at. Clearly, the way those uncertainties are
25 dealt with and defended I think are important to the

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1 overall assessment.

2 So I didn't know if recommendations were
3 appropriate or not, but I went ahead and made some anyway.
4 That's kind of where I came down.

5 Seems tracking the way these assumptions are
6 made, the way uncertainties are handled, the model
7 parameters seems worthwhile and could be expanded to other
8 areas.

9 There's clearly a close interface between
10 unsaturated/saturated zone flow and radionuclide transport
11 and that might be a vehicle to do more of a horizontal
12 check if that has merit.

13 Again, I just came away thinking there might be
14 some utility in just clarifying this term "bounding" so
15 that we're all on the same page.

16 MR. GARRICK: Any questions?

17 MS. DEERING: I'm going to pick up where Jim
18 left off kind of and go on to define a possible vertical
19 slice for the saturated zone.

20 Some of the horizontal ideas Jim described are
21 possibilities for all of the vertical slices, not just the
22 saturated zone, as far as dealing with uncertainty and
23 bounding. So that's just for all of us to consider as an
24 element.

25 And I was also thinking when George said should

1 we not all consider is the process sufficient as we do our
2 vertical slices, the other piece we can also make sure we
3 look at is do we think there is a real handle or is there
4 evidence for risk significance in the subissues we're
5 selecting.

6 Whatever evidence we can find, whether it was
7 from a sensitivity analysis or DOE's principal factors,
8 whatever analysis supported that, I think that would be an
9 interesting piece to add to these.

10 And from there, I'm going to go on and say --
11 George is going to add on some things too. I'll just
12 throw out what I have on this piece of paper. George and
13 I did discuss it a little but not a lot, so he'll pick up
14 on it.

15 We were thinking that there's -- when Jim and I
16 went to this technical exchange, he mentioned they only
17 talked about three subissues of many in the saturated/
18 unsaturated zone KTI.

19 It was this tremendous amount of material and
20 really the main focus was on subissue 6, which was matrix
21 diffusion, and subissue 5, which deals with dilution and
22 -- let me see, what is subissue 5, saturated zone ambient
23 flow conditions and dilution processes.

24 That's the one Jim is suggesting and I support
25 and I think George supports would be a good subissue.

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1 Now, just for clarification, that subissue alone has 11
2 acceptance criteria, all of which I have a lot of -- NRC
3 has laid out what would be acceptable if they saw it, what
4 an acceptable amount of information would look like, and
5 DOE has attempted in these tech exchanges to go down each
6 acceptance criteria and say, "We think this one should be
7 closed. We think this one should be closed and here's
8 why. We think this one should be closed."

9 And then you sum total them all up and say
10 therefore this subissue should be closed or closed-
11 pending. And that's kind of how these tech exchanges
12 work.

13 So a lot of them it's DOE presenting material
14 and where they're coming from is, one, the IRSRs. NRC has
15 already defined in various iterations of these things what
16 they think are open and closed issues.

17 Then NRC had that KTI meeting in April that
18 they've made reference to where they probably added on to
19 what was in the IRSRs. They updated because the one we're
20 working with in saturated zone is June '99.

21 Also the VA comments that the staff made.
22 There's material that they reference back to. Some of the
23 open items and data needs they've identified still you can
24 refer back to their VA comments.

25 And then also the agreements made in these

1 technical exchanges. That's the most recent and updated
2 info on the scene and NRC is kind of reacting in the
3 moment and making agreements about what they think they
4 heard was sufficient and what additional information is
5 still going to be needed.

6 So I'm just giving you a little background on
7 the mechanics of these things. What we were going to do
8 then is plug into this particular subissue we heard a lot
9 of technical discussion on and its current status is
10 closed-pending.

11 What that means is that NRC heard a lot of good
12 ideas and plans for data but, you know, there's a lot of
13 work to be done. There's a tremendous amount of work to
14 be done but DOE has committed to do it. So it gets a
15 closed-pending status.

16 And we're thinking of taking the one -- what I
17 propose on this piece of paper was just one of the eleven
18 acceptance criteria, which was defining the flow paths and
19 what goes along with that is whether or not the transition
20 has been defined where you've got your saturated zone
21 flowing from tuff to the alluvium, and there's
22 significance in that because where it starts to discharge
23 at the 20-kilometer boundary, how much of that flow path
24 actually is in the alluvium affects the retardation,
25 absorption and ultimately the dose.

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1 There's a range and what's interesting is that
2 it ties in with the structural geology issues. Depending
3 on structure, you know, you have north to south faults.
4 That may control flow paths such that they really aren't
5 -- you aren't getting as much flow to the alluvium as you
6 might think otherwise.

7 So there's still a lot of uncertainty. NRC has
8 made some statements about what they think is still needed
9 and a lot of this involves the Nye County work.

10 A lot of it involves a better understanding of
11 stratigraphy and the alluvium properties and so just to
12 justify why we like to follow and maybe trace some of the
13 where NRC stands on these issues, you know, we think there
14 is significance to performance in defining flow paths and
15 the alluvium interface, or at least there could be.

16 There's evidence that suggests that
17 understanding the flow path is pretty important and the
18 ACNW even made some comments on the VA about even if it
19 wasn't a performance issue, from a credibility issue we
20 need to have at least some understanding of the saturated
21 zone flow and defining flow paths is part and parcel of
22 that.

23 One of the issues we could pick up on this in
24 our vertical slice is the concept of bounding because NRC
25 makes the statement in its IRSR that they think that the

1 flow field has been bounded.

2 I think that becomes a really interesting
3 point. We could kind of to our own satisfaction get
4 comfortable with how they came up with that. Where's the
5 evidence? Where's the data? Where's the documentation?

6 Is it in the PMRs? Is it in AMRs? Is it in
7 the TSPA VA? Is it in the TSPA SR? Let's begin to do a
8 little trace of how you make that finding and this is an
9 idea on the table.

10 We could also look at some other acceptance
11 criteria under this subissue and there's some good ones,
12 like conceptual model uncertainty, geometric surface,
13 except that's been defined because there's still some
14 uncertainty about that.

15 Anyway, we'd like to talk further, but this is
16 where we stand now. We're kind of homing in on that
17 particular subissue and to try to narrow our scope and
18 focus.

19 And George, you might want to add some things
20 now.

21 MR. HORNBERGER: No. I think that was a good
22 summary. The contribution that I had made, I had
23 basically been doing some thinking and had come to a
24 similar conclusion, that this would be a good candidate
25 for a vertical slice.

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1 One of the things that I had thought about was
2 the horizontal connection a la the way Ray and Andy have
3 tried to define a vertical slice, with some horizontal
4 look as well.

5 And I think the so-called horizontal
6 connections are there for us to look at. The key
7 technical issue related to -- I forget what it's called --
8 structure and seismicity, when the staff, the NRC staff
9 had some concerns about how faulting was treated in it and
10 in particular how this was integrated into the hydrology
11 in terms of the fracture. I said "fault." I meant
12 fracture.

13 And I think that ties in with some of the
14 things that Lynn was talking about with the flow
15 directions and things like that and the flow paths.

16 Also I know that the staff had expressed some
17 concern that the site model, the model for the geology of
18 the site was not faithfully carried through in this
19 hydrology. So I think that's a natural connection that
20 could be looked at.

21 So I think that with some care this could be
22 defined to be a doable task.

23 MR. GARRICK: Is this the kind of thing that
24 will get to these issues of how the model, for example,
25 represents infiltration in the unsaturated zone?

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1 The measurements that have taken place at Yucca
2 Mountain, for example, have indicated a lot of lateral
3 flow, and yet the assumptions, I think, in the TPA model
4 are all vertical flow.

5 Does what you're doing come to grips with those
6 kind of differences?

7 MR. HORNBERGER: No. That actually, of course,
8 we'd have to look at a different KTI. That KTI would be
9 the unsaturated zone and we'd have to look at a different
10 subissue.

11 MR. GARRICK: But they make the same kind of
12 assumptions in the saturated zone.

13 MR. HORNBERGER: But it's a different module.

14 MR. CLARK: There's a KTI for shallow
15 infiltration. There's another KTI for deep percolation.

16 MR. GARRICK: Okay. That's the type of thing
17 we might ferret out. It's of interest to me to know if
18 the measurements that are being made in the field work has
19 anything to do with the modeling and impacting the
20 modeling.

21 MR. HORNBERGER: Clearly, there's lots of field
22 work that has gone into characterization at the regional
23 scale and there's a lot of field work going on in Nye
24 County, Nye County well drilling and everything else.

25 That's all field work. That pertains to the

1 flow in the saturated zone. It's separate from the
2 measurements that were made for infiltration and the
3 measurements that are being made on alcoves for seepage.

4 So it's a separate issue. We could switch and
5 say, let's not do the saturated zone --

6 MR. GARRICK: Well, no, I wasn't suggesting
7 that. Just are there similar kinds of problems or issues
8 in the saturated zone to what I refer to in the
9 unsaturated zone.

10 MR. LEVENSON: Another way of asking the
11 question, George, is, is the actual measurements finding
12 their way into the model because John and I were on a
13 different committee involving WIPP and when physical
14 measurements disagreed with the model projections, the
15 assumption was made that the physical world was wrong and
16 stick with the model projections. We hope we don't have
17 that here.

18 MR. HORNBERGER: That's a question I certainly
19 can't answer. It's one that we might be alert for.

20 MS. DEERING: Well, I think we got some really
21 good ideas here. The next step would be to -- by the way,
22 I would recommend we don't need to work in the vertical
23 slice George is talking about. What do you think, George?
24 I don't really know exactly what we would do in a working
25 group.

1 MR. LEVENSON: You just want the group to work
2 rather than the working group.

3 MS. DEERING: We have work to do but --

4 MR. HORNBERGER: I would say right now we don't
5 want to plan one. If in fact we get into it and identify
6 some issues that we would later say, "Gosh, we would
7 really like to have a working group together."

8 For example, we might want to raise some of the
9 questions that Jim raised in terms of bounding and how
10 uncertainties are treated. This could be piggybacked onto
11 a working session, a work group session on TSPA perhaps
12 where we could ask some specific questions along those
13 lines.

14 MS. DEERING: A working group that was a
15 horizontal slice that we all could benefit from.

16 MR. GARRICK: Based on this discussion, Lynn,
17 are you in a position to kind of finalize what you think
18 is our approach or is that pretty well finalized?

19 MS. DEERING: I think I can do that, but I
20 think we also need to talk about schedules and
21 individually we're at different phases and where the
22 technical exchange is at and what information we have
23 access to and our own availability.

24 Do we want to talk individually about -- well,
25 maybe we should just start where we know that the cutoff

1 is May or June. What do we want to have by then? Do we
2 want to have comments?

3 By the way, all this vertical slice stuff
4 really doesn't cover what we're going to do in the way of
5 reviewing NRC's SRCR comments. Right? It's related but
6 that's a separate effort also, I think.

7 MR. HORNBERGER: Our efforts, it appears to me,
8 are just as tangled as staff efforts are amongst the YMRP
9 and the SRCR and the issue resolution and we keep asking
10 them, "How are you juggling this," and they keep saying,
11 "Easily." So we're going to learn from them.

12 MR. GARRICK: Well, do you want to go through
13 each one in terms of talking about commitments and
14 agreements or schedules?

15 MS. DEERING: Yeah, maybe so. Next steps.

16 MR. GARRICK: What are the next steps in the
17 one you're most familiar with?

18 MS. DEERING: Well, in the saturated zone,
19 George and I -- we can do this by the next meeting or
20 sooner if we need to do that, probably sooner since the
21 next meeting isn't until January. Put a lot more --
22 narrow the scope and clarify because there is a lot of
23 issues in this subissue, and we can get together and talk
24 about -- I think we need to be more specific.

25 I think we need to be reasonable about the

1 scope too. If anything, all the ideas from today have
2 been really great, but probably too big and too ambitious.
3 I, for one, think --

4 MR. HORNBERGER: Can I --

5 MS. DEERING: Yeah, please.

6 MR. HORNBERGER: For me, what might help is if
7 we actually constructed a template, if you will, and I can
8 almost think about some of the things that we could do.

9 We could have a series of questions and perhaps
10 for now the way we could structure it is to start with a
11 key technical issue and a subissue, why it's closed-
12 pending or open, what the NRC staff has asked for in
13 addition, what the data needs are, how this is treated
14 currently in the current process model report, and what is
15 lacking in terms of supporting data and why the NRC staff
16 has -- in other words, if we created a template and went
17 down and asked a series of questions like that and then
18 each of us could at least address for these disparate
19 things that we're talking about, answer questions at that
20 level, it might give us a little structure so that in the
21 end of the day, Lynn, you and I wouldn't be stuck with
22 four different kind of animals trying to put them all
23 together.

24 MS. DEERING: And I also think that way seems
25 more useful to the Commission because if we go outside of

1 the context, outside of NRC's KTI issue resolution
2 structure, I don't know how we -- say we came up with some
3 really interesting findings on, I don't know, chemistry or
4 whatever, but don't even in our own minds have a real
5 clear idea how that supports or differs from what has
6 already been agreed upon in various KTI areas, we're going
7 to have to make the link at some point.

8 We're going to have to find what our
9 observations are relative to what's already been observed.
10 So we might as well just go with that structure. I like
11 the idea.

12 That's not that different, by the way, than
13 what we did for our vertical slice, but it wasn't quite
14 that systematic, but that was kind of the idea.

15 MR. WYMER: So if we could do that on the key
16 technical issues, I think when we get down to the
17 subissues, we may find some subissues that aren't listed
18 that we're interested in.

19 MS. DEERING: That's true. I would hate to
20 preclude just because everything -- we presume the whole
21 universe has been defined already and that would be a very
22 valuable contribution if you came up with something that
23 was forgotten.

24 MR. WYMER: But doing essentially what George
25 said with respect to the key technical issues is a good

1 approach. We're going to move our stuff around to fit it,
2 but I think we'll maybe have some subissues that don't
3 appear anywhere.

4 MR. GARRICK: Well, maybe a way to get this
5 started is that there's a certain minimum set of questions
6 that apply across the board when thinking about it from
7 the point of view of SRCR, and maybe we ought to frame
8 those as precisely as we can.

9 MS. DEERING: I can do that.

10 MR. GARRICK: Then from there on down, it's
11 probably going to be driven more by the issue than by some
12 common structure. So, you know, that kind of guidance
13 would be very useful in getting everybody going and
14 beginning to get some sort of a trail developed.

15 I'd sort of like to see us reach some sort of
16 conclusion here on what's next and when.

17 MS. DEERING: Well, why don't -- okay. I will
18 do that and I will work with the other leads on this for
19 us to together come up with what we think would be a good
20 template.

21 Now, I certainly take the initiative to lead it
22 and do the writing, but I'd like to get the ideas from
23 staff.

24 MR. HORNBERGER: If you could put a draft
25 together almost in outline form as to what the key things

1 are and then circulate it amongst the committee, and then
2 if we agree to it, maybe what we could do is agree to do
3 enough work to fill in the template, at least with some
4 bullets.

5 MR. GARRICK: And have that as a product.

6 MR. HORNBERGER: Have that as a product for the
7 January 16th meeting, by January 16th. Can we do that by
8 January 16th?

9 MS. DEERING: So what we'd have is a template
10 and then a revised set of vertical slice proposals that
11 follow the template?

12 MR. HORNBERGER: Well, I would say let's go
13 even farther than that. Let's not do it as a proposal but
14 let's start to fill in the answers to the questions that
15 we're posing in this template.

16 And where we don't have them, say to be
17 determined after we read this AMR.

18 MS. DEERING: What do you want to call those
19 vertical slice pieces that each of us are going to bring,
20 so we get our terminology straight? They're not proposals
21 any longer. So are they going to be --

22 MR. GARRICK: It's a scope.

23 MR. HORNBERGER: Scope draft.

24 MR. SINGH: Guidance maybe.

25 MS. DEERING: Vertical slice guidance.

1 MR. SINGH: Yeah. That will be even better
2 since we're working on that, vertical slice guidance.

3 MR. HORNBERGER: Maybe I'm being too optimistic
4 here, but I'm trying to get to more than plans or
5 guidance. I'm starting to get to -- let's look at the
6 IRSRs.

7 Let's look at the meeting summaries as to
8 what's been decided. Let's go back and look at the PMRs
9 and see where the difficulties are and start filling in,
10 not necessarily with paragraphs but at least sentence
11 fragments that we can pick up on later.

12 MS. DEERING: Not to actually start our
13 vertical slice --

14 MR. GARRICK: I think George's point is, let's
15 come to the next meeting with some product. Let's come to
16 the next meeting with some product. In the meantime,
17 let's do these things that you're talking about of getting
18 the guidance, but let's push the guidance into action.

19 MS. DEERING: Okay. I'll send out an e-mail
20 that reminds us of what we just agreed to, as I understand
21 it.

22 MR. LARKINS: It would be nice to have these
23 templates done in a short time frame because if you're
24 going to use these as an example for a discussion of the
25 Commission in January, it would be nice to have something

1 that we could structure some presentation material from
2 that.

3 So if everybody can make a commitment in the
4 next two weeks or so to draft templates, that would help.

5 MS. DEERING: The template gets done and then
6 give it to the teams and then they fill the template with
7 their own particular. Okay. That sounds good, so I'll
8 get on it.

9 MR. GARRICK: Any other comments from staff?

10 MR. McCARTIN: Yeah, just one quick
11 observation. In terms of the groundwater pathway,
12 obviously you have that covered and I don't know how
13 important you view the air pathway via vulcanism, but it's
14 missing completely whether it's worth putting in or doing
15 something. I leave it up to you, but just be aware that
16 that is missing.

17 MR. HORNBERGER: The thing is, we can't do it
18 all and if we do the air pathway, then we're not going to
19 do the groundwater pathway. It's really down to that.

20 MR. McCARTIN: Okay. I would agree. The
21 groundwater pathway is the most lengthy vertical slice.

22 MR. CAMPBELL: It would also require a
23 different type of expertise that we don't currently tap
24 into in terms of consultants. We'd need meteorological
25 background. We'd need --

1 MR. HORNBERGER: But we could do it.

2 MR. GARRICK: The expertise exists. We know
3 that it's out there.

4 MR. HORNBERGER: There are going to be big
5 chunks that we're not going to --

6 MR. McCARTIN: I wasn't suggesting it had to
7 be.

8 MR. SINGH: Lynn, schedule-wise, 12/15 you
9 said?

10 MS. DEERING: The only problem with that is --
11 what day is that?

12 MR. SINGH: Friday.

13 MS. DEERING: Friday? Yeah, I can do that
14 because I'm out until the 12th from now on. From now
15 until the 12th I'm out of the office.

16 MR. LARKINS: It would be nice if the members
17 could provide you some input as to what they think the
18 questions should be in the template.

19 MS. DEERING: That would be great.

20 MR. LARKINS: So that when you get back, you'd
21 have it.

22 MS. DEERING: Well, George has already thrown
23 out, I think, some really good questions. I have five or
24 six that I'm going to add.

25 If you don't want to put those in writing, you

1 don't have to. I have them. If anybody else would like
2 to add to what I'm going to develop and get back to you,
3 I'd appreciate it.

4 MR. LARKINS: Just a short e-mail in the next
5 few days of some questions would be helpful.

6 MS. DEERING: Please, yeah. And then so by
7 that Friday, on the 15th, I should be able to put it
8 together.

9 MR. GARRICK: When do we have to have our --

10 MR. LARKINS: Wait. In the back of my mind,
11 I'm thinking about a January 18th presentation and putting
12 together this bit package which talks about this approach
13 to the committee strategy and the site sufficiency
14 reviews.

15 I'd have to have it done before the --
16 essentially by the 10th of January, which means that I
17 have to put together the package, everybody agree on
18 what's going to be in there.

19 MR. GARRICK: Let me ask something. Which of
20 the several that we've talked about could we conceptualize
21 the easiest to use as an illustration in the Commission
22 meeting?

23 Which one lends itself best to showing the
24 interconnection of all these products, such as the AMRs,
25 the PMRs, so on? Is it the saturated zone?

1 MR. HORNBERGER: Either saturated zone or C22.

2 MR. LARKINS: I think so because I think you
3 could make a risk argument as to why it's important.
4 Start off at the top, very high level, and then work your
5 way down.

6 MR. GARRICK: Okay. Well, we ought to push it
7 far enough to make it our exhibit for illustrating what
8 we're talking about.

9 MR. LARSON: John is right. Put in the
10 notebook when you look at the instructions for the
11 viewgraphs and stuff, there are to be two of them by the
12 9th of January.

13 MR. GARRICK: 9th of January?

14 MR. LARSON: Yeah. So John is right. That's
15 all I'm saying. You have Christmas, New Year's.

16 MR. HORNBERGER: And don't forget that earlier
17 this morning we outlined a brand-new approach for
18 presentations that you folks were going to brainstorm on
19 and put together. So it's not just sort of one on one
20 back and forth with viewgraphs like we've done before.

21 MR. GARRICK: And also there is some talk of
22 this going on line, is there?

23 All right. What I'd like to do now is take our
24 break, but before our break, announce that after the
25 break, the committee is going to get into its reports and

1 letter writing.

2 We will not need the court reporter for that.
3 It is strictly a working session. So with that, we'll
4 take our break right now.

5 [Proceedings recessed to reconvene Tuesday,
6 November 28, 2000.]

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CERTIFICATION OF TRANSCRIPT

I, Ellen Walters, hereby certify that this is the transcript of the proceedings held before the U.S. Nuclear Regulatory Commission in the matter of the 123RD MEETING OF THE ADVISORY COMMITTEE ON NUCLEAR WASTE, at SAN ANTONIO, TEXAS, on November 27, 2000, and that this is a full and correct transcript of the proceedings.

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