

NUCLEAR REGULATORY COMMISSION

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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124TH ACNW MEETING

ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

+ + + + +

TUESDAY

JANUARY 16, 2001

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ROCKVILLE, MARYLAND

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The Advisory Committee met at Conference Room 2B3, Two White Flint North, B. John Garrick, presiding.

COMMITTEE MEMBERS:

- | | |
|-------------------|----------|
| JOHN GARRICK | Chairman |
| GEORGE HORNBERGER | Member |
| MILTON LEVENSON | Member |
| RAYMOND WYMER | Member |

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ACRS STAFF PRESENT:

- John T. Larkins, Executive Director
- Lynn G. Deering
- Howard J. Larson
- Andrew Campbell

ALSO PRESENT:

- Jeff Ciocco
- Stephanie Bush-Goddard
- Nelson
- Bret Leslie, NRC Staff
- Lisa Gue
- Mr. Major
- Carl Feldman
- Bob Nelson
- Paul Genoa

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I-N-D-E-X

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

(10:22 a.m.)

CHAIRMAN GARRICK: Good morning. The meeting will now come to order. This is the first day of the 124th meeting of the Advisory Committee on Nuclear Waste.

My name is John Garrick, Chairman of the ACNW. Other members of the Committee present include George Hornberger, Milt Levenson and Richard -- or Raymond Wymer.

During today's meeting the Committee will discuss progress on ACNW's Sufficiency Review Application Task Action Plan, discuss with the NMSS staff several questions related to the Entombment Option for Decommissioning Power Reactors; discuss Planned ACNW Reports on several topics, including the Entombment Option, Key Technical Issue Resolution, the Staff's Progress on Total Performance Assessment, and the Annual Research Report to the Commission.

Howard Larson is the designated Federal Official for today's initial session. The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act.

We have received no written statements from members of the public regarding today's session.

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1 Should anyone wish to address the Committee, please
2 make your wishes known to one of the Committee staff.

3 And as usual, it's requested that speakers
4 use one of the microphones, identify themselves and
5 speak clearly. Before proceeding with the first
6 Agenda item, I'd like to cover some brief items of
7 current interest.

8 As we all know by now, President Elect
9 Bush has nominated out-going U.S. Senator Spencer
10 Abraham of Michigan to be Secretary of the Department
11 of Energy, and New Jersey Governor Christy Todd
12 Whitman to the Administrator -- to be an Administrator
13 of the Environmental Protection Agency.

14 Utah regulators have given preliminary
15 approval to Envirocare of Utah to its request to be
16 allowed to dispose of more low-level waste, most Class
17 A, plus more Class B and C waste. There is a 60-day
18 public comment period after which approval by both the
19 Governor and the State Legislature is required.

20 On January 3rd of this year, the National
21 Research Council held its first meeting of the
22 Committee on Alternatives for Controlling the Release
23 of Solid Materials from Nuclear Regulatory Commission-
24 Related Facilities.

25 This is related to a proposed clearance

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1 rule. The Committee is chaired by Richard S. McGhee.
2 So with that, the -- and unless there are comments on
3 any of those items, I think we will proceed directly
4 into our Agenda.

5 And the first item is progress on ACNW's
6 Sufficiency Review Application Task Action Plan, and
7 I think the ACNW staff member that's going to lead
8 this discussion is Lynn Deering.

9 MS. DEERING: Yes, sir. Thank you. I'm
10 on Tab 3, and this section of the notebook contains a
11 write-up of a revised approach to our Sufficiency and
12 KTI Resolution Review. And this is draft six of that
13 thing.

14 Each notebook it gets changed a little
15 bit. It gets better and better and one of these days
16 we're going to do something with it. We're going to
17 take it somewhere and --

18 CHAIRMAN GARRICK: You'll stop calling it
19 draft and call it version VER.

20 DR. LEVENSON: REV zero.

21 (Laughter)

22 MS. DEERING: Well, yes, we'll start all
23 over. But at one point we were going to maybe brief
24 -- use that one-pager to brief Commissioner TAs. In
25 light of the fact we may be just briefing the whole

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1 Commission in March on that same subject, perhaps
2 that's what we'll do with it.

3 And in fact, I've already developed some
4 draft view graphs from it. Yes.

5 DR. LARKINS: I just was going to mention
6 -- interject a point here -- now, even with the, what
7 looks like the deferred schedule on the site
8 termination, when I talked to the various Commissions
9 they felt that it was still a good idea that we
10 proceed with our planning and our review, because they
11 felt that would give us an opportunity to get ahead of
12 the curve and it would still be timely. So I just
13 wanted to interject that.

14 MS. DEERING: Good. Okay, because that is
15 our plan to proceed ahead. And one of the things I've
16 asked NRC staff, Jeff Ciocco and Jim Furth, if they
17 can add during this discussion, enlighten us a little
18 bit about their schedule, given the delays, but how
19 they're proceeding, so that we know if there's drivers
20 for us in terms of what they're doing.

21 And so we've got that in the notebook.
22 Item 3, is the template that we developed following
23 the San Antonio meeting to conduct our reviews, help
24 us conduct our reviews. And the Committee members
25 have filled out the templates to various degrees for

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1 discussion today.

2 We will use some of those draft templates
3 for discussion on the individual vertical slices, to
4 what we have. You know, and I think from here also we
5 want to talk about schedules, where we go from here.

6 And Ray's already proposed and George
7 concurred that we use the March meeting to really
8 start. We're going to actually start our reviews and
9 give status reports and official reports, and maybe
10 some presentations and view graphs about where we
11 stand in March.

12 So I'm just going to, before I turn it
13 over to individual KTI vertical slices, just sort of
14 update for the audience, if nothing else, and for
15 ourselves where we stand on this. The last month or
16 the month before last in San Antonio we agreed that we
17 may actually add an additional product to our overall
18 review.

19 And that was, we may do some comments on
20 the SRCR itself. Although that is not the primary
21 objective of what we're doing, it -- but it may be an
22 outcome, and I've revised the one-pager to reflect
23 that.

24 And again, the one-pager was revised to
25 kind of put the focus on the fact that we're

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1 conducting -- and I'm just going to read excerpts from
2 this.

3 So you don't need to follow along, per se.
4 But we're going to conduct vertical slice reviews
5 -- hold on, I've lost my spot -- vertical slice
6 reviews of the staff's KTI issue resolution process,
7 rather than a report itself.

8 So Ray, you made a really good point this
9 morning about having attended the technical exchange.
10 One of the things you said was you weren't sure you
11 agreed with the resolution, at least on one of these
12 sub-issues, in terms of the closed pending status and
13 maybe the basis for that.

14 And I think that's exactly what we're
15 trying to do with these vertical slices, is get at
16 that kind of issue. Do we agree with the
17 defensibility of what the staff's doing, the
18 transparency of what the staff's doing in the issue
19 resolution process, the traceability?

20 Are they being overly conservative? Are
21 they being underly (sic) conservative? Are we buying
22 in with what we hear and see? And so I think that's
23 a really good example. That just really nails what I
24 think we're trying to do here.

25 And again, we're using all the SRCR. Even

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1 though we did not -- it won't be issued until
2 December, all the technical bases documents are out,
3 the PMRs, the AMRs and I am about to ask Jeff to
4 comment here on their schedules and the tools that
5 they're using.

6 But we have what we need, as the staff has
7 what they need, even before the SRCR is submitted, to
8 get a good jump start on this whole review.

9 So Jeff, could you let us know what you
10 guys are doing?

11 MR. CIOCCO: Yes. My name's Jeff Ciocco.
12 I'm with the NRC staff. I'm a little bit hoarse this
13 morning, so excuse me. We are proceeding by
14 implementing the staff sufficiency guidance and
15 beginning to initiate our preparation of sufficiency
16 comments.

17 As you know, there's a lot of uncertainty
18 as to when the DOE will release its Site
19 Recommendation Consideration Report. We do have the
20 AMRs/PMRs. We have the preliminary pre-closure safety
21 evaluation. We don't have the TSP/ASR.

22 MR. WYMER: We received some of those just
23 last week.

24 MR. CIOCCO: Okay. We have received some
25 of the TSP/ASR reports. And we also have the

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1 uncertainty with the new Volume 3 of the SRCR, which
2 is the NWTRBs cold versus hot repository design. So
3 we are beginning to initiate the review in order to
4 get ahead and to -- really to, I guess to get ahead of
5 the submission of the DOE's SRCR.

6 MS. DEERING: Are you using --

7 CHAIRMAN GARRICK: Microphone.

8 MS. DEERING: Sorry. Do you have what you
9 feel you need in the way of your preliminary guidance
10 to -- for now. I know it's not a final document, but
11 you have a structure, and in part, using -- or how do
12 you conduct your review? Put it that way.

13 (Laughter)

14 MS. DEERING: Are you at the point where
15 you're just gathering -- let me back up. Maybe that's
16 not something I can ask you. Are you -- what schedule
17 are you using to try to pull your comments
18 together?

19 MR. CIOCCO: Well, the site recommendation
20 schedule had us to generate sufficiency comments by
21 May of 2001.

22 MS. DEERING: Right.

23 MR. CIOCCO: And depending on when the DOE
24 submits the SRCR, we may be compressed to still submit
25 comments by May 2001. There's, you know, obviously

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1 uncertainty in that. So we're kind of backing out a
2 schedule from May 2001 and generating comments.

3 MS. DEERING: Okay.

4 MR. CIOCCO: Well, obviously, we're going
5 to have to evaluate those comments when the SRCR comes
6 in. We don't know what the actual contents of the
7 report are going to be, but we know what the technical
8 basis documents are now that we have received, and
9 those are public documents.

10 MS. DEERING: Okay. That's helpful. So
11 that means we might want to keep with that schedule
12 also, the May 2001, keep that in mind as a target
13 ourselves, because there's a lot of uncertainty. So,
14 or at least get something preliminary together.

15 I think what we might want to do, then, is
16 talk a little bit about these templates and where we
17 stand in the various -- on the various vertical
18 slices. And Ray, you were -- you did a really nice
19 job on yours, and Andy's got this draft on the working
20 group.

21 So you all might want to start, sort of
22 kick it off and brief us on, you know, some of your
23 insights in filling out the template and whatever you
24 want to talk about.

25 DR. WYMER: Okay. Well, I wasn't terribly

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1 enthusiastic about it when it first came up, but as I
2 get into it, it seemed like it was probably
3 worthwhile.

4 DR. HORNBERGER: "It" being the template.

5 DR. WYMER: The template, yeah.

6 DR. HORNBERGER: I just wanted to correct
7 that for the record.

8 DR. WYMER: Yes. That was a capital "I"
9 there on the end.

10 DR. HORNBERGER: Because somebody might
11 have misinterpreted it and thought you weren't excited
12 about the chemistry issue.

13 DR. WYMER: Oh, I doubt if this group
14 would ever make that mistake. It did force me to,
15 probably sooner than I would have, to go into a real
16 reading of the AMRs and looking through a lot of the
17 stuff. So I thought it was a worthwhile exercise, all
18 in all.

19 I questioned one of the points that Lynn
20 put into her outline, is the NFC's previous resolution
21 status prior to technical exchange and source. I
22 didn't know how that contributed to going forward. So
23 I didn't do anything on that particular item.

24 DR. HORNBERGER: Ray, I think that -- I
25 don't disagree with you're not pursuing it -- but I

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1 think that our -- I believe that our thinking had been
2 that we might get some insight as to if there was a
3 change in the issue's status as to exactly what it was
4 that led the staff to conclude that such a change was
5 warranted, and that would give us sort of a time line
6 or a course, a path to resolution and might give us
7 some insights. That's all.

8 DR. WYMER: Yes, I thought that's probably
9 what the objective was, but it seemed to me that if we
10 knew what the current status was and we're going
11 forward from that point, that was what was important.
12 But okay.

13 There's differences of opinion. But we do
14 plan, as you know, to hold this little working group's
15 -- not exactly a working group, but a group of us get
16 together, three consultants and Andy and myself are
17 going to get together and discuss the KTIs that relate
18 -- and the AMRs that relate to mainly the corrosion
19 issue, but peripheral issues that related to that,
20 that have to do with transport of radio nuclides.

21 And so we've put together a plan to
22 proceed to an outline that we're going to follow in
23 holding our meeting, which will allow us to go into
24 considerable depth vertically.

25 And Andy has also superimposed on that in

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1 order to cover some of the issues, the other KTIs that
2 are not our direct interest, the horizontal slice,
3 which broadens out what we're going to discuss, too,
4 things like transport phenomena.

5 If I recall the RAD transport in
6 particular is an issue that we're interested in.

7 MS. DEERING: Yes.

8 DR. WYMER: So as we're going a little
9 farther than maybe than you anticipated with respect
10 to making this in-depth vertical slice, in that we're
11 pulling in outside people to help us with our
12 thinking, people that have a more detailed background
13 in some of these specific areas.

14 And that's pretty well outlined in the
15 stuff that you've handed out to the Committee, at
16 least, which is generally available to anybody who has
17 the temerity to be interested in all of these details.

18 I don't know what else, really, to say,
19 Lynn, without getting into the stuff I specifically
20 wrote on the KTIs. Generally, I think it's a
21 worthwhile exercise.

22 MS. DEERING: Yes. And you're comfortable
23 -- it's a worthwhile exercise. You think it's a
24 doable exercise, right?

25 DR. WYMER: Yes.

1 MS. DEERING: We can get there from here?

2 DR. WYMER: Yes.

3 MS. DEERING: I mean, because some of this
4 was experimental in the beginning. Like, are we even
5 on the right track; how far can we go with it.

6 DR. WYMER: Yes, I think we can. And in
7 my write-up of the vertical slice template I have a
8 fairly extensive attachment that I hooked on that
9 deals with the resolution of the key technical issues,
10 at least on container life and source term, which is
11 our principal thrust.

12 So there is an attachment that deals in
13 some detail with the corrosion processes and the
14 lifetime of the containers. And it says what the
15 steps are that NRC and DOE plan to take with respect
16 to resolution of these key technical issues, with even
17 down to the particular AMRs that are -- that ought to
18 be looked into.

19 One thing that came out of this review
20 last week when we went to the resolution meetings, KTI
21 resolution meetings, is that a lot of the AMRs are
22 going to be redone. They're going to be extended and
23 there are revisions already in hand that I did not
24 have at the time I wrote this.

25 And there are other revisions that are

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1 planned. So in a way, we're always running behind,
2 and I don't know a way, really, to get around that
3 except that some of the issues that I may have pointed
4 out or come up with are already at least partially
5 resolved.

6 This will be kind of a problem for us when
7 we hold our little group meeting, too, that we will
8 not have the latest AMRs in hand. And a lot of them
9 are requested at this meeting by the NRC staff, but we
10 probably will not have those by the time of our
11 meeting.

12 We certainly will not have had time to
13 review them at the time of our meeting.

14 MS. DEERING: Yes, I recall, too, a lot of
15 the staff requested as part of issue resolution a
16 particular analysis. And DOE would say, yes, that'll
17 be in our AMR and that will be submitted in 2002.

18 DR. WYMER: Yes. There were about three
19 or four, maybe more, that were specifically said 2002
20 and we said, well, that doesn't do us a lot of good.

21 MS. DEERING: Except that I don't think to
22 do our vertical slice and the conclusions we will
23 make, I don't -- I think there's a way to get around
24 that.

25 DR. WYMER: Yes.

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1 MS. DEERING: We don't have to say all
2 information was provided and information was adequate
3 or anything like that, Ray, George.

4 DR. HORNBERGER: Right. But it's also
5 true, I think, that the AMRs are available. What
6 you're talking about is the additional information in
7 the next revision of an AMR that won't be required to
8 have the issue closed.

9 So the AMR itself is available. It's just
10 that the additional information that NRC staff has
11 requested won't be available.

12 DR. WYMER: Well, that's certainly true,
13 but some of that information is so important that it
14 would be nice to have it, you know.

15 DR. LEVENSON: Yes, but at this point
16 isn't the most significant thing staff recognition
17 that that is important and that is needed and they're
18 going after it? We don't necessarily have to see the
19 data.

20 We just want to make sure that they
21 haven't missed something, if they've identified it and
22 are insisting on it.

23 DR. WYMER: And if I were to make a
24 general observation about this KTI resolution meeting,
25 it is that most of the stuff that was requested was,

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1 where is your data.

2 That was the thrust, where's the
3 information that backs up this statement that you
4 made. And that's 90 percent at least of what was
5 asked for, was supporting data.

6 DR. WYMER: Which is what we'd like to
7 see.

8 MS. DEERING: Yes, that's a good point.

9 MR. CAMPBELL: And that was true in the
10 RAD transport tech exchange, is a significant amount
11 was either what is the data to support your position,
12 or how are you going to get that data.

13 DR. WYMER: Yes. That was one of the
14 things I liked about the meeting and the discussion in
15 the caucus, was the emphasis on factual support for
16 fairly broad and sweeping statements that were made by
17 DOE.

18 I thought it was a good process. I'll
19 repeat that for the larger group, or I thought it was
20 a good process.

21 CHAIRMAN GARRICK: Yes. And in connection
22 with the process question it's important for us to
23 remind everybody here that what we're doing here is a
24 departure from our normal way of doing business, of
25 reviewing an applicant's material and offering

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1 comments and advice, et cetera.

2 Given the large amount of material that's
3 involved and tremendous amount of reading that is
4 necessary to even get through it, much less evaluate
5 and analyze it, the Committee and the staff has made
6 the decision that the vertical slice concept of not
7 only doing a vertical slice, but focusing more on what
8 the NRC's doing than on necessarily what the DOE is
9 doing, is a more efficient way to get to the issues.

10 And I guess the question we have to keep
11 asking ourselves, is this giving us visibility into
12 the process that the NRC is employing to review
13 something like the SRCR, and are we learning more
14 about how effective that process is?

15 And in the meantime, are we also staying
16 alert to technical questions that may require us to go
17 back to the source material, the DOE source material,
18 to get to the -- get real satisfaction on them? Is
19 that happening, is something we have to be very alert
20 to.

21 DR. HORNBERGER: Of course, I'd point out
22 that all of this stuff we're talking about looking at,
23 PMRs and AMRs, is in fact to be resource material.

24 CHAIRMAN GARRICK: Right.

25 DR. HORNBERGER: So that's exactly what

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1 we're doing.

2 DR. WYMER: That's right.

3 CHAIRMAN GARRICK: Yes. Yes.

4 DR. WYMER: That's all I have, Lynn.

5 DR. LEVENSON: Yes. I have one question
6 for Ray.

7 CHAIRMAN GARRICK: Oh, a question.

8 DR. LEVENSON: Under -- in your thing you
9 wrote under DOE's current modeling approach and
10 position:

11 "The DOE's current models are based on
12 the assumption that the environment on
13 the surface of the waste package is the
14 same as that on the drip shield."

15 Does that mean we're spending some
16 hundreds of millions of dollars of money for drip
17 shields, and taking no credit for it at all?

18 DR. HORNBERGER: Chemistry clinic.

19 CHAIRMAN GARRICK: Water flow right up
20 their --

21 DR. WYMER: I don't know that it means
22 exactly that, but it does mean that they just assume,
23 as it says, that the water hasn't changed after it's
24 gone off the drip shield into the package, and that's
25 probably not true.

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1 DR. LEVENSON: Oh, okay. So this is not
2 -- it's not the total environment. It's only the
3 chemistry of the water.

4 DR. WYMER: That's it.

5 DR. LEVENSON: Okay.

6 DR. WYMER: Because the total environment
7 includes quantity of water.

8 DR. LEVENSON: Yes, okay. That's how I'd
9 --

10 DR. WYMER: Yes, I'm sorry. That wasn't
11 clear.

12 DR. LEVENSON: Okay.

13 DR. WYMER: John, you had a --

14 DR. LARKINS: Yes. Well, you had
15 questions to answer for Commissioners where you, you
16 know, these questions. And it says: "Is the issue
17 resolution process sufficient for the sub-issues," and
18 you say maybe not, because of the absence of, you
19 know, maybe some things have been overlooked. How do
20 you --

21 DR. WYMER: How do you know what you
22 haven't thought about, yes.

23 DR. LARKINS: Yes.

24 DR. WYMER: And a very good case in point,
25 of course, is the trace impurity corrosion of Alloy

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1 22. That wasn't thought of until it came up. So you
2 can't know what you don't know, but these things do
3 emerge with time and with additional experimental
4 studies.

5 And that's where it's all at. You've just
6 got to go out there and look at the system more and
7 get data, and things will continue to crop up,
8 especially in the coupled effects area because the
9 system's so extraordinarily complicated chemically.

10 DR. LARKINS: Yes. I guess what you're
11 saying is for the way it's -- the sub-issues are
12 defined that it may be sufficient; however, because of
13 uncertainties in the knowledge base there that you
14 -- there may be some things which aren't included.

15 DR. WYMER: I would bet there are things,
16 you know. It's almost a certainty that there are
17 things that will crop up. But of course, till they
18 crop up we don't know what they are.

19 DR. HORNBERGER: Now, to me there's, shall
20 I say, a danger for us here and that is that this is
21 typically -- we know this is true in science, okay
22 -- there are always surprises. We know that there are
23 surprises.

24 So the scientific approach to a question
25 never leads to an answer, but this is an engineering

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1 project, and basically, I think that we have to keep
2 in mind that the whole idea is to try to engineer it
3 so that it is at least robust against surprises.

4 Not that all of the issues or all of the
5 scientific issues have to be explored in goriest
6 detail, but rather that a safety case can be made.

7 DR. WYMER: Yes.

8 DR. HORNBERGER: And so I also think that
9 as we go through the vertical slice, what John has
10 really emphasized for us, is to keep the RIPB -- keep
11 the risk perspective in mind as we go through it and
12 not lose sight of that.

13 DR. WYMER: Yes, and what you look for is
14 not the technical details, but the gross things like,
15 is Alloy 22 really going to last 11,000 years, some of
16 these key issues.

17 If they're not of that magnitude then they
18 do get washed out because the engineering approach,
19 using George's term here, does allow you to ignore a
20 bunch of stuff that is chemically interesting, it will
21 happen chemically, but doesn't matter.

22 DR. LEVENSON: If there is no impact on
23 safety, then why do we pursue getting it? Then it's
24 just a matter of satisfying somebody's curiosity. I
25 think we have to assure ourselves, is that things that

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1 have a significant impact on safety are not
2 overlooked.

3 DR. WYMER: Yes.

4 DR. LEVENSON: Not that nothing is
5 overlooked.

6 DR. WYMER: Yes, absolutely.

7 MS. DEERING: Right. Right. That's not
8 necessarily easy to do.

9 DR. LEVENSON: Oh, no. No. No, certainly
10 not, but there's a lot of things that you can in fact
11 discard. If you say you have no idea what this is,
12 but if you say, this is the maximum range it could be
13 and it doesn't matter where in that range it is, it
14 has nothing to do with safety.

15 MS. DEERING: Yes, and I hope that that's
16 going to be definitely a part of each of our reviews
17 wherein we could make comments that if we feel the
18 staff has considered the risk significance of an issue
19 before they've pursued it rigorously, for example, you
20 know, that's something we need to be conscientious
21 about, is staff pursuing issues that don't have risk
22 significance.

23 And do we -- is there a way for us to even
24 know that? But one of the ways is to look at the
25 staff's process and the risk insights that they're

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1 coming up with. You know, it involves going pretty
2 deep into this review.

3 DR. LEVENSON: Well, almost. The reason
4 being that unfortunately to some extent the staff is
5 not limited to only looking into risk issues. They're
6 also charged with assuring compliance. So they may
7 look into things that we don't think would be
8 necessary, but they have no choice. So we have to
9 recognize that.

10 DR. WYMER: Well, let me make one more
11 point. One of the areas that we need to look at most
12 carefully in this vertical slice thing is assumptions.
13 There are a bunch of assumptions made, just sort of
14 carte blanc. They're just made.

15 These are assumptions. We think there are
16 good reasons for these assumptions, so I think to
17 critically review assumptions, because as a friend of
18 mine always used to say, assumptions drive
19 conclusions, and they do. So we need to really pay
20 close attention to assumptions.

21 MS. DEERING: That's really a good point.

22 MR. CAMPBELL: In terms of just in
23 addition to what Ray said, the whole issue of defense
24 in depth is a key to why we're looking beyond the
25 corrosion issues related to the waste package.

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1 And the idea here is that our vertical
2 slice will focus on the waste package and corrosion
3 issues. But we really needed to look at the other
4 components of the system that contribute to
5 performance in the absence of the waste package.

6 And those are, you know, in package
7 chemistry, in drift chemistry, transport to the
8 accessible environment. And those, basically, the
9 three key areas outside of container life and
10 container performance that need to be looked at.

11 And you know, one of the things that we
12 have to be aware of is that the conceptual models
13 built into everything into TSPA do necessarily leave
14 things out. So the question is, in that process has
15 something very important been left out.

16 So that's part of what we're going to look
17 at in the context of this meeting.

18 MS. DEERING: That sounds really good. Do
19 you want to talk about your work?

20 MR. CAMPBELL: I think Ray's actually
21 covered most of the things. We have three consultants
22 in different areas, RAD transport, Jim Clark. Paul
23 Schuman's a corrosion expert, and we have Marty
24 Steiver (phonetic) coming in, and kind of divvied it
25 up in terms of individual responsibilities to look at

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1 different areas based upon their expertise.

2 And we're not coming here to draw
3 conclusions, but to, rather, put our heads together
4 and, you know, see if there are general trends that we
5 see in our individual analyses that warrant, you know,
6 further analysis and more focus.

7 I think that's -- I've tried to cast the
8 questions that each of us will, you know, bring to the
9 table in terms of the questions that were posed in the
10 vertical slice template.

11 CHAIRMAN GARRICK: Yes. And I think one
12 of the things that I'm hopeful that we'll find in the
13 vertical slice exercise with the TPA and TSPA is
14 whether or not we indeed have a baseline or a
15 reference point to work with.

16 There's two things that I think we want to
17 get out of the TSPA that make the process sound. One
18 is a kind of a realistic appraisal of what the real
19 risk is of this repository.

20 The other is what will -- addresses this
21 issue that we keep raising about integration and
22 interaction and systems interaction and what have you.
23 And that's the issue of context and perspective.

24 So if we can get some sense on the basis
25 of the current design specifications, what the safety

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1 issue is, what the risk really is, including of course
2 it's uncertainty, and get the sense of how all the
3 pieces fit together that lead to that estimate of
4 risk, then that will help all these other exercises
5 greatly in terms of saying, well, how relevant is
6 this, this or that issue, and what kind of backup
7 lines of defense really appear to be important here.

8 So we'll be looking for that. We're a
9 little behind in the TSPA vertical slice exercise from
10 the others. Part of the problem is we've been anxious
11 to have the full benefit of the TSPA SR and also the
12 technical exchange meeting that keeps getting
13 scheduled and rescheduled.

14 But I think we'll be able to have
15 something in -- for the November -- or for the March
16 meeting that will allow us to at least talk to it in
17 terms of the scope, but I don't think we'll be as far
18 along as the other three.

19 DR. LARKINS: John, are you saying that
20 when Ray and Andy finish their exercise and identify
21 the areas where they see a need for more information
22 or a better understanding on their part that they need
23 to fold us into --

24 CHAIRMAN GARRICK: Right.

25 DR. LARKINS: -- looking at the TSPA --

1 CHAIRMAN GARRICK: Yes.

2 DR. LARKINS: -- to see.

3 CHAIRMAN GARRICK: There's got to be
4 something we do that tells us --

5 DR. LARKINS: How do we do that?

6 CHAIRMAN GARRICK: -- the importance of
7 these individual pieces and parts.

8 DR. LARKINS: Yes.

9 CHAIRMAN GARRICK: And right now, that is
10 the TPA TSPA, and we can criticize it and we should,
11 but what we should be doing is saying, okay, how can
12 we overcome these problems that we have with it,
13 because somewhere along the line we have to ask
14 ourselves, is -- has enough work been done.

15 DR. LARKINS: Yes.

16 CHAIRMAN GARRICK: Is the analysis
17 adequate? And we certainly need to be guided on how
18 far we go in this whole issue of trying to resolve
19 uncertainties. And if we find ourselves -- and I
20 think Milt was alluding to this a little while ago
21 -- if we find ourselves in a position where an issue
22 is being addressed and another order or magnitude of
23 change in the uncertainty isn't going to impact it,
24 then you know, we need to -- we'd like to know that
25 and we need to move on.

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1 DR. LARKINS: I think it sounds like it
2 would be worthwhile having the staff involved in some
3 of these, because if you're going to come back later
4 on and say, you know, how have you taken these issues
5 into consideration in your analysis, either with TPA
6 or reviewing TSPA, they ought to get to understand how
7 these insights came about doing this vertical slice
8 approach. So I didn't know whether you'd planned on
9 --

10 MR. CAMPBELL: We do.

11 DR. LARKINS: Okay.

12 MR. CAMPBELL: And we haven't had a chance
13 to talk to them until we kind of settled upon our
14 approach. As you point out, the integration into the
15 vertical slice for TSPA is part of this plan, and
16 actually, 4 and 5 of our meeting goals was to feed
17 into TSPA.

18 If you will, what Ray and I are doing is
19 kind of a process level model, look-see. And what
20 John and I intend to do is more of a higher level TSPA
21 model looking back. And hopefully, we'll be able to
22 make those connections.

23 And then, as you point out, having staff
24 involved and discussions with staff is intended. It's
25 just we haven't set anything specific up at this

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1 point.

2 DR. WYMER: It seems to me that one of the
3 important points with respect to this TSPA thing is
4 what John already alluded to, namely, the propagation
5 of uncertainties, plus the issues of what do you lose
6 in the abstraction, in particular a couple processes.

7 DR. LEVENSON: I think, you know, there's
8 two pieces that I have in the way, and one is the
9 propagation of the uncertainties, but we're spending
10 a lot of time looking at details.

11 And if in fact in the abstraction process
12 those things are wiped out, why are we spending time
13 assessing whether something is done properly if it
14 doesn't propagate through, not only the uncertainty,
15 does it itself propagate through?

16 And it's why I think we have to -- I think
17 this vertical slice thing can't just be a vertical
18 slice through the KTIs. I think we have to take one
19 or two at least and follow them through the
20 abstraction process into the TSPA, to see what it
21 really means.

22 MR. CAMPBELL: The focus of the issues,
23 this isn't intended to be a random walk through either
24 the process models, AMR, PMRs or TSPA. We've allowed
25 the modeling that's been done to date, both by the

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1 staff and TPAs, the TPA analyses and by DOE and their
2 TSPA analyses to help guide the picking of the issue
3 areas to look at.

4 CHAIRMAN GARRICK: Yes. This Committee
5 has always been pushing for some indication of how
6 much safety are we getting from what. We've always
7 wanted that. When we talk about introducing
8 engineered barriers, we've talked about being able to
9 quantify the contribution of individual barriers, at
10 least to the extent that it's reasonable.

11 And I think when it comes to simplifying
12 a specific model we want to know what the impact of
13 that is, you know. Ray was talking about assumptions.
14 Some analysts will say assumptions are the curse of
15 any -- of the truth because you don't want to assume
16 your way out of reality.

17 And that's why we keep pushing for, well,
18 let's understand first what is our best shot at how
19 this thing really does perform. And then we can start
20 whacking away at how good this part of the analysis is
21 and that, and get to the issue of assumptions.

22 But I think we've already been talking
23 about in the TSPA vertical slice of trying to back out
24 the critical assumptions so they're more visible and
25 in terms of their impact on something like a realistic

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1 assessment of what the risk is, what the performance
2 is.

3 Then we can choose to be as conservative
4 as we want, but we need a reference. So we need that
5 baseline to know, to be able to measure how
6 conservatively we might be making some of these
7 estimates.

8 How about the -- how about yours, George?
9 Are you satisfied that we can achieve what we want
10 with this process in the -- on the one that you're in
11 charge of here?

12 DR. HORNBERGER: Yes. I mean, and I think
13 that Lynn actually laid out the guts of it in her
14 outline last time. And as long as, at least the way
15 I envision it, we're talking a slightly more narrow
16 view than what Ray and Andy have just outlined for the
17 chemistry, and that is to focus, really, primarily on
18 the flow paths in the saturated zone.

19 There are obviously lots of other issues
20 that touch upon that, but to the extent that we can,
21 given our limited availability of time and resources,
22 I would like to see us focus as tightly as we can on
23 the issue that we described.

24 And I think if we do that there's plenty
25 to look at. It's not as if -- that just makes it

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1 easy.

2 MS. DEERING: Yes. I think George and I,
3 based on the piece that you wrote, George, this helps
4 tighten it up even more. And I feel like now it's
5 just a matter of starting, getting started.

6 DR. HORNBERGER: Yes, I do, too.

7 MS. DEERING: And whether the data's been
8 provided or not, I don't feel it's going to hang us
9 up. It's more the fact that it's been asked for, and
10 from a risk perspective is it the right data to ask
11 for, and maybe make the assumption that it will be
12 provided.

13 DR. HORNBERGER: Right.

14 MS. DEERING: And maybe we have an idea of
15 whether that's -- how realistic that is or not, I
16 don't know. You know, we already know there's
17 problems in getting data in terms of permitting from
18 Nye County.

19 Some of that alone is problematic. Just
20 getting data, even if there's funding, is not
21 necessarily easy and something you can count on
22 happening. But so I'm keeping that in mind. I think
23 we've got plenty to work with.

24 And we'll talk and I'll talk with the
25 staff, and come March we'll put together something,

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1 you know, that shows we've actually cut into this a
2 little bit, which we haven't done yet. See, that's
3 true in all of our cases.

4 I think we're sort of on the edge here.
5 We've been defining what we want to do and whether
6 it's even -- you know -- sort of a feasibility
7 assessment: is it even reasonable to consider can we
8 go there before we get too involved? And I think
9 that's exactly where we should be right now.

10 DR. LARKINS: Sound like, yes, this is
11 going to be somewhat iterative in nature.

12 MS. DEERING: Yes.

13 DR. LARKINS: You're going to go through
14 this one time, and then you're going to discover
15 things and then you're going to need to go back and
16 take another look at these things.

17 MS. DEERING: And each one so closely
18 links to another, like George's and mine, it
19 definitely bumps up against the retardation issue and
20 the alluvium, you know, first defining flow paths, how
21 much water even goes into the alluvium.

22 And then so there's going to be, I think,
23 the staff here, we've been meeting weekly, or we've
24 been trying. We've sort of tapered off from that, but
25 once we get started on these, we ourselves need to,

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1 once we share insights with each other, where we
2 stand, you know, what works, what doesn't, so we'll
3 make a commitment to do that.

4 CHAIRMAN GARRICK: On the basis of a
5 preliminary look-see does anybody, any of the members
6 have any concerns that are rather significant at this
7 point that ought to be telegraphed in terms of either
8 the modeling or the input information, that is to say,
9 the data?

10 DR. LEVENSON: I have one question, John,
11 and that is, it goes back to the template from the KTI
12 meeting that Rich and I attended. We certainly got
13 nothing that would let us address the last question,
14 namely, what's the risk significance of the issues
15 being discussed.

16 CHAIRMAN GARRICK: Yes.

17 DR. LEVENSON: There was no discussion
18 whatsoever.

19 CHAIRMAN GARRICK: At your meeting?

20 DR. LEVENSON: Yes.

21 MR. MAJOR: There was a debate. I mean,
22 the Department of Energy would come out and make a
23 presentation and they would claim the colloids didn't
24 contribute much to the overall dose, and therefore, it
25 didn't need to be considered much further than they

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1 already have.

2 And then you have the NRC staff on the
3 other hand saying, well, you know, we're a bit
4 skeptical about that; have you considered A, B, C and
5 D.

6 DR. LEVENSON: Yes, but that was on
7 specific, very narrow things, not relevant, really, to
8 the overall question of risk. I mean, because whether
9 you do or don't generate colloids is one little piece.

10 Then you've got questions of transport of
11 colloids and trapping and you got all these other
12 things so that the things were addressed bit by bit.
13 The risk did not to me appear to be a basic part of
14 the issues of what was important or why.

15 MS. DEERING: Can Bret Leslie make a
16 comment? He wants to comment on that issue.

17 MR. LESLIE: This is Bret Leslie, from the
18 NRC staff. And I agree with the assessment. I
19 attended the first one of these technical exchanges,
20 and at the first one they didn't even have any
21 insights into risk.

22 And we requested that they try at the
23 beginning of these meetings to put a TSPA overview so
24 that we could understand things, and DOE was very
25 reluctant to go into this in much detail.

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1 And therefore, what they agreed to provide
2 at this because they felt it was the purview of TSPA,
3 that they didn't want to have to repeat the TSPA
4 meeting in every one of these meetings.

5 So what they're trying to do to help put
6 the risk perspective for the NRC staff in place is to
7 look at, for instance, colloids, which was one of the
8 topics, and say, this is how we dealt with colloids
9 generation, which is one of the topics we were talking
10 about.

11 So I agree with that but we're somewhat
12 limited by what DOE is going to provide us, you know.

13 DR. LEVENSON: But what that would
14 indicate is the templates that we're using for
15 vertical slices is -- the risk issue should be deleted
16 from each individual one and maybe ought to be a
17 separate one, if they're treating it separately.

18 CHAIRMAN GARRICK: Well, this is all a
19 matter of style and how it's done, but one argument
20 could be that -- to take the position that, well, as
21 a matter of fact, that's exactly what we should be
22 doing.

23 That is to say, what we should be doing is
24 every time an issue comes up, start with the TSPA and
25 ask ourselves, where does that issue appear in the one

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1 analysis that we have defined as integrating
2 everything and bringing all the pieces and parts
3 together.

4 As a matter of fact, I'm reminded of when
5 we really began to make progress on the WIPP
6 performance assessment was when we did just exactly
7 that. We took the position that we're not going to
8 have anymore discussions of technical issues without
9 it first being put to the test of the PA.

10 And so whenever we would start a
11 presentation we started with the idea of, well, where
12 does this issue fit in the grand scheme of things, and
13 the measure for -- the grand scheme measure is the
14 performance assessment until something comes along
15 better, and then go from there so that people are
16 using a legitimate reference in the discussion.

17 So you know, it may be that just what DOE
18 is saying we should avoid here is exactly what we
19 should be doing. And maybe that's something for us to
20 consider.

21 MS. DEERING: Well, is there also the
22 other half of it, which is NRC's risk insights, you
23 know, because that's important, too, because NRC has
24 done -- has in its pocket some of its own ideas about
25 what's important.

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1 And I don't know to what extent that has
2 been shared with us. I mean, but I think one on one
3 that that would be a reasonable thing, for us
4 technical staff to talk to NRC technical staff and try
5 to help out along those lines.

6 You know, it's not something that probably
7 you're going to hear in a public meeting.

8 CHAIRMAN GARRICK: Yes. Yes.

9 DR. WYMER: The problem is, is that lots
10 of different -- there's a lot of kinds of risk, and it
11 seems to me that if you don't discuss risk as you have
12 in your outline for this vertical template, you're
13 going to miss a lot of risk.

14 If you take a sort of a top-down view
15 you're not going to unearth some of the risk that you
16 will unearth by a detailed discussion within the AMRs
17 and the KTIs. So and then there are sort of overall
18 risks that are not specific technical risks, but have
19 to do with risks of whether something in fact will be
20 accepted or not accepted in a broader sense, because
21 of public outcry or because of some regulation or
22 because of something else.

23 So there's different hierarchies of risk
24 and I think to get at some of the technical risks you
25 really got to get into the nitty-gritty. Then you

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1 decide based on the overall plan of approach, the
2 TSPA, the TPAs, whether or not the risks that you've
3 unearthed are relevant risks, and you weed them out if
4 they're not.

5 But I think you're going to miss them if
6 you don't go into the details.

7 CHAIRMAN GARRICK: Okay. We've had a
8 request to -- from a public citizen group to make a
9 comment.

10 MS. GUE: Thank you, Mr. Chairman. I'm
11 Lisa Gue with Public Citizens Critical Mass Energy and
12 Environment Program. Certainly, we're very interested
13 to follow along in your vertical slice process.

14 And we share some of the concerns that
15 your committee has stated, and also the Technical
16 Review Board, with respect to the uncertainties of the
17 most recent outlines available from the Department of
18 Energy.

19 The specific comment I'd like to make
20 jumps back to the beginning of this discussion with
21 respect to the sufficiency report that NRC will issue
22 referencing the SRCR document.

23 And I want to bring to the attention of
24 this Committee some of the very serious concerns that
25 Public Citizen, together with other -- working

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1 together with other public interest groups nationally,
2 and also State of Nevada groups, have on the SRCR
3 document and the process leading up to its release.

4 I guess there's three main concerns, or
5 I'd categorize our concerns into three areas, anyway.
6 First of all, this of course is not a legislative
7 document. It's not specifically outlined as part of
8 the Nuclear Waste Policy Act.

9 But the DOE has chosen to use the SRCR as
10 -- in order to fulfill the requirement for public
11 comment on a final recommendation. And our concern
12 with respect to the opportunities for public comment
13 is that the last formal opportunity that the public
14 had to comment on the Yucca Mountain process was in
15 response to the draft Environmental Impact Statement.

16 Yet, as members of the public we have not
17 yet received any feedback as to how or if our previous
18 comments have been integrated into the proposal. And
19 yet -- and so now we are seriously questioning whether
20 we will in fact participate in the SRCR comment
21 period, simply because we have no indications of how
22 worthwhile it is for us to spend our time trying to
23 understand these very technical documents, if in fact
24 our comments are not taken into account.

25 I guess our second main concern is the

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1 timing of the report. As you know, the SRCR was
2 originally scheduled to be released at the end of
3 December of last year.

4 And that was due at a time -- or according
5 to that original schedule and also according to
6 looking at the overview that was prepared, the SRCR
7 was to be making comments on the suitability of the
8 Yucca Mountain site prior to the finalization of
9 several key scientific studies, and also prior to the
10 finalization of key regulations, most notably, the EPA
11 Radiation Protection Guidelines.

12 And we feel that this is really a very
13 inappropriate display of premature confidence on the
14 part of the DOE, and we would extend that to the NRC's
15 sufficiency report, too, if it's released before the
16 consideration of how this site would be able to meet
17 these standards that have not yet been released.

18 And certainly, several specific aspects of
19 your conversation could fit into this category with
20 respect to, for example, the regulatory period, which
21 is one aspect of those EPA regulations which now
22 appear that they won't come out before the change in
23 administration, and therefore, will be delayed to an
24 uncertain point, hopefully in the new year.

25 And finally, I guess I want to bring to

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1 your attention -- hopefully -- I'm sure you're already
2 aware of this, but the internal memo that was leaked,
3 written by a DOE contractor, TRW, and attached to this
4 overview of the SRCR document, and that surfaced last
5 December, has seriously damaged, I guess, the
6 credibility of the DOE's site characterization process
7 in the public mind.

8 The indications, both of the overview
9 itself and more specifically stated in the leaked memo
10 were that, first of all, the technical suitability of
11 the Yucca Mountain site was not the first priority of
12 the DOE, but rather, to offer a financially and
13 politically possible solution to the industry's
14 nuclear waste crisis.

15 And secondly, that this document was
16 available to be used by presumably industry lobbyists
17 to garner support for the Yucca Mountain Project in
18 Congress.

19 Certainly, it's inappropriate, of course,
20 for a federal agency that's been specifically mandated
21 to study the suitability of the Yucca Mountain site to
22 have, even via its contractors, such a blatant and
23 obvious display of bias.

24 And it really has, like I say, undermined
25 the credibility of this process and been very

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1 discouraging to members of the public who have been
2 participating in good faith in the various
3 opportunities for public involvement in the process.

4 And now, it seems that in fact from the
5 perspective of the DOE, a favorable recommendation for
6 the Yucca Mountain site is in some ways a foregone
7 conclusion.

8 So into that context, and I'm sure you're
9 aware that, in fact, we work together, like I say,
10 very closely with citizens groups in Nevada and other
11 national groups, and as well, the federal delegation
12 from the -- the congressional delegation from the
13 State of Nevada in looking at this problem and drawing
14 attention to it.

15 And I'm sure you're aware that the SRCR
16 has actually now been delayed pending the results of
17 an Inspector General investigation. But I did just
18 want to bring to your attention that into this context
19 there are actions of the NRC, as well, that serve to
20 further undermine the public's confidence in this
21 process.

22 One of those is the prelicensing
23 conversations on the key technical issues, which
24 sometimes seem to be phrased or framed in the sense of
25 moving towards the inevitable licensing of the Yucca

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1 Mountain Project, in terms of when the license
2 application is submitted rather than if, when clearly
3 and formally the situation still is if, and other
4 -- or I guess actions of other divisions of the NRC
5 further feed into this sense.

6 And I'd just bring to your attention, I
7 know I've raised it to you before, the draft
8 Environmental Impact Statement for the private fuel
9 storage proposal, which was drafted by the NRC and
10 which makes explicit reference to a Yucca Mountain
11 facility as the eventual destination of waste that
12 would be stored at the PFS facility.

13 So I just -- I appreciate the opportunity
14 to comment to you today and I want to make you aware
15 of those issues, and technical issues and also
16 procedural issues, I guess. We're very aware that the
17 Yucca Mountain proposal lies at the intersection of
18 very challenging science and challenging public policy
19 considerations.

20 And both of those require, I guess, a
21 process which displays optimal integrity. And neither
22 the science nor the policy will be accepted by the
23 public without a process that displays that level of
24 integrity. Thank you.

25 CHAIRMAN GARRICK: Before you sit down can

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1 I ask you a question?

2 MS. GUE: Yes.

3 CHAIRMAN GARRICK: You said regarding your
4 first concern about the SRCR that you had received no
5 feedback from DOE on previous comments. Will you
6 remind me again what specific comments those were and
7 what form they took?

8 MS. GUE: I was referring in general to
9 the comments that were made, both in writing and
10 through participation in formal meetings, on the draft
11 Environmental Impact Statement.

12 CHAIRMAN GARRICK: Yes.

13 MS. GUE: So we were hoping that we would
14 have -- the public would have access to the final
15 Environmental Impact Statement to be able to see how
16 those comments were integrated prior to the comment
17 period on the final -- on the recommendation by the
18 DOE.

19 CHAIRMAN GARRICK: Okay.

20 MS. GUE: But as it happens, the comment
21 period on the SRCR is scheduled to close just as the
22 final Environmental Impact Statement is scheduled to
23 be released. And as you pointed out, all those time
24 lines are now somewhat in question, but that's the
25 best information we have.

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1 CHAIRMAN GARRICK: Okay. I understand.

2 MS. GUE: Yes.

3 CHAIRMAN GARRICK: Thank you.

4 MS. GUE: Thank you.

5 CHAIRMAN GARRICK: Thank you. Did you
6 want to make any comments on the thermal effects,
7 vertical slice, Milt?

8 DR. LEVENSON: No. I think most of the
9 comments --

10 CHAIRMAN GARRICK: Better pull that mike
11 down.

12 DR. LEVENSON: Okay. Most of the comments
13 arising from the meeting we attended have already been
14 made. I would like to pursue the possibility of
15 having a one on one session with somebody from the NRC
16 staff to have what I would call a guided tour through
17 the AMRs, the PMRs, the abstractions, the modeling and
18 to the total system performance assessment of one of
19 some quite narrow issues, either the question of, does
20 all of the water really always move away from the
21 drift in both the pre-closure and post-closure time?

22 Or a guided tour and assessment of what
23 really are the differences regarding water movement
24 and transport if the temperature is 110 degrees
25 centigrade versus 95 degrees centigrade. Been a great

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1 deal of discussion and assumptions about importance of
2 boiling.

3 I've not seen any technical information or
4 discussion as to why it's important. I mean,
5 superficially, there's no inflection in the vapor
6 pressure curves. So I would really like that.

7 You know, I'd be willing to take the time
8 and come and have a one on one, somebody lead me
9 through why these issues are handled with a basic
10 assumption. I mean, is there support in the AMR, in
11 the PMR? Or do they turn out to not be so important
12 during the abstraction?

13 CHAIRMAN GARRICK: Yes.

14 DR. LEVENSON: And I don't know whether
15 it's appropriate, but that would really help me
16 evaluate the total process.

17 CHAIRMAN GARRICK: I think it is
18 appropriate and I think it would be very helpful.
19 Okay.

20 Lynn, where are we?

21 MS. DEERING: Well, it sounds like we're
22 wrapping up this session. With the anticipation of
23 March, we will come in here having started -- getting
24 a good start on these reviews. And I'll --

25 CHAIRMAN GARRICK: Right.

1 DR. WYMER: With view graph presentations?
2 Is that what you were suggesting?

3 MS. DEERING: Yes. Well, how much time do
4 you think we need next month to do -- maybe set aside
5 at least a couple hours?

6 DR. LEVENSON: Half an hour for each one,
7 anyway.

8 MS. DEERING: March, next meeting.

9 CHAIRMAN GARRICK: Yes.

10 DR. LEVENSON: February is saturated
11 without this going.

12 MS. DEERING: Yes. That gives us two
13 months, which I think is good. That's just what we
14 need. So we'll put at least two hours on the Agenda.

15 DR. LEVENSON: I would like to then have
16 my one on one sufficiently in advance of the next
17 meeting.

18 MS. DEERING: Okay. So are you -- is your
19 little team going to organize that?

20 DR. LEVENSON: I'll organize it.

21 MS. DEERING: Okay.

22 DR. HORNBERGER: Sounds like it'll be the
23 entire month of February.

24 MS. DEERING: Yes. You know, I might --
25 I just wanted to add, the NWTRB meeting coming up the

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1 30th and 31st, I think is going to be extremely
2 informative about some of DOE's -- let me just try to
3 explain what I understand about it.

4 The schedule's going to be on the website
5 today, and I'll peel that off and bring it back after
6 lunch. But the TRB is going to attempt to ask DOE
7 very pointed and specific questions of a technical
8 nature about its analysis. And a lot of this I --

9 DR. LEVENSON: Is that a new format?

10 MS. DEERING: Yes. There's no -- that's
11 going to be -- and DOE, of course, knows what the
12 questions for the most part, I think, are going to be.
13 But DOE's essentially going to walk the Board through
14 how it's treating -- I don't want to say tracing a
15 particle all the way through, but that's the
16 impression I'm getting.

17 Now, when I look at the Agenda we'll see,
18 but you know, flow and transport in the unsaturated
19 zone, waste package issues and waste package
20 degradation, juvenile failure, flow in the saturated
21 zone.

22 You know, it's really attempting to shake
23 out the uncertainties, the hard questions, and see
24 what we really understand now.

25 DR. LEVENSON: What's the date of that

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1 meeting?

2 MS. DEERING: The 30th and 31st. It's in
3 Amargosa Valley, of January.

4 DR. LEVENSON: January.

5 MS. DEERING: I just wanted to put that
6 out as -- I'm planning on attending that and I -- for
7 George's and my vertical slice we think there's going
8 to be some real valuable stuff in there. But if
9 others are interested, we'll look at the Agenda this
10 afternoon.

11 CHAIRMAN GARRICK: Are you going?

12 DR. HORNBERGER: No.

13 CHAIRMAN GARRICK: Okay. Any other
14 comments from Committee members, staff, George, Ray?

15 DR. WYMER: I've said my piece.

16 MR. MAJOR: May I share one --

17 CHAIRMAN GARRICK: Yes.

18 MR. MAJOR: -- thing with the Committee
19 members? Following each of these technical exchanges
20 the staff and the DOE do a summary. And in that
21 summary they capture the highlights of the meeting and
22 they also capture the additional information that the
23 staff is looking for and that DOE agreed to provide.

24 And I'm going to hand you a copy of the
25 summary from this last meeting. I guess the staff

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1 does a valiant effort and an awful lot of work goes
2 into putting these things together.

3 CHAIRMAN GARRICK: Yes.

4 MR. MAJOR: They do it at the meeting and
5 then they're signed and agreed to by the senior NRC
6 person there and the senior DOE individual. So if you
7 want to get a sense as to the types of things that
8 come out of these meetings, when you get this brief
9 summary it'll give you some idea of what comes out of
10 these. It shows you how they're moving towards
11 resolution.

12 CHAIRMAN GARRICK: Okay.

13 DR. HORNBERGER: Something had occurred to
14 me and I don't know if this is -- will help it be
15 possible or perhaps it may even be trivial. It
16 strikes me that in some of our discussions about the
17 risk implications of different assumptions or as we
18 dig into things, how big an affect things might have,
19 or at least some insights.

20 I know Andy has done some work with the
21 TPA code. It's even, at least in my mind, perhaps
22 feasible to either look at what the staff has done in
23 the way of looking at things in terms of sensitivity
24 analyses, and try to get at things that way.

25 Or possibly, you know enough about it that

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1 if there were special purpose runs to be done, either
2 you could ask somebody to do them or potentially even
3 do them yourself. Is that totally out of the
4 possible?

5 MR. CAMPBELL: It's possible; it's
6 possible. It would take me a little bit of time to
7 tool up, back into that mode. What you're referring
8 to is when we had Cheryl Hawkins here --

9 DR. HORNBERGER: Right.

10 MR. CAMPBELL: -- as a summer intern. And
11 you know, frankly, I was relying heavily on Cheryl's
12 computing capabilities to run that. I'm familiar
13 enough with it I could do it.

14 It might not be the most efficient use of
15 my time, but it certainly would be worthwhile to be
16 able to go back to the staff and say, have you guys
17 looked at this.

18 DR. HORNBERGER: Look at this.

19 MR. CAMPBELL: To these particular
20 combinations of things.

21 DR. HORNBERGER: Right.

22 MR. CAMPBELL: And so we do have --

23 DR. HORNBERGER: Let me just --

24 MR. CAMPBELL: -- at least some tool. And
25 in fact, we actually have a tool that was all there.

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1 Now, it might require a little bit of change to adapt
2 to the latest version of TPA, but there was this tool
3 that Cheryl put together that allows us to look at
4 kind of -- what do they call it Kilmagoroff,
5 (phonetic) Smirnoff type of sensitivities.

6 MS. DEERING: Isn't that George's tool?

7 MR. CAMPBELL: Yes, it is, by the way,
8 George's original tool, but Cheryl did a lot of work
9 to make it work on the TPA code. And I mean, the
10 insights, I gave you a thick document that Cheryl
11 wrote up as a final report last November that kind of
12 gives you how the insights from that analysis compared
13 to staff insights. And there was a good comparison.

14 DR. WYMER: One of the problems with
15 respect to the code that sort of came out of this
16 meeting we attended, there's an awful lot of stuff at
17 room temperature in the databases, but there's
18 precious little outside of room temperature in the
19 chemistry area.

20 And then also, in some of the minerals
21 that form -- there really aren't data, the
22 thermodynamic data that you need in order to decide
23 which compounds take precedence over other compounds
24 with respect to what's going to form.

25 So there are some fairly significant data

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1 deficiencies, it seems to me, especially with respect
2 to temperature, but also with respect to just
3 fundamental thermodynamic data for stability of
4 mineral phases.

5 MR. CAMPBELL: Yes. There's, I mean, in
6 general there's a lot of room temperature, you know,
7 25 C type of data maybe going up to 50 C, and you have
8 a little bit around three or 400 C just before you get
9 to the critical point.

10 And then you don't have data until you get
11 way up into real high temperature pressure regimes
12 that you have --

13 DR. WYMER: Yes.

14 MR. CAMPBELL: -- deep within the earth.
15 The way that's generally handled is that the
16 thermodynamics people do these correlation type of,
17 you know, thermodynamic extrapolations.

18 DR. WYMER: You can do some of that, yes.

19 MR. CAMPBELL: Which can bound thermo data
20 to some degree, but you're right. There's not a lot
21 of data at this 100 to 300 degree range.

22 DR. WYMER: The argument's made that
23 before it's important the temperature's down again
24 before it ever seems to be. And that, of course, is
25 an issue, not an answer.

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1 MR. CAMPBELL: And processes occur much
2 faster at these higher temperatures.

3 DR. WYMER: Yes.

4 MR. CAMPBELL: That's why it pops up as an
5 issue. I guess the real question for us is, are these
6 kinds of extrapolations done sufficient to bound the
7 problem?

8 Are they sufficiently conservative to
9 bound the problem so that, you know, the fact that you
10 don't actually have the data but you're relying on
11 some basic properties of Gibbs' Rule or whatever, to
12 get that -- some estimate of the data that you need,
13 is that sufficiently robust in the temperature
14 pressure regime you're interested in to answer the
15 question.

16 DR. WYMER: And it's another case of
17 whether sometimes you're drifting off into
18 assumptions, again, too, and solving your problem by
19 assumptions. So the whole thing is complicated.

20 MR. CAMPBELL: And I'm sure Dr. Steindler
21 will raise those issues, true to form.

22 (Laughter)

23 CHAIRMAN GARRICK: Any other comments,
24 questions, concerns?

25 (No response)

1 CHAIRMAN GARRICK: Okay. Well, I think
2 what we'll do is -- don't we have some lunch meetings?

3 MS. DEERING: Yes.

4 CHAIRMAN GARRICK: Yes. So why don't we
5 adjourn and get ready for that, and then come back
6 here at 1:00 o'clock for the discussion on entombment,
7 okay?

8 (Whereupon, the foregoing Meeting went
9 off the record 11:35 a.m., and went back
10 on the record at 1:05 p.m.)
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(1:05 p.m.)

CHAIRMAN GARRICK: The meeting will come to order. The next item on our Agenda is the Entombment Option Decommissioning Power Reactors. The member that will lead the discussion on this is Dr. Wymer. Ray, it's your subject.

DR. WYMER: Hi, Stephanie.

MS. BUSH-GODDARD: Hello. How are you?

DR. WYMER: Fine. We're struggling with this, and I'm sure you are, too. And so we thought we'd just have a sort of a discussion. Now, if you want to use some view graphs, I understand you might want to, that's fine in answering these questions.

MS. BUSH-GODDARD: Okay.

DR. WYMER: But entombment doesn't seem like an unreasonable idea to us, but there seem to be some major stumbling blocks to it. The greater than Class C issue is certainly a biggie.

And then the -- getting decommissioning done in six years after a license is terminated is another potential problem that ties in with Class C waste a little bit, maybe.

And whether or not we need changes in the Waste Policy Act, and there are many, many facets or

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1 hurdles to it, and whether or not you can safely seal
2 up and leave in place a reactor vessel, and what are
3 the implications of that.

4 And so we just wanted to kick this around.
5 You have these six issues.

6 MS. BUSH-GODDARD: Questions, yes.

7 DR. WYMER: And then I don't know whether
8 you wanted to proceed using view graphs addressing
9 each of the issues and talk from those. But in
10 general, we just wanted to exchange ideas and get some
11 notion of what the staff's developing, revolving
12 position is, insofar as you can do that.

13 MS. BUSH-GODDARD: Okay.

14 DR. WYMER: In this kind of a meeting.

15 MR. LARSON: I didn't give them to her in
16 any priority order, Ray. So you may have a specific
17 --

18 DR. WYMER: Each one of them is a
19 difficult problem.

20 MS. BUSH-GODDARD: Okay. What I do is I
21 have them on presentation and I also have them -- I'll
22 put them up.

23 DR. WYMER: Fine.

24 MS. BUSH-GODDARD: And we've kind of
25 answered them in bullet style. So I guess --

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1 DR. WYMER: Okay. And then later on as
2 the conversation goes on, I guess if we have the
3 Nuclear Energy Institute representative, we'd like to
4 get their point of view on these issues to sort of
5 broaden the base from which we're trying to address
6 them.

7 MS. BUSH-GODDARD: Yes.

8 DR. WYMER: Okay. So if you just want to
9 start off, that's fine, and then we'll talk as we go.

10 MS. BUSH-GODDARD: Okay. As Ray said, my
11 name is Stephanie Bush-Goddard. And the ACNW
12 Committee sent us about six questions that -- okay --
13 that they wanted us to answer. And I would also like
14 to ask if my colleagues in the audience that are also
15 working on the entombment scenario, in particular Carl
16 Feldman and Bob Nelson, if they would like to comment
17 on the questions to help along.

18 DR. WYMER: Sure.

19 MS. BUSH-GODDARD: The first question was
20 how to handle the question of GTCC waste. And in
21 doing that we're developing a rule-making plan and an
22 advanced notice of proposed rule-making. So the
23 suggestions that I'm giving as the answers are not
24 necessarily the Commission's view, but are discussions
25 that we are developing.

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1 If you look on page 2, we're developing an
2 option in the rule-making plan to establish
3 performance objectives and technical requirements for
4 an entombment facility.

5 (Pause)

6 CHAIRMAN GARRICK: Go ahead.

7 MS. BUSH-GODDARD: Okay. And in here
8 we're addressing GTCC wastes that these requirements
9 might be under a new part. They might be similar to
10 some of Part 61 requirements. Some of them may be
11 pathway analysis and performance requirements.

12 And in doing this we can address some of
13 the 1,000 year limitations that the License
14 Termination Rule has. So that's one way we're
15 addressing greater than Class C, maybe just developing
16 a new regulation particular to an entombed facility,
17 and specifically to handle GTCC waste.

18 CHAIRMAN GARRICK: At reactor sites only.

19 MS. BUSH-GODDARD: At this moment we're
20 looking at even expanding that to maybe other
21 nonreactor facilities. Yes.

22 CHAIRMAN GARRICK: Have you resolved the
23 question of threshold values and what have you?

24 MS. BUSH-GODDARD: No. We're definitely
25 in the preliminary stages. We've had the package to

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1 go around for office concurrence only once.

2 CHAIRMAN GARRICK: Yes.

3 MS. BUSH-GODDARD: And like you said, we
4 had so many difficult issues. We've had to have a
5 couple of management meetings and numerous working
6 group meetings just to get over the basic things. So
7 no, we haven't --

8 DR. WYMER: No.

9 MS. BUSH-GODDARD: -- looked into that.

10 DR. WYMER: I can certainly understand
11 that.

12 MS. BUSH-GODDARD: Another option is
13 concentration averaging; as we know, what happened
14 with the Trojan reactor case where they did
15 concentration averaging over the reactor pressure
16 vessel. So that's another way to handle GTCC.

17 And in doing that now we will not
18 necessarily be classified as GTCC waste, and then
19 won't have those limitations on it.

20 DR. WYMER: Now, was that reactor vessel
21 filled with concrete? Was that empty?

22 MS. BUSH-GODDARD: I'm not sure. Do you
23 know, Dr. Feldman?

24 DR. FELDMAN: Yes. It's filled with
25 grout.

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1 DR. WYMER: Yes, grout.

2 MS. BUSH-GODDARD: Okay.

3 DR. WYMER: Grout.

4 CHAIRMAN GARRICK: You've got to speak
5 into a microphone.

6 MS. BUSH-GODDARD: Okay. Yes, it was
7 filled with grout.

8 CHAIRMAN GARRICK: Got the answer.

9 MS. BUSH-GODDARD: Yes.

10 DR. WYMER: Thanks. Okay.

11 MS. BUSH-GODDARD: So there's two ways of
12 handling it.

13 DR. WYMER: Is it considered that those
14 reactor vessels will be sealed so that effectively
15 nothing can get inside, anything that attacks it would
16 be from the outside?

17 MS. BUSH-GODDARD: There's two ways to
18 look at that. Over time you could have the
19 possibility of something leaking out of the concrete
20 or the steel structure. So I think in the pathway
21 analysis that you would have to do, you would have to
22 consider all pathways.

23 And that's, you know, something, water or
24 whatever getting in and then bringing the
25 radioactivity out.

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1 DR. WYMER: Is it considered that there'll
2 be other contaminated materials that might be thrown
3 into the reactor vessel and then grouted in place in
4 there, or?

5 MS. BUSH-GODDARD: At this particular time
6 -- do you mean things like spent fuel?

7 DR. WYMER: No. No. No. No.

8 MS. BUSH-GODDARD: I was just going to
9 say.

10 DR. WYMER: No, other contaminated --

11 DR. FELDMAN: Control rods.

12 MS. BUSH-GODDARD: Oh.

13 DR. WYMER: Yes, contaminated metal and
14 parts of the reactor itself.

15 MS. BUSH-GODDARD: That are outside?

16 DR. WYMER: That are not part of the
17 containment vessel, but which are part of the reactor.

18 MS. BUSH-GODDARD: Oh, I don't know. We
19 haven't got to that detail yet.

20 DR. WYMER: Okay. That seemed to me in
21 thinking about it that that might be a rather
22 important consideration.

23 MS. BUSH-GODDARD: Okay.

24 DR. FELDMAN: Hi. I'm Carl Feldman. I
25 just commented the -- I'm over here. Actually, let me

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1 move more -- I'm sorry. The idea is a general idea,
2 so we would put in various low level waste materials
3 or whatever in the reactor vessel, and then grout the
4 whole thing in.

5 DR. WYMER: Okay.

6 DR. FELDMAN: Or you might not even grout
7 it, depending on how -- what the content is.

8 DR. WYMER: Yes. Yes, that does have
9 implications with respect to how valid the volume
10 averaging --

11 DR. FELDMAN: Yes.

12 DR. WYMER: -- concept is.

13 DR. FELDMAN: Yes.

14 DR. WYMER: Yes.

15 DR. FELDMAN: Again, this is preliminary.
16 So depending upon how much -- whether they want to use
17 greater than Class C waste or not, and what the
18 options are, are still open right now.

19 DR. WYMER: The reactor vessel would have
20 sealed lid on it.

21 DR. FELDMAN: Yes, the reactor vessel
22 would be sealed and you might or might not grout it,
23 depending upon what's in there and the pathway
24 analysis and the whole show.

25 DR. WYMER: Yes, okay. These are the kind

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1 of things we need to get so we could think
2 intelligently.

3 CHAIRMAN GARRICK: If you're going to
4 change a rule or something wouldn't it be better just
5 to create a entombment-specific rule and get away from
6 the A, B, C classification completely, and
7 establishing the thresholds for the entombment option.

8 DR. WYMER: Our position when we framed
9 this rule was basically using the license termination
10 rule types of criteria. It took us forever to do that
11 one. We're not saying those are good limits.

12 It's just a question of making sure you
13 have adequate pathway analysis and isolation from the
14 environment, so working around that. But the idea
15 there was to think about 50-82, which is the 60-year
16 time limit, and the license termination rule and
17 whether -- and how far you could go with those as they
18 exist now, and what you would have to modify to be all
19 inclusive or a broader type of entombment
20 consideration. So that was our --

21 DR. LEVENSON: Is it envisioned that --
22 I'm having a little trouble grasping what we're
23 talking about. Is the entombed article, would that be
24 the pressure vessel and whatever you might put inside
25 it? Or is it much more generic?

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1 Would you entomb a contaminated steam
2 generator right next to a pressure vessel? What are
3 we talking about, first of all?

4 DR. FELDMAN: No. We're talking about the
5 reactor containment building, vessel, et cetera, and
6 using that as the primary entombment configuration.
7 And whatever you want to cut up and put in there is a
8 possibility, too.

9 DR. LEVENSON: Okay. So it's not -- the
10 discussion to date has been just on the vessel.

11 DR. FELDMAN: No.

12 DR. LEVENSON: You're not limiting it to
13 that.

14 DR. FELDMAN: No.

15 MS. BUSH-GODDARD: No.

16 DR. LEVENSON: Okay.

17 MR. LARSON: So you're including
18 entombments greater than Class C waste --

19 DR. FELDMAN: As a possibility.

20 MR. LARSON: -- in the containment
21 building.

22 DR. FELDMAN: As a consideration for
23 consideration -- as something to think about, yes.

24 DR. WYMER: And learning a new regulation
25 to cover that.

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1 MS. BUSH-GODDARD: Yes, as a possibility.

2 DR. WYMER: Perhaps.

3 DR. LEVENSON: Or a modification.

4 MS. BUSH-GODDARD: Or a -- yes.

5 DR. WYMER: A modification to the existing
6 regulation. Yes, okay. But you're not really giving
7 serious consideration to what John said; namely, we're
8 writing another --

9 DR. FELDMAN: Well, I think that's another
10 option that was -- that is coming up that Stephanie is
11 going to discuss. There was one of these so-called
12 option threes. I think option one was leave it alone.

13 Option two is modify it by modifying maybe
14 50-82 and the license termination rule as appropriate,
15 and option three, one version of option three is to
16 create a new rule. We're still toying with that kind
17 of concept. It's not --

18 DR. WYMER: Yes. The precedent that I see
19 is you did create a new rule Yucca Mountain, and that
20 was a big deal. And I think this -- a look at
21 entombment is a big deal. And so it's a parallel.

22 DR. FELDMAN: Well, some of it is not that
23 big a deal in the sense that the license termination
24 rule -- part of the reason for this while
25 entombment consideration comes about because the

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1 license termination rule allows for restricted release
2 with conditions.

3 DR. WYMER: Yes.

4 DR. FELDMAN: And while that's limiting
5 for the general entombment considerations for the
6 reactors, nevertheless, it leads to that kind of
7 investigation. And so it's almost more -- it's a more
8 natural kind of process to look at it that way.

9 At least that's why we look at it
10 initially that way.

11 DR. WYMER: So if you went to a restricted
12 release mode, for example, just discussing that for a
13 minute --

14 DR. FELDMAN: Yes.

15 DR. WYMER: -- then you would -- the
16 utility would have to come up with some sort of a
17 long-term financial --

18 DR. FELDMAN: Yes.

19 DR. WYMER: -- program that would
20 guarantee --

21 DR. FELDMAN: Yes, but it's the same now,
22 too. It's the same restrictive release for non-
23 entombment. For whatever set-up they have, there has
24 to be adequate financial resources to maintain it.

25 DR. WYMER: Yes.

1 DR. FELDMAN: It would be maintained
2 presumably by the state or some group.

3 DR. WYMER: Yes, now, that's a little
4 different.

5 DR. FELDMAN: It's different, yes, I know.
6 I know.

7 DR. WYMER: So there is quite a
8 difference.

9 DR. FELDMAN: But this is sort of a
10 generalization of that and one way to look at it.

11 DR. WYMER: Okay. So there's no
12 consideration that is being given to whether or not
13 the utility would have to be responsible or whether
14 some governmental body would have to be responsible?

15 DR. FELDMAN: Yes. That has to be
16 included as part of the -- whatever look at this thing
17 is going to --

18 DR. WYMER: Yes, okay.

19 DR. FELDMAN: The other thing is, the
20 license termination rule is limiting, too, in that the
21 100 millirem and 500 millirem, while that's something
22 we would want to stay within, when you have -- if
23 you're thinking about a very hot type of situation --

24 DR. WYMER: Yes.

25 DR. FELDMAN: -- then there's the

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1 potential for exceeding that, and so you have to worry
2 about that, too.

3 DR. WYMER: Right.

4 DR. FELDMAN: So.

5 DR. WYMER: Okay. Yes. That's very
6 helpful. This discussion is helpful.

7 Okay. Stephanie.

8 MS. BUSH-GODDARD: Okay. The next
9 question is how to address the issue of engineered
10 barriers. Once again, there are a couple of things
11 that we're looking at. First, let's kind of look at
12 the demonstration decommissioning criteria -- excuse
13 me -- for the West Valley Demonstration Project, and
14 define engineered barriers as they did, saying that if
15 a barrier does not require an institution or a human
16 factor to maintain its effectiveness, then it's an
17 engineered barrier.

18 But we're also thinking about maybe
19 amending the regulations to clarify what an engineered
20 barrier is. So that's --

21 DR. WYMER: Okay. You're --

22 MS. BUSH-GODDARD: And once again, that's
23 preliminary, too, you know.

24 DR. WYMER: You're walking on soggy
25 ground, there.

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1 MS. BUSH-GODDARD: This is a soggy
2 package.

3 (Laughter)

4 DR. LEVENSON: We can do it on dry ground.

5 MS. BUSH-GODDARD: That's true. And then
6 I said other, like I said, once you put out the AMPR
7 we're going to get comments from commenters, maybe
8 some licensee or some other entity might give us a
9 definition of how we should define engineered
10 barriers.

11 DR. WYMER: Okay. You might come back to
12 that, but let's go ahead.

13 MS. BUSH-GODDARD: Okay.

14 DR. WYMER: I've now had -- now, I've got
15 to digest that.

16 CHAIRMAN GARRICK: Is that the definition,
17 a unique definition? Is that new for engineered
18 barrier?

19 MS. BUSH-GODDARD: It means a -- the West
20 Valley definition?

21 CHAIRMAN GARRICK: Yes. Yes. Is that
22 what we mean when we say engineered barrier?

23 MR. NELSON. Yes. This is Bob Nelson,
24 Chief of the Facilities Decommissioning Section,
25 Decommissioning Branch, Division of Waste Management.

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1 The interpretation that's expressed in the
2 -- that -- excuse me -- that Stephanie summarized here
3 is based on a review of past practice, how the Agency
4 has treated engineered barriers in other cases, and
5 also, based on the analysis of the language in the
6 statements of consideration in the rule itself.

7 The OGC created a rather lengthy paper
8 addressing this, but the basic conclusion was that
9 based on that review and past practice that if an
10 engineered barrier did not require human intervention
11 to maintain its effectiveness, then it should not be
12 considered an institutional control.

13 DR. WYMER: Okay. What would be an
14 engineered barrier, for example? Would it be a --

15 MR. NELSON: I can address that, first of
16 all generally, and then more specifically. Normally,
17 an engineered barrier is a -- some constructed device
18 or feature that typically is incorporated into a
19 design, a waste design, to either limit infiltration
20 of water or slow or retard groundwater flow or
21 resurface water flow.

22 DR. WYMER: Yes, that --

23 MR. NELSON: Around the grout. That's
24 generally what an engineered barrier's considered to
25 be.

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1 DR. WYMER: I would like an example or
2 two.

3 MR. NELSON: A cap.

4 DR. WYMER: A cap to do what?

5 MR. NELSON: A cap, a slurry wall, a
6 swale.

7 DR. WYMER: Okay.

8 MR. NELSON: A grout curtain.

9 DR. WYMER: Yes.

10 MR. NELSON: All of those things would
11 normally be considered engineered barriers. The
12 problem with assuming calling those, then,
13 institutional controls is that the license termination
14 rule requires you to do an analysis when institutional
15 controls fails.

16 And that means a time zero assumption that
17 all your engineered barriers vanish, which is an
18 unreasonable, in minds of a lot of folks, an
19 unreasonable assumption. You should be able to take
20 credit for the barrier for as long as you can justify
21 taking credit for it.

22 Assuming that a cover vanishes
23 instantaneously or a concrete wall evaporates is a
24 little conservative.

25 DR. WYMER: Yes.

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1 MR. NELSON: So the definition -- I'd call
2 it an interpretation rather than a definition that OGC
3 has proposed is that to the extent that you have to
4 rely on human intervention to maintain effectiveness,
5 that you can no longer count on its effectiveness.

6 CHAIRMAN GARRICK: So it's defined in
7 terms of the transport or movement of water?

8 MR. NELSON: Well, that's generally how an
9 engineered barrier is --

10 CHAIRMAN GARRICK: As opposed to
11 radiation?

12 MR. NELSON: Well, I used the -- clearly
13 a cover wall, so affect direct radiation exposure, as
14 will the other, as I mentioned. But the principal use
15 of an engineered barrier has been, at least in our
16 practice, has been focused on migration rather than
17 controlling direct exposure, although clearly, things
18 like a cover will have a direct impact on direct
19 exposure.

20 CHAIRMAN GARRICK: Okay. That helps a
21 lot. Thanks.

22 CHAIRMAN GARRICK: Yes, thank you.

23 MS. BUSH-GODDARD: Okay.

24 DR. WYMER: That's a pretty
25 straightforward answer, no.

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1 MS. BUSH-GODDARD: Well, we're saying
2 maybe not. The approach can definitely develop within
3 the existing acts, but the regulations might need to
4 be changed as we were talking about, amending 50-82,
5 maybe --

6 DR. WYMER: I might take the word "might"
7 out of there.

8 MS. BUSH-GODDARD: Okay.

9 DR. WYMER: Say regulations need to be
10 adjusted.

11 MS. BUSH-GODDARD: Okay.

12 DR. WYMER: There's no might about it, is
13 there? Won't they have to be?

14 MS. BUSH-GODDARD: Well, like, for
15 instance, if you look at an option one where you don't
16 -- there's no rule-making, you can do an entombment
17 approach within the existing regulations, within the
18 60-year limit, but that might be limited. So --

19 DR. WYMER: With what they created, the
20 Class C waste won't fit in there.

21 MS. BUSH-GODDARD: No, exactly. You'd
22 definitely have to take out the pertinent class.

23 DR. WYMER: So that they need to be
24 adjusted.

25 MS. BUSH-GODDARD: Okay.

1 DR. LEVENSON: For GTCC.

2 MS. BUSH-GODDARD: For -- okay, yes.

3 DR. WYMER: Yes, for GTCC.

4 DR. WYMER: But that's in there, see.

5 MS. BUSH-GODDARD: Okay.

6 DR. LEVENSON: Now, even if it -- but

7 since it's a generic it might not be GTCC.

8 DR. WYMER: Have to go to a microphone

9 there.

10 DR. LEVENSON: If we're talking about a

11 generic case then, since it isn't primarily focused on

12 the pressure vessel, you might have cases where you

13 want to entomb everything but the pressure vessel --

14 DR. WYMER: Right.

15 DR. LEVENSON: -- at a sight, and it might

16 not be GTCC.

17 DR. WYMER: So that --

18 DR. LEVENSON: So I think this is correct.

19 DR. WYMER: Okay. So you'd have to

20 partition the new regulation.

21 DR. LEVENSON: Oh, it clearly would be

22 different if there is or is not GTCC.

23 DR. WYMER: Yes.

24 DR. LEVENSON: But these are all within

25 the generic envelope they're looking at.

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1 MR. NELSON: Bob Nelson again, the
2 Division of Waste Management. The point of the first
3 bullet is that the entombment can be done today under
4 the existing laws and regulations. It's only source
5 term constraining.

6 DR. WYMER: Right.

7 MR. NELSON: If you reduce the source term
8 enough you can entomb under the LTR, under the license
9 termination rule. To some, 50-82 limits the amount of
10 time you can allow -- you can have time to help you
11 out on that, to 60 years.

12 But if you remove, then, the higher
13 activity components from the containment, you could
14 entomb the rest under the LTR. So it's just source
15 term constraint.

16 DR. WYMER: I guess I'm having a sort of
17 a semantic difficulty here.

18 DR. FELDMAN: May I make a qualification
19 of 50-82? Carl Feldman, research. 50-82 is for case
20 specific approval.

21 DR. WYMER: Yes.

22 DR. FELDMAN: So provided it's some kind
23 of a health and safety situation. So it could go way
24 beyond the 60 years, if it were health and safety.

25 DR. WYMER: I'm having a little problem

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1 with the words. I guess to me entombment meant
2 something different than what it means to you. In one
3 case you've just got a little old waste disposal
4 facility on site.

5 In the other case, you got a reactor
6 vessel that has some activity in it and you're
7 entombing it. Those are two different things in my
8 mind. Now, maybe they're not in yours.

9 DR. FELDMAN: The GIS that we did back in
10 I guess '88, entombment dealt with putting something
11 in some kind of a barrier and going to a termination
12 of license through decay.

13 DR. WYMER: No.

14 DR. FELDMAN: That's the -- I'm sorry --
15 that's the original concept. Now, you know, what they
16 want to call it now, I don't know. But --

17 DR. WYMER: Yes.

18 DR. FELDMAN: -- the idea is to terminate
19 -- everything we structured in the decommissioning
20 rule and GIS was to terminate that license.

21 DR. WYMER: I had a narrower view of it.
22 My view was that what this entombment thing was all
23 about was to enable you to -- the utility to save
24 money by leaving the reactor vessel in place then --

25 DR. FELDMAN: Yes, sure. Sure.

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1 DR. WYMER: -- entomb it, and that's a
2 much narrower point of view than what I'm hearing
3 expressed now, and I think it needs to be sorted out
4 a little bit better.

5 MS. BUSH-GODDARD: Well, that's -- we are
6 in the rule-making plan stage now, and I think what
7 we're doing is trying to put all the options on the
8 table.

9 DR. WYMER: Okay.

10 MS. BUSH-GODDARD: Whereas, I think in the
11 past it was considered strictly as a decommissioning-
12 type activity.

13 DR. WYMER: Yes.

14 MS. BUSH-GODDARD: But now, we are also
15 looking at the possibility of maybe it being more-so
16 a disposal-type activity as opposed to
17 decommissioning.

18 DR. WYMER: Right.

19 MS. BUSH-GODDARD: But these are only
20 options that are on the table.

21 DR. WYMER: Sure. And that's all we -- I
22 realize that's all we're discussing.

23 MS. BUSH-GODDARD: Yes.

24 DR. WYMER: But I wanted to make it clear
25 that there was some confusion in my mind, and I

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1 suspect that there is -- my mind is not the only one
2 that's --

3 DR. FELDMAN: I think it's a broadening of
4 the Commission paper that requested entombment of
5 power reactors.

6 DR. WYMER: Yes.

7 DR. FELDMAN: But that just basically
8 talked about power reactors and decommissioning.

9 DR. WYMER: Yes, and that's the context in
10 which I was thinking about it.

11 MS. BUSH-GODDARD: Yes.

12 DR. WYMER: And I guess I would prefer to
13 continue thinking about it that way.

14 DR. LEVENSON: Well, that's why I had
15 asked the question I asked.

16 DR. WYMER: Yes. Okay. Well, okay. You
17 see what my problem is.

18 MS. BUSH-GODDARD: Okay. We talked about
19 the 50-82 limits, and I assume that you meant the 60-
20 year decommissioning time limit or time limit for
21 decommissioning?

22 DR. WYMER: Yes, that's one of the big
23 points in there. Yes.

24 MS. BUSH-GODDARD: Okay. Like I said, the
25 LTR, as both Carl and Bob said, might limit some

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1 facilities. If we keep the 60-year time limit, we
2 might not be able to keep the LTR.

3 DR. WYMER: Yes.

4 MS. BUSH-GODDARD: But also, a question
5 is, if credit can be given to engineered barriers for
6 dose reduction, we might be able to meet the 60-year
7 limit or shorten it. So the question is to what
8 extent can dose reduction credit be given.

9 DR. WYMER: Yes. I guess I was thinking
10 in terms of lengthening it. So you're talking in the
11 opposite direction.

12 MS. BUSH-GODDARD: Well, no, I'm talking
13 in both -- I'm talking in all directions --

14 DR. WYMER: Okay.

15 MS. BUSH-GODDARD: -- actually.

16 DR. WYMER: Okay.

17 MS. BUSH-GODDARD: If you can give little
18 dose reduction credit you would have to lengthen the
19 60-year time frame.

20 DR. WYMER: Yes.

21 MS. BUSH-GODDARD: So I think that's the
22 question that we're also struggling with.

23 DR. WYMER: And if you allow the barriers
24 to evaporate, then you also -- we're going to have to
25 lengthen the time.

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1 DR. FELDMAN: When we did the license
2 termination rule we had no entombment concept at all.
3 We weren't even -- we weren't looking at that at all.

4 DR. WYMER: Yes. I realize that, yes.
5 This is an extension.

6 DR. FELDMAN: Sure, yes.

7 DR. WYMER: Yes.

8 MS. BUSH-GODDARD: Yes.

9 DR. WYMER: Okay.

10 MS. BUSH-GODDARD: Is waste concentration
11 averaging applicable and acceptable? Talked about the
12 Trojan Reactor case and there, permission was given by
13 an agreement state. We don't have an answer on this
14 one yet.

15 But in looking at it, DOE was given the
16 responsibility for developing a national disposal
17 strategy and we were given the responsibility for
18 licensing.

19 DR. WYMER: Yes.

20 MS. BUSH-GODDARD: So waste -- you know,
21 that's kind of a gray area, you know. I think they're
22 waiting on us for some lead in this, and we're looking
23 to see what they want to do. So I don't have a
24 definite answer for this, either.

25 DR. WYMER: Yes. One of the reasons I

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1 asked the question about, is the containment vessel
2 going to be sealed, is if it is and you can make some
3 case for it staying sealed for awhile, then you can't
4 really do concentration averaging because -- volume
5 averaging, because you can't use the internal volume
6 if no water gets in there.

7 And if the radioactivity doesn't disperse
8 itself inside that volume then there's no logic to
9 using volume averaging, just because it would all be
10 external and there's no volume there on the outside of
11 the container.

12 So there's a logical, technical problem
13 there, as well. And it's, just exactly what do you
14 mean by volume averaging? That's also relevant to the
15 question of how much trash do you throw inside the
16 vessel?

17 DR. FELDMAN: Yes.

18 DR. WYMER: If you throw a lot in there
19 and it has a lot of radioactivity --

20 DR. FELDMAN: Right.

21 DR. WYMER: -- relative to what's induced
22 in the --

23 DR. FELDMAN: Right.

24 DR. WYMER: -- in the containment vessel,
25 then volume averaging makes sense. But if you throw

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1 the waste in, trash in there and it's low level, then
2 it doesn't add anything to the radioactivity and
3 volume averaging doesn't make much sense against it.
4 All these things are a problem.

5 DR. FELDMAN: Well, the case in point is
6 Trojan, where they took the vessel out intact, filled
7 it up with some concrete or fill or whatever, then
8 buried it in Hanford.

9 DR. WYMER: Yes.

10 DR. FELDMAN: It has a volume-averaged
11 type of currie concentration so that they could meet
12 the low-level waste criteria.

13 DR. WYMER: But that does assume that
14 you're going to get dispersion of that --

15 DR. FELDMAN: Yes.

16 DR. WYMER: -- of the radioactivity within
17 that grout.

18 DR. FELDMAN: Ultimate -- yeah, yes, it
19 does.

20 DR. LEVENSON: Ultimately.

21 DR. WYMER: Ultimately.

22 DR. FELDMAN: Ultimately.

23 DR. WYMER: Yes, ultimately. Okay. Well,
24 these are problems.

25 DR. FELDMAN: Yes.

1 DR. WYMER: Okay.

2 MS. BUSH-GODDARD: Then the last question
3 was, should the facility be monitored during the
4 entombment period, and how? As we talked about, we
5 haven't really developed the definition of an
6 entombment period.

7 You know, for example, is it a
8 decommissioning, or is it a disposal or just whatever.
9 So it's hard to answer that question. However, if you
10 adopt the LTR criteria, then once the license is
11 terminated, of course, and you meet the requirements,
12 the entombment facility is no longer monitored.

13 DR. WYMER: Yes. Yes.

14 MS. BUSH-GODDARD: However, the other
15 option that we're suggesting is that you develop these
16 performance objectives and technical requirements, and
17 in that period of time you would have to do some
18 monitoring until you terminate the license.

19 DR. WYMER: Yes.

20 MS. BUSH-GODDARD: Under whatever
21 criteria.

22 DR. WYMER: So it's your sort of general
23 approach that if you expand on this regulation or
24 write a new one, that it'll be broad enough and go in
25 enough different directions that now matter what the

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1 utility decide to do, you got them surrounded.

2 If they decide to go to a restricted
3 license termination, then there's some -- some
4 provision has to be set up for institutional
5 management.

6 MS. BUSH-GODDARD: Yes.

7 DR. WYMER: If you change the regulation
8 with respect to greater than Class C so that you can
9 have greater than Class C on the site, then that's
10 another deal that has to do with engineered barriers
11 and has to do with modeling to demonstrate
12 containment.

13 MS. BUSH-GODDARD: Yes.

14 DR. WYMER: So you're going to cover it;
15 every way it might go, you've got it covered. Is that
16 -- that's your general approach?

17 MS. BUSH-GODDARD: Yes, to put all the
18 options out.

19 DR. WYMER: And entombment is going to be
20 kept as a broad term, rather than one that applies
21 fairly specifically to reactors, containment vessels.

22 MS. BUSH-GODDARD: Well, not necessarily
23 so. If we get comments back, you know, it depends on
24 I guess how the comments go, and you know, how the
25 Commission wants to proceed on what we send up and

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1 what we suggest.

2 So it could be only limited -- it could be
3 the decommissioning only of power reactors.

4 DR. WYMER: Yes.

5 MS. BUSH-GODDARD: Where you have to meet
6 the license termination rule, and maybe extending the
7 60-year time frame.

8 DR. WYMER: Yes.

9 MS. BUSH-GODDARD: So it just depends.

10 DR. WYMER: It would be cleaner to
11 separate it out cleanly for reactors, since that's a
12 whole separate -- in my judgment -- a whole separate
13 class of thing quite apart from low-level waste
14 disposal sites.

15 MS. BUSH-GODDARD: Yes.

16 MR. LARSON: But then you got intermediate
17 things like a hot cell, which you could look at that
18 as a containment in the sort.

19 MS. BUSH-GODDARD: Yes.

20 MR. LARSON: But you're saying you don't
21 know whether you'd consider that or not, as opposed to
22 Ray's end thing of a low-level waste disposal
23 facility. So you know, the Committee was going to
24 comment the last time, but they expected that they
25 would get AMPR, the plan within a couple of weeks.

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1 MS. BUSH-GODDARD: Yes.

2 MR. LARSON: And the Committee'd probably
3 be interested in what the current schedule is or when
4 they expect to see something because, you know, they
5 haven't seen the logic as to anyone of these
6 approaches.

7 MS. BUSH-GODDARD: Well, exactly. I can
8 say that we did get an extension today.

9 DR. WYMER: We understood that.

10 MS. BUSH-GODDARD: And this is an
11 extension to extend the Commission date of sending the
12 rule-making plan and AMPR up to SECE (phonetic), I
13 believe it's June 1st.

14 DR. HORNBERGER: That was a blessing,
15 wasn't it?

16 MS. BUSH-GODDARD: Oh, definitely a
17 blessing. So we're still at the drawing table.

18 DR. HORNBERGER: Yes. Well, we can't
19 really prepare a letter until we see a lot more
20 definition, until you people -- until you clarify all
21 of these issues and what exactly -- how you're going
22 to deal with it.

23 MS. BUSH-GODDARD: Now, we are sending
24 paper off for office concurrence, and I think you all
25 are on that distribution, and that's going to be

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1 within two weeks, definitely within two weeks.

2 DR. WYMER: Well, that'll -- okay --
3 that'll be something, yes. Well, that's all very
4 helpful, Stephanie. We appreciate your bringing us up
5 to date, and it clarifies a lot of -- well, it doesn't
6 clarify a whole lot, but it explains a lot to me.
7 It's no more clear to me than it is to you.

8 MS. BUSH-GODDARD: Exactly, yes.

9 CHAIRMAN GARRICK: It sounds like this is
10 kind of a variation on the theme of in situ disposal.
11 Is there a general category of disposal that if you
12 would look at it rather than in the context of
13 entombment that would give you greater flexibility on
14 licensing?

15 Have you considered a general approach to
16 in situ disposal?

17 MR. NELSON: I think -- excuse me. Bob
18 Nelson again. The staff's trying to flesh out the
19 options that it's presenting us have raised a lot of
20 these types of questions. And after we got past
21 option one, which is just let the license termination
22 rule handle it and don't make any changes, we got into
23 all of these things.

24 Is it just -- should it just be focused on
25 reactors or are we -- are there things here that would

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1 have -- that are more generic and would apply to in
2 situ type disposals?

3 The question of how to treat engineered
4 barrier really kind of launched this discussion
5 because we were moving forward to the Commission with
6 a position on engineered barrier versus institutional
7 controls on West Valley.

8 And we saw that a position on that needed
9 to be taken that was consistent with what we were
10 doing at West Valley, or we had to have a clear reason
11 why there should be some other approach taken for
12 "entombment."

13 So that discussion kind of drove us into,
14 well, aren't there other generic issues here that we
15 need to consider. So the long answer to your
16 question, but yes, it did open the generic question.

17 So we were looking at, one, don't do
18 anything. That was pretty clear. The other option
19 was, okay, well, let's make some possible -- option
20 two was -- some changes, like for example, extending
21 the time limit in 50-82, maybe clarifying the
22 definition of engineered barriers and some other
23 things.

24 In other words, making some modifications,
25 minor modifications to a set of regulations. And then

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1 the third option was, well, let's just develop
2 something new for this thing.

3 CHAIRMAN GARRICK: Yes.

4 MR. NELSON: Whatever this thing is.

5 CHAIRMAN GARRICK: Well, if we --

6 MR. NELSON: And that's really been the
7 focus of the staff's development --

8 CHAIRMAN GARRICK: Yes. The idea here is
9 that if we're really trying to move in the direction
10 of a RIPB, risk informed performance base practice of
11 regulation it would seem that you could define a
12 category of conditions that would apply to all in-
13 place disposal situations and be done with it.

14 CHAIRMAN GARRICK: That's definitely an
15 approach.

16 DR. WYMER: A comment --

17 CHAIRMAN GARRICK: But remember that we're
18 not trying to define the way the staff's going to go.
19 What we're trying to do is frame options that we can
20 put out in an AMPR to get a discussion going and get
21 some feedback, along with some focused questions on
22 those options.

23 So we're not narrowing down what we want
24 to do. We want to make the options broad enough that
25 it covers a reasonable span of potential paths forward

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1 on this topic.

2 MR. NELSON: That's exactly what I'm
3 getting at.

4 DR. WYMER: Yes.

5 MR. NELSON: Because otherwise you get
6 into a situation, well, we've done this for reactors
7 and now we're going to do this for hot cells. Then
8 we're going to do this for waste storage facilities.
9 We're going to do this for fuel fabrication
10 facilities. We're going to do this for reprocessing
11 and so on and so forth.

12 DR. WYMER: It's a fine balancing act
13 between being so general that you can't work with it
14 and being so specific that you've got a hundred cases.

15 DR. FELDMAN: Could I just comment? The
16 approach for the reactor was that it was sort of a
17 natural thing, and if you were going to go -- I'm
18 sorry -- if you were going to go for an entombment and
19 you wanted some sort of easier path to follow, then
20 reactors are the types of things, especially power
21 reactors, because they're not -- they're nice
22 -- they're sort of tidy.

23 You have all sorts of barriers built into
24 them. You have decay processes that are fairly robust
25 in some situations and you have, then, as part of the

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1 metallurgical structure you don't readily -- wouldn't
2 expect them to readily leach out, depending upon how
3 you treated them and so on.

4 And so that was why this was a fairly
5 reasonable way to go initially, and if you broaden it
6 too much, as you say, then you run into a lot of
7 problems.

8 DR. LEVENSON: I have a question, John.
9 We talk about power reactors, but you really aren't.
10 You're talking about PWRs.

11 DR. FELDMAN: No.

12 DR. LEVENSON: BWRs aren't -- don't have
13 containment buildings. I mean, they're --

14 DR. FELDMAN: Well, yes. Yes.

15 DR. LEVENSON: -- significantly different
16 --

17 DR. FELDMAN: Yes.

18 DR. LEVENSON: -- problems. The pressure
19 vessels are --

20 DR. FELDMAN: Sure.

21 DR. LEVENSON: -- a factor of two or three
22 thinner. The problems would be quite different.

23 DR. FELDMAN: But they're are -- you're
24 right, but there are engineering compensations even
25 for those, depending upon --

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1 DR. LEVENSON: But they're different.

2 DR. FELDMAN: They're different, yes,
3 they're different.

4 CHAIRMAN GARRICK: Yes.

5 DR. WYMER: Okay. Well, it really has
6 been helpful, Stephanie. It gives a good feeling of
7 where we are at the present time, and we appreciate
8 your coming in and sharing these problems with us, and
9 your struggles toward solving them.

10 CHAIRMAN GARRICK: I think Andy has
11 another --

12 DR. WYMER: Are there other questions?

13 MR. CAMPBELL: Yes. Actually, the more
14 you talk about the entombment option, the more it
15 sounds like a Part 61 site when you think in terms of
16 the total number of curries and so on.

17 How are you going to resolve all the
18 various limits in Part 61 with respect -- I mean, in
19 essence, if you go down this road you're not sending
20 anything to a Part 61 site which would normally have
21 gone to a low-level waste site.

22 You're disposing of it on site, but within
23 Part 61 -- I mean, Trojan's a special case because it
24 went to an already existing Part 61 site, and
25 therefore, met the siting requirements and so on and

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1 so forth that you normally associate with a Part 61
2 low-level waste site.

3 Now, you're talking about reactor sites,
4 which more often than not were chosen because they're
5 near water. They're not necessarily stable for all
6 kinds of long time frames. You're talking about
7 greater than Class C waste, which is under Part 61 not
8 considered -- generally not considered suitable for
9 near surface disposal.

10 You've got a lot of issues with Part 61
11 and how are you going to deal with that?

12 DR. WYMER: Well, I'd sort of like to
13 solve this discussion if we can and give Paul Genoa
14 here a chance to give us the NOI perspective on this
15 thing, if you will, Paul.

16 MR. GENOA: Well, thank you, Mr. Chairman.
17 I appreciate this opportunity again. I'm Paul Genoa
18 with the Nuclear Energy Institute, and have been
19 looking at the issue of options for operation and
20 decommissioning of power reactors primarily.

21 And many of the questions you've asked
22 today have been asked by our members, as well.
23 Fundamentally, our thinking is that at the early
24 stages that clearly we believe that there are options
25 for decommissioning facilities other than digging them

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1 up and moving them to another part of the country, and
2 it can be done safely, we believe.

3 The license termination rule, being a
4 performance-based rule, really begs the question,
5 well, how can you interpret that. Is there a way to
6 meet the license termination criteria by simply
7 isolating the material at a facility on site in a way
8 that it doesn't exceed the performance-based rule?

9 We think the answer's yes. Unfortunately,
10 it gets very quickly complicated. Initially, our
11 proposal at the NRC's workshop in entombment -- and we
12 would very much like to see the name change. We think
13 that the name is confusing.

14 We think something like enhanced SAFE
15 store or enhanced isolation or any number of other
16 words might be better. But fundamentally, we thought
17 that there are a range of options all the way from
18 operating the plant routinely, as you always have,
19 sending all the waste to a low-level waste facility,
20 coming to decommissioning, doing chemical cleaning,
21 perhaps to scour out all the active you can reasonably
22 scour from the facility, perhaps even removing the
23 greater -- the Class C components from the core,
24 putting them into storage like fuel oil with the fuel,
25 and ultimately just leaving the facility itself on

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1 site, which would be a very lower activity.

2 That would be on one end of the extreme,
3 and the other, as you've mentioned, is the possibility
4 of actually entombing the reactor itself. Now, the
5 question of engineered barriers, I think that
6 shouldn't be confused with institutional controls.

7 Clearly, if you're going to leave residual
8 activity and you're going to have a restricted release
9 scenario as envisioned by the LTP, there will be
10 ongoing institutional controls that will -- must be in
11 place.

12 And it has to be outside the operator's
13 hands, and the operator will be responsible for
14 funding of all sorts of active maintenance over time,
15 and for funding those institutional controls. But
16 they're going to have to be doable controls, probably
17 a state or federal government control.

18 But you know, that can be explored clearly
19 outside of the operator's control. Certainly, it
20 would be easier to do institutional controls for 130
21 years than 1,000 years.

22 And so, you know, often we believe that
23 we'd like the option, but it would be nice to walk
24 before we run, and perhaps to show that the entombment
25 can be managed for any type of a facility with a

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1 constrained source term within it.

2 But then if you want to also look at some
3 special conditions that would allow greater than Class
4 C to be entombed within the structure, that would
5 certainly make sense, but it would raise the bar
6 considerably.

7 We just hope that the debate doesn't get
8 like, like in clearance, where we only talk about
9 metals. In reality, it's a much broader rule. The
10 same thing with entombment. There are a variety of
11 scenarios that could be envisioned.

12 We think on the issue of engineered
13 barriers you're really thinking, what are the
14 assumptions that I can put legitimately into a dose
15 modeling scenario that would give me an accurate dose.

16 And as we've seen in performance
17 assessments space for Part 61, there's been views
18 that, well, you know, engineered barriers we can maybe
19 credit for about 500 years.

20 But beyond that you're -- you know
21 -- perhaps we could count on the chemical properties
22 of concrete or a large cementitious mass would, you
23 know, inhibit certain isotopes from migrating. Maybe
24 we could buy that more than 500 years.

25 But clearly, as we see in the entombment

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1 option for everything other than greater than Class C,
2 you only need about 130 years. Certainly, there are
3 engineered barriers that we could count on.

4 And what we would ask is the Commission,
5 is it deliberate to really reflect on what we've
6 learned our high level waste program. Certainly,
7 engineered barriers are going to be used at Yucca
8 Mountain or some other predecessor of that facility.

9 And we would hope that you would recognize
10 that those are out there and available. But
11 institutional controls, they're currently being used
12 by the EPA and Super Fund, and we're going to have to
13 look at those for DOE facilities and other facilities
14 across the country.

15 We think that's not insurmountable. We
16 don't believe that you need to change the Nuclear
17 Waste Policy Act or the Low-Level Waste Policy Act,
18 necessarily. Again, entombment could be an option
19 that doesn't even deal with the greater than Class C
20 waste.

21 However, there certainly are advantages.
22 When I was here last I offered to you that it makes us
23 question the value of cutting up the reactor
24 internals. Connecticut Yankee is now cleaning up from
25 that process.

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1 They will expend about 160 MAN REM, maybe
2 170 in that job. Now, the difference is really not
3 because they cut it up. It's because how they cut it
4 up.

5 Absent waste acceptance criteria, they
6 made -- from DOE -- they made a decision that the
7 safest thing is to cut up into real small pieces
8 that'll fit into what they call fast cans or fuel-size
9 cans.

10 That extra cutting is what caused the
11 extra dose. Main Yankee's going to use another
12 approach, but they're doing it at risk because they
13 don't have clear guidance from DOE, what it would
14 take to accept this material.

15 Now, they're cutting up into bigger chunks
16 and it's not as dose intensive. So you know, there
17 are different ways to do this. Solving entombment is
18 one solution, but encouraging DOE to come up with a
19 waste acceptance criteria would certainly be another.

20 And I guess finally, what we're looking
21 for is options, and we would hope you'd continue to
22 expand the thinking on this concept and perhaps change
23 the title of this concept to allow for what we believe
24 certainly are realistic opportunities to safely
25 isolate materials at facilities.

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1 And my final comment would just be that we
2 are looking at this not just as a way to save a buck.
3 I mean, that certainly is an element of everything.
4 There's always economic considerations. But you
5 really need to take it in holistically.

6 This is an opportunity perhaps to maintain
7 some benefits at a community that has hosted a
8 facility during its operational life. You know, why
9 take 4- or \$500 million and dig that facility up and
10 take the facility and the dollars to some other place
11 in the country, when perhaps it can be safely isolated
12 on site and funds can stay in the local community for
13 oversight, monitoring, you know, jobs for security and
14 so forth.

15 So the concept we view is that this would
16 be tried as an option not by everybody, but by a
17 facility that is industrial in nature, that will
18 continue to be an industrial facility for sometime in
19 the future, that looking over an entombed reactor on
20 site would not be a large burden if it was done
21 properly.

22 That would reduce cost, would create jobs,
23 oversight for the community and for the state
24 government and the regulator and so forth. So those
25 are some of my thoughts.

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1 DR. WYMER: Well, thank you very much.
2 Let me ask you a technical question you probably won't
3 be able to answer. Is it likely even that a reactor
4 containment vessel with the induced radioactivity in
5 it would be less than --

6 DR. LEVENSON: You mean a pressure vessel?

7 DR. WYMER: Pressure vessel. I'm sorry,
8 pressure vessel -- would be less than Class C waste at
9 the end of 60 years? Don't you think that that vessel
10 would be greater than Class C for longer periods of
11 time than that?

12 MR. GENOA: Yes, unless you cut the
13 internals out of it. Those internals are by
14 definition, if you separate them, those are greater
15 than Class C.

16 DR. WYMER: But the --

17 MR. GENOA: The reactor core barrels.

18 DR. WYMER: -- but the vessel itself is --

19 MR. GENOA: The reactor vessel is not
20 necessarily.

21 DR. WYMER: Not necessarily.

22 MR. GENOA: Yes. And just for a point of
23 clarification, the grout at the Trojan facility was
24 not for concentration averaging. The grout was there
25 to fix the internal contamination, so in a

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1 transportation accident it wouldn't be released. That
2 was part of the scenario. So --

3 DR. WYMER: But the volume averaging,
4 nonetheless, took into account the internal volume.

5 MR. GENOA: It didn't take -- I don't
6 believe it used the volume of the dead air space. It
7 took the activity and the activity of the radiated
8 metal within the eight to ten-inch reactor vessel.

9 DR. WYMER: Oh.

10 MR. GENOA: And averaged all the activity
11 within that mass and decided that that was less than
12 Class C.

13 DR. WYMER: Didn't take into account the
14 enclosed volume?

15 MR. GENOA: No. It actually is a mass.
16 It wasn't a volume concentration.

17 DR. WYMER: Yes.

18 MR. GENOA: But we can verify that.

19 DR. WYMER: Wasn't volume averaging; it
20 was mass averaging?

21 MR. GENOA: Yes.

22 DR. WYMER: Okay. Well, thanks. Thanks.
23 Any comments or questions of Paul while he's sitting
24 here?

25 MR. GENOA: I guess I answered them all.

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1 Thank you very much.

2 DR. WYMER: Yes, well, thank you. And any
3 other questions of Stephanie while we've got her here,
4 or any comments?

5 CHAIRMAN GARRICK: Well, we do have a
6 comment.

7 DR. WYMER: Have we got one from back
8 here?

9 CHAIRMAN GARRICK: Yes, the Public Citizen
10 Group.

11 MS. GUE: Thanks again, Mr. Chairman.
12 Lisa Gue from Public Citizen. At this preliminary
13 stage as you're considering this issue, I just wanted
14 to remind you of Public Citizen's continuing objection
15 to the concept of entombment as a viable option for
16 decommissioning.

17 Our membership across the country,
18 including at nuclear power sites or the communities
19 around them is certainly clearly opposed to this
20 concept of creating no -- which would potentially
21 create 104 nuclear sacrifice zones or low-level waste
22 dumps across the country.

23 And certainly, in this more broad concept
24 that's here being described as an option, this does
25 not seem like a reasonable or responsible policy for

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1 managing low-level waste. It becomes even more
2 objectionable when the stated objective is to make it
3 more cost-effective for nuclear utilities to
4 decommission.

5 We certainly don't feel that that's --
6 that that is in the public interest for the motivation
7 for regulation. Our conviction is that nuclear
8 utilities have accepted the burden and the cost of
9 decommissioning when they've decided to invest in
10 nuclear power, and that it shouldn't -- it's not
11 acceptable for that burden to now be transferred onto
12 the public, in violation of the spirit of the license
13 termination requirements.

14 DR. WYMER: Thank you.

15 CHAIRMAN GARRICK: Yes, thank you.

16 DR. WYMER: Well, if there's no other
17 comments or questions, we're right on schedule.

18 Thank you very much, Stephanie. We'll
19 look forward to seeing you again.

20 MS. BUSH-GODDARD: Yes.

21 DR. WYMER: Thanks, Paul.

22 CHAIRMAN GARRICK: Yes. Ray, I guess what
23 we're concluding from this is that it's premature to
24 write a letter?

25 DR. WYMER: Oh, yes, it is.

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1 DR. HORNBERGER: Is the staff looking for
2 comments on their paper that's supposed to be coming
3 out in the next few weeks?

4 CHAIRMAN GARRICK: I don't know.

5 DR. WYMER: Well, I think it's premature.

6 CHAIRMAN GARRICK: It's -- have they gone?

7 MS. BUSH-GODDARD: What was the question?

8 I'm sorry.

9 CHAIRMAN GARRICK: Well, we're at -- the
10 Committee has to decide whether we wish to write a
11 letter or a report on entombment, and based on what
12 I'm hearing here it sounds as though maybe it's
13 premature to do that.

14 But unless staff wants to have the
15 opinions of the Committee about the issue in general
16 or in some other form --

17 DR. LARKINS: Sounds like after you see
18 the paper and the various options, you might -- that
19 might be the more appropriate time or reasonable time
20 to weigh in on this.

21 CHAIRMAN GARRICK: Yes. Yes.

22 DR. WYMER: Certainly not before then.

23 MS. BUSH-GODDARD: I think that's a good
24 idea.

25 DR. LARKINS: No. It says, clearly, the

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1 objectives still seem to be --

2 CHAIRMAN GARRICK: Well, unless we have
3 some ideas that -- about the whole issue or that we
4 have some concerns about the general direction that it
5 was taking, I would agree, yes.

6 MR. LARSON: Stephanie, you said it was a
7 concurrence paper that --

8 MS. BUSH-GODDARD: Yes.

9 MR. LARSON: I mean, so it's going to be
10 publicly released or it's going to be pre-decisional,
11 or what's it going to be?

12 MS. BUSH-GODDARD: No, it's definitely
13 pre-decisional. When I said office concurrence, it's
14 the NRC Offices.

15 MR. LARSON: Okay.

16 MS. BUSH-GODDARD: NRR research, that type
17 of thing, and having their directors sign off on it.

18 DR. LARKINS: I think we'll get it for
19 information, probably.

20 MS. BUSH-GODDARD: Yes, exactly.

21 DR. LARKINS: Yes. So you can take a look
22 at it then and decide if it's something that the
23 Committee wants to weigh in, or it could wait till you
24 get comments. During the public comment period there
25 are a number of different times when the Committee can

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1 provide comments.

2 MS. BUSH-GODDARD: Yes. Now, we're not
3 sending it out for public comment until it's gone up
4 the --

5 DR. LARKINS: No, I understand. I
6 understand the process.

7 MS. BUSH-GODDARD: Okay.

8 MR. LARSON: In light of the broad scope
9 of options that you seem to be looking at, what is it
10 going to be, a 90-, 180-day public comment period or?

11 MS. BUSH-GODDARD: I think right now we're
12 looking for a 90-day comment period. But you know,
13 that can always be extended.

14 CHAIRMAN GARRICK: Any other comments,
15 questions? Staff? All right. Well, thank you again.

16 MS. BUSH-GODDARD: You're welcome.

17 DR. WYMER: Thank you very much.

18 CHAIRMAN GARRICK: Okay. I think this
19 brings us to the conclusion of our presentation part
20 of our Agenda and that we're now in a position to move
21 into a discussion and the preparation of reports.

22 And I'd like to suggest a very short break
23 so that the court reporter can remove his equipment
24 and sign off, and then we'll start our reports. So
25 we'll have a short break now.

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(Whereupon, this portion of the 124th meeting of the Advisory Committee on Nuclear Waste was concluded at approximately 2:01 p.m.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: ACNW 124th Meeting

Docket Number: (not applicable)

Place of Proceeding: Rockville, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings as recorded on tape(s) provided by the NRC.



Beth Reid

Official Transcriber

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