



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

May 1, 2013

MEMORANDUM TO: ACRS Members

FROM: Derek A. Widmayer, Senior Staff Scientist **/RA/**
Technical Safety Branch, ACRS

SUBJECT: CERTIFICATION OF THE MINUTES FOR THE MEETING OF THE
RADIATION PROTECTION AND NUCLEAR MATERIALS
SUBCOMMITTEE, APRIL 9, 2013 – ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on April 9, 2013, are an accurate record of the proceedings of that meeting.

Attachment: Certified Minutes

cc: C. Santos

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

MEMORANDUM TO: Derek A. Widmayer, Senior Staff Scientist
Technical Support Branch, ACRS

FROM: Dr. Michael T. Ryan, Chairman
Radiation Protection and Nuclear Materials Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES FOR THE MEETING OF
THE RADIATION PROTECTION AND NUCLEAR MATERIALS
SUBCOMMITTEE, April 9, 2013 – ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on April 9, 2013, are an accurate record of the proceedings of that meeting.

/ RA / 4/28/2013

Michael T. Ryan, Chairman Date
Radiation Protection and Nuclear
Materials Subcommittee

**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
RADIATION PROTECTION AND NUCLEAR MATERIALS
SUBCOMMITTEE MEETING MINUTES**

**April 9, 2013
Rockville, MD**

The Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on Radiation Protection and Nuclear Materials (RPNM) met on April 9, 2013, at 11545 Rockville Pike, Rockville, MD, in Room T2-B3. The meeting was convened at 8:30 am and adjourned at 12:07 pm.

The entire meeting was open to the public. Mr. Derek A. Widmayer was the cognizant ACRS staff scientist and the Designated Federal Official for this meeting. No written comments or requests from members of the public for time to make an oral statement were received from members of the public concerning this meeting.

ATTENDEES

ACRS

M. Ryan, Chairman
D. Skillman, Member
H. Ray, Member
S. Armijo, Member
S. Schultz, Member
J. Stetkar, Member
D. Widmayer, ACRS Staff

NRC Staff

| | |
|--------------------------|----------------------------|
| L. Camper, FSME/DWMEP | G. Suber, FSME/DWMEP |
| D. Jackson, FSME/DILR | M. Lee, FSME/DWMEP |
| C. Grossman, FSME/DWMEP | C. Ridge, FSME/DWMEP |
| C. McKenney, FSME,/DWMEP | D. Lowman, FSME/DWMEP |
| A. Carrera, FSME/DILR | J. Shaffner, FSME/DWMEP |
| D. Esh, FSME/DWMEP | A. Schwartzman, FSME/DWMEP |
| G. Alexander, FSME/DWMEP | L. Parks, FSME/DWMEP |
| P. Yadav, FSME/DILR | |

Others

J. T. Greeves., Talisman
L. Suttora, DOEI
E. Regnier, DOE
C. Cariedor. DOE
D.. Schultheise , EPA

Others (via Teleconference)

W. Brunkow
T. Buckner
D. D'Arrigo
R. Lundberg
C. Thomas

SUMMARY

The purpose of the meeting was to review and discuss the proposed rulemaking language and technical basis for revisions to 10 CFR Part 61, *Licensing Requirements for Land Disposal of Radioactive Waste* published in December 2012. The Subcommittee planned to gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the Full Committee at the upcoming July 2013 Full Committee meeting. The RPNM Subcommittee will also hold another meeting on this same matter in June 2013 before taking it to the Full Committee in July.

| <i>SIGNIFICANT ISSUES</i> | <i>Reference Transcript Pages</i> |
|---|--|
| M. Lee presented the FSME staff views of how the Recommendations in the ACRS Letter Report of September 22, 2011, were factored into the current Part 61 revisions being commented on by the Committee. There was a great deal of discussion on this matter, including how the staff has had to balance the recommendations of the Committee with the three sets of directions they have received on Part 61 revisions in Staff Requirements Memos from the Commission. | 9 -19 (Slides Pgs 179 – 184) |
| Members of the Subcommittee brought up the following issues during this presentation from staff: | |
| - The transition from qualitative to quantitative in the analysis and how this is taken into account in the decision whether compliance is achieved. (Ryan) | 12 |
| - The relationship of the period of performance (10,000 years) and the institutional control period (100 years). (Skillman) | 14 |
| - Achieving compliance given the time period of 10,000 years. Since the answer is it is all analysis (i.e., there are not measurements and/or data provided over the years) what does an applicant actually have to do to comply. (Armijo) | 16 |
| M. Lee presented the FSME staff analysis and response to public comments they received from the first request for public comments on the initial proposed revisions to Part 61. Members were particularly interested in the comments received (or not | 19 – 52 (Slides Pgs 185 – 196) |

| | |
|---|--|
| <p>received) from the Agreement States that have operating LLW Disposal facilities (namely TX, SC, UT, and WA).</p> <p>Members of the Subcommittee brought up the following issues during this presentation from staff:</p> <ul style="list-style-type: none"> - That protection of the intruder is still a driving concept in the Part 61 regulation, and how it is being implemented in the revisions compared to either the original Part 61 and/or whether it has any relationship to a real individual who requires protection. (Armijo) | <p>34 – 37</p> |
| <p>Drs. Esh and Grossman presented the bulk of the presentation to the Subcommittee on the major technical concepts used to derive the Part 61 revisions and the technical basis behind the revisions proposed in the rulemaking language.</p> <p>Members of the Subcommittee brought up the following issues during this presentation from staff:</p> <ul style="list-style-type: none"> - The analysis in the revisions of Part 61 are an emphasis on the front-end (the decision to operate) performance assessment and intruder assessment, instead of having any requirements or emphasis that this should be an “ongoing” analysis that factors in the results of new information and data, especially environmental monitoring. (Ryan) - The inclusion of engineered barriers in the analysis for periods of time beyond the 500 or so years that the hydrological parameters are considered “exclusionary.” (Ryan) - What should be considered a “catastrophic” event when performing the long-term analysis, or the second tier of the analysis as recommended by both ACNW and ACRS, and when does the analysis become “unrealistic” or no longer “meaningful.” (Armijo) - How will the results of the analysis be used in the context of a decision on whether the facility is safe or “not safe,” when a qualitative judgment is being used on the basis of the quantitative analysis. (Ryan) - Ensuring that the use of modern ICRP dose methodology ensures safety and sound decisions, and does not have unintended consequences and creates a burden for licensees. (Armijo and Skillman) - Whether the revisions to the rule, since the 100 year institutional control period of 100 years seems so short now that we are talking about DU, shouldn’t consider mandating | <p>53 – 156 (Slides Pgs 197 – 238)</p> <p>75 – 77</p> <p>88 – 89</p> <p>103 – 110</p> <p>111 – 117</p> <p>119 – 128</p> <p>133 – 139</p> |

| | |
|--|----------------------------------|
| a longer institutional control period with maintenance of it – re-licensing the site even after closure. (Skillman) | |
| <p>In summarizing their comments on the presentation, members had the following issues:</p> <ul style="list-style-type: none"> - Whether Depleted Uranium (DU) can be separated out as a separate problem and dealt with as special case waste stream. Staff defends the current approach as responsive to stakeholders who want a solution to any waste stream without singling out DU. (Armijo and Skillman) - Continued concern over the use of a specific intruder assessment that goes out far into the future, rather than factoring in realistic conservatisms. (Armijo and Skillman) | <p>165- 170</p> <p>169 – 172</p> |

| <i>ACTION ITEMS</i> | <i>Reference Transcript Pages</i> |
|--|--|
| A comment letter from CRESS at Vanderbilt University contains comments of direct interest to Member Armijo. Staff pointed out that those comments came in response to the second request for comments and will be addressed in the June 2013 Subcommittee meeting. | 21 – 23 |

ATTACHMENT

Official Transcript of Proceedings, Meeting of ACRS Radiation Protection and Nuclear Materials Subcommittee, April 9, 2013, Rockville, MD.

Documents Provided to the Subcommittee:

1. Federal Register, Vol. 77, No. 236, *Low-Level Waste Disposal: Regulatory basis and preliminary rule language; second request for comment*, (77 FR 72997), December 7, 2012.
2. *November 2012 Preliminary Rule Language for Proposed Revisions to Low-Level Waste Disposal Requirements (10 CFR Part 61)*. (ML12311A444)
3. *Regulatory Analysis for Proposed Revisions to Low-Level Waste Disposal Requirements (10 CFR Part 61)*, November 29, 2012. (ML12306A480)

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Radiation Protection and Nuclear Materials

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Tuesday, April 9, 2013

Work Order No.: NRC-4112

Pages 1-173

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3 + + + + +

4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

5 (ACRS)

6 + + + + +

7 RADIATION PROTECTION AND NUCLEAR MATERIALS

8 SUBCOMMITTEE

9 + + + + +

10 TUESDAY

11 APRIL 9, 2013

12 + + + + +

13 ROCKVILLE, MARYLAND

14 + + + + +

15 The Subcommittee met at the Nuclear
16 Regulatory Commission, Two White Flint North, Room
17 T2B3, 11545 Rockville Pike, at 8:30 a.m., Michael T.
18 Ryan, Chairman, presiding.

19 COMMITTEE MEMBERS:

20 MICHAEL T. RYAN, Chairman

21 J. SAM ARMIJO, Member

22 HAROLD B. RAY, Member

23 STEPHEN P. SCHULTZ, Member

24 GORDON R. SKILLMAN, Member

25

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WASHINGTON, D.C. 20005-3701

1 NRC STAFF PRESENT:

2 DEREK WIDMAYER, Designated Federal Official

3 LARRY CAMPER, FSME

4 ANDREW CARRERA, FSME

5 DAVE ESH, FSME

6 CHRISTOPHER GROSSMAN, FSME

7 DEBORAH JACKSON, FSME

8 MICHAEL LEE, FSME

9 CHRIS MCKENNEY, FSME

10 ABY MOHSENI, FSME

11 LEAH PARKS*

12 GREGORY SUBER, FSME

13 PRIYA YADAV*

14
15 ALSO PRESENT:

16 WARD BRUNKOW*

17 TED BUCKNER*

18 DIANE D'ARRIGO*

19 RUSTY LUNDBERG*

20 CHRISTOPHER THOMAS*

21
22 *Present via telephone
23
24
25

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Adjourn

P R O C E E D I N G S

(8:30 a.m.)

CHAIRMAN RYAN: All right, we'll go ahead and open the meeting. This is a meeting of the Advisory Committee on Reactor Safeguards, Radiation Protection and Nuclear Materials Subcommittee.

I'm Michael Ryan, Chairman of the Subcommittee.

ACRS members in attendance are Sam Armijo, Dick Skillman, Harold Ray, Steve Schultz. Dana Powers and Dennis Bley will be joining shortly, I believe.

The purpose of this meeting is to discuss the rulemaking language in 10 CFR Part 61, proposed revisions to low-level waste disposal requirements. The proposed revisions were published in the Federal Register for public comment this past December.

The Subcommittee will gather information, analyze the relevant issues and facts, and formulate proposed positions and actions as appropriate. The Subcommittee will meet and discuss again on this matter on June 20, and which the matter will be taken up by the Full Committee at the 606 ACRS Full Committee meeting in July.

This meeting this morning is open. The rules of conduct are that your participation in the

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1 meeting will be published in the Federal Register as
2 part of the notice for the meeting. Derek Widmayer is
3 the Designated Federal Official for the meeting.

4 A transcript of the meeting is being kept,
5 and will be made available on the ACRS webpage.
6 Therefore, it is requested that speakers first
7 identify themselves and speak with sufficient clarity
8 and volume so they can be readily heard.

9 We have not read received any requests for
10 time to make oral statements from anyone prior to
11 today's meeting. However, there will be time made
12 available at the end of the proceedings for anyone who
13 wishes to comment at that time to make a comment at
14 that time.

15 I understand there are a number of folks
16 who are listening in on the meeting on our bridge
17 line. The bridge line will kept in a listen-only mold
18 to minimize noise disturbance here in the meeting
19 room, but we will open it for any comments that anyone
20 wishes to make at the end of the proceedings.

21 Thank you.

22 We will now proceed with the meeting. I
23 call upon Deborah Jackson, Deputy Director of the
24 Division of Intergovernmental Liaison and Rulemaking
25 and FMSE, to open the proceedings.

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1 INTRODUCTION

2 BY DEBORAH JACKSON

3 DEPUTY DIRECTOR JACKSON: Thank you, Mike,
4 and good morning to everyone.

5 We are here today at your request to give
6 you an update on the work with the Part 61 rulemaking
7 up to December 2012. At our meeting with you in June,
8 we will discuss public comments on the proposed rule.

9 Over the course of this rulemaking, the
10 staff met with the ACRS on multiple occasions to
11 provide updates and solicit the Committee's views on
12 certain technical issues related to the Part 61
13 rulemaking and implementation guidance document
14 development.

15 These meetings resulted in an ACRS comment
16 letter dated December 22, 2011. This letter provided
17 four recommendations to the staff with regards to the
18 approach to this rulemaking. In a response letter
19 dated November 3, 2011, the staff discussed its views
20 on the ACRS recommendation approach. Mike Lee will be
21 discussing the views in greater detail in the next
22 presentation.

23 Next slide.

24 This rulemaking began when the staff
25 received direction from the Commission to engage in a

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1 limited-scope rulemaking to add requirements for site-
2 specific technical analysis prior to the disposal of
3 significant quantities of depleted uranium and blended
4 waste.

5 With this direction, we were to identify
6 the technical requirements that would apply to the
7 site-specific analysis and develop a guidance document
8 that outlines the parameters, assumptions, and those
9 things conducting with such site-specific technical
10 analysis.

11 In the SRM in 2012, listed at the second
12 bullet, the Commission directed the staff to expand
13 the ongoing limited-scope provision of Part 61 to
14 include the following issues:

15 1. Allowing the licensees the flexibility
16 to use the latest ICRP dose methodologies in the site-
17 specific assessment for the disposal of all
18 radioactive low-level waste;

19 2. developing a two-tiered approach that
20 establishes a compliance period that covers the
21 reasonably foreseeable future, and a longer period of
22 performance that is not a priority and established to
23 evaluate the performance of the site over longer time
24 frames;

25 3. providing flexibility for disposal

1 facilities to establish site-specific LORW acceptance
2 criteria based on the results of the site's
3 performance assessment and intruder assessments; and

4 4. recommending a compatibility category
5 element of the revised rule that ensures alignment
6 between the states and federal government on safety
7 fundamentals while providing the states with the
8 flexibility to determine how to implements these
9 safety requirements.

10 I'll note for item number four on that
11 previous slide, the agreement states' compatibility,
12 the staff is working with NRC Standing Committee on
13 Compatibility on appropriate compatibility
14 recommendations on these proposed revisions.

15 Now, for the last slide, the submitted
16 agenda is different than, I believe, what's on this
17 slide and that Mike Lee is going to discuss the ACRS
18 comment letter. I think what we had submitted was
19 different.

20 So today, we have five presenters. Mike
21 Lee is going to go over the ACRS comment letter, and
22 he'll discuss the 2012 public outreach initiative.
23 Dave Esh and Chris Grossman well talk about the 2012
24 regulatory basis development document. Andrew Carrera
25 will go over the proposed language that luminary

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1 proposal language. And Aby Mohseni will discuss the
2 path forward under Part 61.

3 So, with that, I'll turn it over to Mike
4 Lee.


5 MICHAEL LEE: STAFF VIEWS ON
6 THE ACRS RECOMMENDATION APPROACH

7 MR. LEE: Good morning.

8 CHAIRMAN RYAN: Good morning.

9 MR. LEE: Can everyone hear me?

10 CHAIRMAN RYAN: Yes.

11  MR. LEE: I drew the short straw, and I
12 get to talk to the Committee about its earlier letter
13 to the staff.

14 (Laughter.)

15 MR. LEE: While I was on vacation, I got
16 volunteered -- no, I'm just joking. It's always a
17 pleasure to talk to the Committee.

18 I'm currently in FSME, and this slide
19 speaks for itself, so why don't we go to the second
20 slide, please?

21 Just to provide some context, as everyone
22 in this room knows, or is probably aware by now, the
23 staff has received no fewer than three sets of
24 direction on this particular rulemaking from the
25 Commission.

1 The initial direction was provided in an
2 SRM from the Commission in March 2009. This is in
3 response to SECY-08-147, and that's been, in many
4 respects, the primary driver for what we're doing in
5 the rule.

6 If I were to amend the slide today, I
7 would also acknowledge that there was a second piece
8 of direction we received soon thereafter in connection
9 with the blending paper that Jim Kennedy put together.
10 So that was kind of the two pieces of information that
11 were in play when the Committee first looked at the
12 Part 61 rulemaking that the staff submitted.

13 Your letter dated September 22, 2011,
14 reflects, as you know, a series of interactions the
15 Committee had with the staff in the summer of 2011.
16 And the Committee submitted four recommendations to
17 the staff to consider. We subsequently reviewed those
18 recommendations and responded to you and a letter
19 dated November 3, 2011.

20 Slide three, please.

21 For the first part of this presentation,
22 I'm going to follow this standard template, if you
23 will. It shows what the Committee recommended to the
24 staff initially in its letter, how the staff responded
25 in the November 3rd letter, and then how we're

1 currently implementing it in the context of the
2 rulemaking.

3 So your first recommendation, of course,
4 was that Part 61 should not be amended in accordance
5 with the staff's recommendations. We believe that, in
6 response, we know we're doing with the Commission told
7 us to do, which was to introduce an explicit
8 performance assessment and human intrusion analysis
9 for requirement for the Part 61 regulations.
10 Heretofore, they did not exist.

11 (Cell phone ringing.)

12 MR. LEE: As a reminder, everyone please
13 turn off your phones.

14 (Laughter.)

15 MR. LEE: I'm sorry.

16 Returning to slide three, in the context
17 of the rulemaking that the Committee looked at
18 previously, we did introduce an explicit performance
19 assessment and intruder analysis requirement to the
20 regulation, consistent with earlier Commission
21 direction. So we believe we're doing what the
22 Commission told us to do.

23 Slide four, please.

24 In the Committee's second recommendation,
25 "Implementation guidance for Part 61 should not

1 specify it *a priori* a period of performance." The
2 staff agrees.

3 Originally, we specified a longer-term
4 period of performance. As you recall, that was a
5 20,000-year number consistent with the dose
6 calculations that the staff did. However, the staff
7 believes that it is important now to specify a period
8 of compliance in the rule because that's the most
9 recent set of directions we received from the
10 Commission.

11 We now are proposing a time of compliance
12 of 10,000 years and a longer unspecified period of
13 performance based on risk insights that were developed
14 consistent with the performance assessment.

15 CHAIRMAN RYAN: Mike, this might not be
16 the right the right time to ask this question, but let
17 me just put it out there.

18 MR. LEE: Sure.

19 → CHAIRMAN RYAN: Somewhere between 100
20 years and 20,000 years, you go from quantitative to
21 qualitative.

22 MR. LEE: Right.

23 CHAIRMAN RYAN: I'd like to understand
24 somewhere during our conversation, maybe not even
25 today, but --

1 MR. LEE: Yes, how the --

2 CHAIRMAN RYAN: -- through that --

3 MR. LEE: Either through the presentations
4 later today or in the next presentation that we have
5 in our second meeting with you all, we'll be able to
6 articulate it.

7 CHAIRMAN RYAN: And I asked the question
8 because I think it's critical that the Committee
9 understand the details of what that transition is,
10 from a quantitative to a qualitative assessment.

11 MR. LEE: Sure.

12 CHAIRMAN RYAN: You know, where we draw
13 conclusions from analytical data, it's pretty clear to
14 everybody, you're above or below something.

15 MR. LEE: Right.

16 CHAIRMAN RYAN: But how we make a decision
17 based on qualitative criteria is not clear.

18 MR. LEE: Sure.

19 CHAIRMAN RYAN: Generally and
20 specifically, in this case, it's not clear at all, to
21 me at least. So that's one area where I think we
22 hopefully will spend a little bit more time --

23 MR. LEE: Sure. Yeah.

24 CHAIRMAN RYAN: Again, not necessarily
25 today, but --

1 MR. LEE: Well, seeing that I drew the
2 short straw, I'll volunteer Dave Esh to talk to that
3 later, either later today or in the next two.

4 CHAIRMAN RYAN: That's fine. Whenever we
5 get to it is fine. I just thought I'd get it out on
6 the table.

7 MEMBER SKILLMAN: Mike, let me follow up
8 on Dr. Ryan's question.

9 MR. LEE: Yes.

10 → MEMBER SKILLMAN: In this discussion
11 sometime today, I would like to her the distinction
12 between the period of performance --

13 MR. LEE: And the time of compliance.

14 MEMBER SKILLMAN: -- and institutional
15 control period.

16 MR. LEE: Oh, okay. Sure.

17 MEMBER SKILLMAN: It seems to me that one
18 is the analytical for how the progeny may affect what
19 might be discovered many, many years from now. But
20 institutional control period has a direct bearing on
21 the ability to identify it, discover it.

22 You have a driver's license that expires
23 every two years.

24 MR. LEE: Sure.

25 MEMBER SKILLMAN: You have another kind of

1 permit that might expire after five years. I'm
2 wondering if there isn't a connection between the
3 period of performance and the institutional control
4 period that would serve to address some of the
5 concerns that this Committee has.

6 MR. LEE: Well, I think the short answer
7 is, the original institutional control period is a
8 derivative of how the waste classification system
9 under Part 61 was first developed, and that's
10 described in the EIS that dates back to the late 1970s
11 and early 1980s.

12 The staff arrived, based on its analyses,
13 at 100 years, and that's pegged to the waste
14 classification scheme which pegs out, I think, for
15 class A.

16 There was no period of performance under
17 the original regulation. The original regulation was
18 predicated on assumptions related to siting, design,
19 and the basic classification system in the context of
20 those concentration levels for the isotopes
21 identified.

22 Currently, there's no nexus between the
23 two, but we can get into this discussion later on.

24 MEMBER SKILLMAN: Great.


25 MR. LEE: Either Dave or Chris Grossman

1 will speak to it when Brian comes up.

2 MEMBER SKILLMAN: Well, like Chairman
3 Ryan, I'm just getting it on the able right now.

4 MR. LEE: It's good to have these --

5 MEMBER SKILLMAN: Thank you.

6  MEMBER ARMIJO: Mike, one of the things
7 I'd like to hear about this morning from the staff is:
8 How does one actually satisfy your compliance
9 requirements that you're going to propose in this
10 rule? Exactly what does someone who manages one of
11 these facilities have to do to demonstrate that this
12 is the appropriate compliance period, and this is how
13 it's satisfied? It's all analysis; right? No one can
14 guarantee what's going to happen 10,000 years from
15 now.

16 So what will it take to satisfy the staff
17 that the requirements of this proposed rule have been
18 met?

19 MR. LEE: Well, I don't put too much on
20 Dave's plate, but the short answer is that in the
21 numerical performance assessment that's been proposed
22 for the 10,000-year time of compliance, you'd run the
23 numbers for 10,000 years and evaluate them against the
24 61.41 performance objectives.

25 The details of the analysis, the

1 attributes of the features that we believe should be
2 included in the performance assessment, will be
3 discussed in detail in the guidance document that goes
4 out in parallel with the draft rule text.

5 Dave, is there anything you'd add, or?

6 MR. ESH: I think I already have
7 indigestion and it didn't even get to me; it sounds
8 like my plate is filling up.

9 (Laughter.)

10 MR. ESH: For this topic, yeah, I plan to
11 talk about it in detail after we get through Mike's
12 spot. So we can wait and talk about it then in
13 context with the slides, or we can talk about that
14 now, whichever you prefer.

15 MEMBER ARMIJO: When you're ready to talk
16 about. Why don't we cover it in the --

17 MR. ESH: I'm making notes here to try to
18 remember to talk to these things, and if I forget,
19 just remind me.

20 MEMBER ARMIJO: We'll try.

21 CHAIRMAN RYAN: Thanks, Dave.

22 MR. LEE: I think I'm on slide five --I'm
23 at the end. Thank you very much.

24 I have another presentation.

25 On slide five, the Committee noted that it

1 believed that its earlier recommendations were equally
2 applicable to both DU as well as other low-level
3 waste. The staff agrees, for the reasons that are
4 outlined in our earlier letter responding to your
5 comment.

6 We believe that once you become more
7 familiar with the current edition of the rule text,
8 you'll begin to see how we've implemented that
9 direction, or how it comports with your views.

10 The final slide of this series, slide six,
11 applies to Recommendation 4. Compliance with the
12 performance objectives of the disposal system after
13 institutional control ends, as well as the possible
14 doses to the hypothetical intruders should be
15 evaluated considering the features, events, and
16 processes for a given site for a period of time,
17 commensurate with the risk for a specific facility and
18 site.

19 The staff agrees, and we believe that in
20 the context of the regulation that we developed in
21 2011, and the current version, we were consistent with
22 that theme, and we would again be glad to point that
23 out as we get farther into the presentation.

24 So, unless there are other questions with
25 respect to your earlier letter, I can jump into the

1 second presentation I have, which speaks to the 2012
2 public outreach initiative.

3 CHAIRMAN RYAN: Please go ahead.

4 2012 PUBLIC OUTREACH INITIATIVE

5 MICHAEL LEE

6 MR. LEE: So, again, to put things in
7 context, in 2011, the staff developed a rulemaking
8 consistent with Commission direction in both SRM SECY-
9 08-147 as well as the blending Commission paper that
10 Jim Kennedy put together. For the life of me, I can't
11 remember the number. I think it was 10.47, but it's
12 in the record somewhere, and we can get to that
13 number.

14 As the rulemaking was making its way
15 through the concurrence process, we received
16 additional Commission direction in the January 2012
17 SRM.

18 The Commission told us to take the
19 existing direction they had given us and complement it
20 with the additional requirements that they told us to
21 go out and float with the public. Consistent with
22 that direction, we were told to seek public feedback.
23 We issued Federal Register notices, and we were very
24 proactive in contacting our partners at the agreement
25 states on what the Commission asked us to look at.

1 I believe Debbie has already spoken to
2 those four additional initiatives in the earlier
3 slides, so I'm not going to repeat them here.

4 So what the staff did was it kind of work
5 on two fronts. The first front is we already had some
6 pre-program public meetings. We were going to
7 participate in certain public events. We also hosted
8 our own independent events.

9 Slide three.

10 So if you look at slide three, you'll see
11 a series of events that the staff participated or
12 sponsored during the summer of 2012. The events that
13 the staff sponsored have little stars after them.

14 We had public meetings in Phoenix, Dallas,
15 and here and Rockville, Maryland. We had transcripts,
16 and from those transcripts, we collected information
17 from the public that were in attendance, and got their
18 views on the four initiatives that the Commission
19 asked to be added to the rulemaking effort.

20 Slide four.

21 The other initiative we undertook is we
22 created a docket in the Federal Register. We announced
23 that availability of that docket for receipt of public
24 comments, and through the course of the summer, we
25 received approximately 16 sets of comments from

1 various individuals, organizations, and entities, and
2 they approximately corresponded to 200 individual
3 comments, questions, and suggestions.


4 So, between the record and the meeting
5 transcripts as well as the docket, we had a body of
6 some data that we could evaluate and consider in the
7 context of the four additional things that the
8 Commission asked us to consider.

9 So turning to slide five --

10 MEMBER ARMIJO: Mike, before you --

11 MR. LEE: Yes, sure.

12 Slide four.

13  MEMBER ARMIJO: We got a copy of a letter
14 from the Consortium for Risk Evaluation, with
15 stakeholder participation three, and that's not on
16 your list of commenters. Is that an oversight, or
17 didn't they comments in time?

18 MR. LEE: You received a letter directly.

19 MEMBER ARMIJO: Yes. It was addressed to
20 Larry Camper. It was just a copy of this letter --

21 MR. LEE: I think they --

22 MEMBER ARMIJO: -- C-R-E-S-P.

23 MR. WIDMAYER: I think the answer is I
24 think it was within the time frame.

25 MEMBER ARMIJO: The reason I bring it up

1 is because their comments were pretty consistent with
2 ACRS comments.

3 MR. LEE: That's E-S-P.

4 MEMBER ARMIJO: C-R-E-S-P.

5 SPEAKER: It's Cresp. What is the date on
6 it?

7 MEMBER ARMIJO: Vanderbilt University,
8 Howard University, Oregon State.

9 MR. LEE: Oh, I'm sorry; that -- we're
10 kind of confusing two, we're talking about two
11 populations of comments. The letter that I believe
12 you're talking to is the one we received in a second
13 round of comments that we submitted.

14 MR. McKENNEY: No, January 4, 2013.

15 MEMBER ARMIJO: This is January 4, 2013.

16 MR. McKENNEY: Which is --

17 MEMBER ARMIJO: So was early this year.

18 CHAIRMAN RYAN: Chris McKenney?

19 MR. LEE: Chris.

20 MR. McKENNEY: Just to clarify, that is in
21 the second set of comments, none of which are on the
22 chart above, because, as requested by the Committee,
23 we're here to bring you up to December 2012 because
24 we're not addressing the comments received on the
25 draft proposal text that we put out in December. And

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1 that Cresp letter will be discussed in June.

2 MEMBER ARMIJO: Okay. Thank you.

3 MR. LEE: Thank you, Chris. Just the kind
4 of everybody on the right page.

5 You know, I'm confused. We went out for
6 comments in 2011. We got additional direction in
7 January 2012. We went out for comment yet again in
8 calendar year 2012. The slides three and four
9 summarize what we did in 2012 up until December to
10 seek public input on both the original Commission
11 direction as well as the second set of direction we
12 got from the Commission.

13 The letter from Dr. Armijo, that you're
14 referencing from the Consortium at Vanderbilt and, I
15 think, Rutgers, was in response to a third outreach
16 request made as recently as December of this year, and
17 that will be discussed later. It's not part of this
18 population that I'm talking now right now.

19 MR. WIDMAYER: Do the comments that you're
20 referring to on the slide predate the ACRS? Is that
21 correct?

22 MR. LEE: These comments were post-ACRS.

23 MR. WIDMAYER: So, post-ACRS would have
24 been pre-December --

25 MR. LEE: These are the comments we got

1 last summer subsequent to the receipt of the
2 Committee's letter.

3 MR. WIDMAYER: Okay.

4 MR. LEE: And these comments, the material
5 that I'm speaking to on slide three and four, are with
6 respect to the four additions that the Commission
7 asked us to seek public input on, in the context of
8 its earlier direction.

9 As a result of that second request for
10 comment, if you will, we received 200 individual
11 comments, questions, and suggestions. So this is
12 basically what we heard last summer after we received
13 your letter.

14 Turning the slide five.

15 The intent of this slide is to give the
16 Committee and others a sense for how the public's
17 comments were tracked out. We kind of pinned them,
18 for the purposes of review, in some categories. These
19 are ranked-ordered. The bold type with the asterisks
20 refer to the four Commission questions that came out
21 of the January 2012 SRM. We received additional
22 comments from the public and other interested
23 stakeholders on other matters bearing on the
24 rulemaking.

25 We applied some simple statistics your to

1 give everyone a sense for where most of the comments
2 fell. The other comments, if you will, the second-
3 highest rank bin was basically miscellaneous comments.

4 As you can see from the slide, most of the
5 comments we've received are on the period of
6 performance and time of compliance, themes that you've
7 expressed some interest in already this morning. Our
8 second and third rank ends were miscellaneous
9 comments. We received a lot of comments on the waste
10 classification tables found at 61.55. And then, in
11 decreasing order, are the other themes that we heard
12 from our stick was on.

13 And just for the record, the total is not
14 exactly 100 because of rounding errors.

15 On slide six, what we tried to do is, have
16 two populations of comments: comments received at the
17 public meetings and available in the transcripts, and
18 the written comments. I think we could fairly see
19 that there was generally no disputing the need for the
20 rulemaking. By and far, most commenters felt that
21 there was a need to freshen up Part 61. However, they
22 were disparate views on how we should freshen up the
23 rule and what the rulemaking should include.

24 With respect to comments from the
25 agreement states, the staff were very proactive in

1 contacting the agreement states. Not all agreement
2 states chose to express that you on the rulemaking at
3 this time, which is understandable because we're only
4 in the drafting of proposal rule text.

5 Later on, when the rule goes out for
6 public comment, we expect to solicit additional
7 comments from our --

8 CHAIRMAN RYAN: Mike, do you think this
9 will be focused mainly on the sited states as opposed
10 to states that don't have and probably think they will
11 never have a low-level waste site?

12 MR. LEE: We went to sited as well as
13 unsited states.

14 CHAIRMAN RYAN: And what was the response
15 from each?

16 MR. WIDMAYER: What does the -- obviously,
17 not all agreement states express an opinion -- what
18 does the slide mean?

19 MR. LEE: Well, I'm trying to communicate,
20 first of all, that we directly targeted agreement
21 states. And in particular, to put a finer point on
22 Dr. Ryan's question, we made direct calls to the four
23 sited agreement states. Not all four sited agreement
24 states chose to express a view on what we're doing
25 right now.

1 CHAIRMAN RYAN: How many didn't?

2 MR. LEE: I think between -- two, three,
3 maybe. I mean we contacted South Carolina Washington,
4 Texas, Colorado -- Utah; excuse me. We also contacted
5 Washington state, Tennessee, and Pennsylvania by
6 virtue of their arrangements in terms of waste
7 processing and other interest, historically.

8 CHAIRMAN RYAN: Okay. Thank you.

9 MR. LEE: I mean we can get back to you
10 with that detail if you'd like to see it.

11 CHAIRMAN RYAN: I guess what I'm reaching
12 for a little bit -- and I don't expect an answer this
13 minute -- is, what were the tone and tenor of comments
14 from the various constituencies?

15 MR. LEE: We're going to get to that in a
16 little bit --

17 CHAIRMAN RYAN: Okay. That's fine.

18 MR. LEE: -- in the remaining slides.
19 What I've tried to do is, with respect to the four
20 comments or questions that the Commission asked us to
21 take to the public, I do have some details on that.
22 But for future reference, if you go to Chapter 5 of
23 the regulatory basis document, there are tables that
24 address specific agreement states comments.

25 CHAIRMAN RYAN: Yes, okay. All right.

1 Thanks.

2 MR. LEE: But to kind of put a flavor on
3 this particular issue if you will, in terms of what
4 the agreement states had to say, they noted that like
5 many state governments, the agreement states have
6 budget challenges, and these challenges, you know, are
7 -- there are other things besides implementation of
8 new NRC regulations that the states have to balance in
9 terms of their budget priorities.

10 Of course, some of the states' comments
11 that we received are very limited. To the extent that
12 we did receive comments, there were comments to the
13 effect that the duration of institutional control
14 should be extended from 100 to 300 years. And other
15 comments were that states were wary of adding new
16 requirements to the regulations that might oblige them
17 to receive large quantities of depleted uranium.

18 MEMBER SCHULTZ: So the bullet, "Budget
19 Constraints" means we just don't have the resources to
20 look at this now, not that they have budget
21 constraints and can't implement what you're proposing.

22 MR. LEE: No, I think they were
23 sensitizing the staff to the fact that given competing
24 priorities at state levels, if the Commission were to
25 go ahead and issue new regulations in the area of Part

1 61, this would impose another challenge to their --

2 MEMBER SCHULTZ: -- budget line. So it's
3 a regulatory burden issue.

4 MR. SUBER: Mike, how are you doing?

5 This is Gregory Suber. I'd just like to
6 put a finer point on some of the things that Mike's
7 talking about because he participated in some of the
8 outreach but not all of it.

9 CHAIRMAN RYAN: Could you introduce
10 yourself, please?

11 MR. SUBER: I'm sorry; my name is Gregory
12 Suber. I am the Chief of the Low-Level Waste Branch.

13 We did contact each sited state. In fact,
14 we had meetings in various locations. We had a
15 meeting in Texas at which we invited Texas to
16 participate. They wanted to observe, but they not
17 actively participate.

18 We also went to OAS, and at the OAS
19 conference, we had a meeting with all of the sited
20 states that chose to attend at those meetings. They
21 did come to us with a variety of concerns, and one of
22 them was a resource concern.

23 The state of Texas was having a high
24 degree of turnover in their program, and that was one
25 of the reasons that their participation was limited.

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1 And one of the constraints that they mentioned as far
2 as actively participating in the process and being
3 able to simultaneously complete the licensing of WCS
4 and actively participate in a Part 61 limited ruling.

5 South Carolina also expressed concern
6 about their ability to manage the Barnwell site and
7 simultaneously participate actively in the number of
8 Part 61 activities that we had ongoing because we had
9 the rulemaking going on at the same time we had the
10 revision of the Branch Technical Position on
11 concentration averaging.

12 So the staff have a lot of stuff going on,
13 and several sites said it was a challenge. They
14 didn't say they couldn't do it, but they did recognize
15 that they had the same kind of fiscal constraints that
16 the federal government has and that it was becoming
17 increasingly challenging for them to actively
18 participate in all of the Commission activities as
19 well as to manage the sites that they were responsible
20 for. MR. LEE: Okay. So again, just for
21 additional details, I would refer you to Chapter 5 of
22 the regulatory basis document, which is publicly
23 available. I believe there's a table or two in there
24 that summarizes what we heard from the agreement
25 states.

1 All right. Turning to slide seven, the
2 next series of slides, I again kind of followed the
3 same format here. In the left-hand column, you see
4 the Commission proposal from January 2012. The
5 stakeholder response, response from the agreement
6 states, and then some preliminary staff observations.
7 Again, this was high-graded from Chapter 5 in the
8 regulatory basis document.

9 The first direction received from the
10 Commission in January 2012 was to allow licensees the
11 flexibility to use the latest ICRP does methodologies.

12 The stakeholder response was generally in
13 favor of this topic by this proposal. The agreement
14 states, to the extent that we heard from them, were
15 mostly in support of this proposal. And in terms of
16 implementation, allowing the staff to use or allowing
17 licensees the flexibility to use the up-to-date ICRP
18 recommendations would align with past agency practice
19 generally in this area.

20 Slide eight.

21 Same format again -- the Commission
22 proposal to implement a two-tiered approach to
23 performance assessment that establishes a compliance
24 period that covers the reasonably foreseeable future,
25 and a longer period of performance that is not defined

1 *a priori*.

2 Again, the stakeholders expressing a view
3 on this topic were generally in support of the
4 Commission's proposal. The agreement states -- again,
5 not all agreement states expressed a view on the
6 merits of the two-tiered approach at this time, and
7 the comments that we did receive from agreement states
8 were mixed.

9 The preliminary staff observation is the
10 staff had previously advocated the adoption of a two-
11 tiered approach to the conduct of PA both in 2011 and
12 the current rulemaking package that's in concurrence.

13 MR. WIDMAYER: Mike, I've got a question.

14 MR. LEE: Sure.

15 MR. WIDMAYER: The staff interpretation of
16 this, that the performance assessment should be done
17 this way, did you guys assume that they also meant the
18 intruder assessment?

19 MR. LEE: No.

20 MR. WIDMAYER: You did not.

21 MR. LEE: No.

22 MR. WIDMAYER: So that intruder assessment
23 does not have to be done in a two-tiered approach.

24 MR. LEE: I don't believe so.

25 MR. WIDMAYER: Okay.

1 MR. LEE: Chris Grossman's here, I think,
2 if he wants to make any additional response.

3 MR. GROSSMAN: The December package that
4 we put out at the compliance period and period of
5 performance for both performance objectives, both
6 61.41 and 61.42, 61.41 being the PA, essentially, and
7 61.42 then being the intruder assessment.

8 (Pause.)

9 MR. LEE: Okay.

10 MR. WIDMAYER: Yeah, but it sounds like
11 it's been okayed by the Commission if you took two
12 separate purchase.

13 MR. LEE: Help me out here.

14 MR. WIDMAYER: The Commission did not say,
15 do an intruder assessment with a two-tiered approach;
16 so, therefore, you could have done some other approach
17 it. Am I missing something, or?

18 MR. LEE: Yes -- I -- yes.

19 MR. GROSSMAN: The Commission wasn't
20 explicit about intruder assessment.

21 MR. WIDMAYER: Okay.

22 MR. GROSSMAN: There could have been a
23 different approach, yes.


24 MR. WIDMAYER: Okay.

25 MR. LEE: And we'd be happy to talk to you

1 about the current approach that's in the rulemaking
2 package later on this morning.

3 MEMBER ARMIJO: Let me ask you a question.

4 MR. LEE: Sure.

5  MEMBER ARMIJO: Is the intruder assessment
6 still a central driver for this new rulemaking?

7 You know, it seemed to me, in the earlier
8 version that I read, that so many of the things we're
9 doing were all driven by this hypothetical intrusion
10 sometime in the future. And I thought that if it just
11 disappeared, there wouldn't be much left to this
12 rulemaking.

13 Is that way out of line, or is the
14 intruder assessment still central to this rulemaking?

15 MR. LEE: Well, I think, to put a historic
16 perspective on this, you'll recall that the waste
17 classification tables were designed around an acute
18 exposure to an intruder. So, for the purposes of the
19 development of the waste classification system under
20 61.55, the staff historically relied on the intruder,
21 the acute does to an intruder.

22 CHAIRMAN RYAN: I think the key point is
23 that probability of intrusion has always been one.

24 MR. LEE: Yes. Yes.

25 CHAIRMAN RYAN: It's one. That's what the

1 assumption is; there will be intrusion. At some
2 point, there might be a different structure to the
3 ways people look at it, but there are dose scenarios
4 where the intrusion is less than one or 100 percent.
5 So that's something to think about a little bit, I
6 think.

7 Is there it been where protections or
8 designs or other features could make the probability
9 of intrusion less than one?

10 MR. LEE: Yeah, well, the tension in the
11 philosophy underlying Part 61 generally is that, at
12 some point, you maintain a period of institutional
13 controls for about a hundred years. There's some
14 feeling that you'd have some additional duration of
15 time for which institutional knowledge is maintained.
16 Society is aware that this site exists, and folks
17 would generally avoid it.

18 Today, if you want to drill a well, you
19 have to get a permit, you have to go to the local
20 government center, maybe the county seat, and go
21 through records, look through land affidavits and
22 things like that, to get permission stick do certain
23 things.

24 But the Commission recognized at some
25 point, there would be a loss of institutional

1 knowledge of the site, and there was a potential for
2 an inadvertent intruder to go in there and to get
3 exposed. And that's how the tables were arrived at.
4 That's the assumption, that you can't protect that
5 site in perpetuity, at some point there was the
6 potential for --

7 MEMBER ARMIJO: Can you regulate and
8 perpetuity? That's the thing that bothers me. You
9 know, there's no way to prove that you're actually
10 accomplishing anything except adding burden to the
11 siting of a new low-level waste site and discouraging
12 the creation of more low-level waste sites, which the
13 country needs.

14 I just don't see how you're getting around
15 that, particularly if you make the intrusion a
16 probability of one.

17 MR. LEE: Well, unless Kenny or Grossman
18 has something to say, I prefer defer to them. It's a
19 point as well noted, but --

20 MR. GROSSMAN: This is Chris Grossman of
21 the staff.

22 To get to your first question, Dr. Armijo,
23 yes, we believe inadvertent intrusion protection for
24 intruders is still an essential component of Part 61.

25 MEMBER ARMIJO: Okay.

1 MR. GROSSMAN: We'll discuss a little bit
2 of the probability more and our presentations later
3 on.

4 MEMBER ARMIJO: Okay. You know, different
5 people on the Committee will have different views on
6 that, but I just think this whole intrusion
7 requirement is just so arbitrary and so difficult to
8 prove that you've taken into account short of not
9 building any low-level waste sites that it's really an
10 impediment to a good regulation --

11 MR. LEE: Well, I --

12 MEMBER ARMIJO: -- that says let's
13 concentrate on protecting the people, here and now,
14 and maybe for a couple of hundred years. What is it
15 Mike? Five hundred years? This is still low-level
16 waste site, so after that, forget about it. You know,
17 if the country is still in existence, people in the
18 future will deal with the problem.

19 MR. LEE: Right.

20 MEMBER ARMIJO: Why do we have to deal
21 with it now? Where do licensees have to deal with all
22 these hypothetical things so far into the future?

23 It just seems to me it's -- I struggle
24 with how you can do reasonable regulation without --

25 MR. LEE: Well, the original framers of

1 the Part 61 regulation found that by limiting
2 concentrations of waste in the ground, you could
3 protect future generations to an intrusion event.
4 That's how the concentration tables came up. They
5 viewed this as an issue of, at some point, there was
6 not going to be any control of the site, so how do you
7 protect future generations?

8 MEMBER ARMIJO: It seems to me that made
9 a lot of sense.

10 MR. LEE: Right, and one of the things you
11 do is limit concentrations of what you put in the
12 ground because of decay factors and certain
13 engineering features for different classes of waste.
14 And that's a burial. The original framers of the
15 regulation found that there was some level of
16 protection that could be afforded.

17 CHAIRMAN RYAN: There were some accepted
18 constraints on this thought process. One is, for
19 example, uranium, which has a half-life that's way
20 longer than most of the universe, is in play in low-
21 level waste. Take that out and you've got a whole new
22 ballgame in terms of what's in play.

23 MR. LEE: Sure.

24 CHAIRMAN RYAN: And if you look at
25 inventories of existing sites, the fraction of the

1 inventory that's going to be there in 100 years of 300
2 years is quite thoroughly small.

3 So, you know, I think we're trying to
4 wrestle with the long term and the short term of
5 what's there and what's not there. And, you know, is
6 there some way to address that? Correct me if I'm
7 wrong.

8 MR. LEE: Yes. I mean these points are
9 very good to discuss, but again, going back to the
10 Commission's direction, we were given a set of
11 instructions to do some limited changes to the
12 rulemaking and not to undertake a wholesale revision.

13 CHAIRMAN RYAN: And I do appreciate that,
14 I think, very much. So I'm not --

15 MR. LEE: Yes.

16 (Simultaneous speaking.)

17 MEMBER ARMIJO: We understand you have a
18 history of different instructions. Some of them are
19 in conflict. And you have other people, including
20 ourselves, giving you other input.

21 MR. LEE: Sure.

22 CHAIRMAN RYAN: But as you beyond the
23 scope of our discussion today.

24 We also have the conundrum of depleted
25 uranium, which is basically piled up; we put a little

1 topsoil on it, and grass, and that's the end of that.
2 So, you know, I wonder where the risk management
3 analysis is for that --

4 MR. LEE: Chris McKenney.

5 CHAIRMAN RYAN: -- analysis on -- sorry.

6 MR. MCKENNEY: This is Chris McKenney of
7 the Performance Assessment Branch.

8 Just to manage expectations for a second,
9 while we'll be getting into some of the intruder
10 assessment, a lot of the discussions of how much that
11 can possibly drive and analysis and some of the stuff,
12 especially with the WAC, a lot of those details will
13 likely be more in June when we can talk about the
14 guidance and everything else, and how guidances
15 differed for different in some stuff, just so that,
16 just my reminder that we can get into a bit more
17 detail on the management of some of these activities.

18 CHAIRMAN RYAN: That's great. I will look
19 forward to that very much, Chris.

20 I think what Dr. Armijo and the other
21 folks who have spoken are trying to say is that we're
22 just trying to share with you what the thoughts are,
23 that we're thinking about, how we can somehow come to
24 alignment, so we're all on the same page.

25 MR. MCKENNEY: And that's what I'm saying;

1 right. But for most of the facilities, so far, they
2 have actually done site-specific intruder analyses.
3 That's not the driving risk. Even using generic
4 scenarios, those are not the driving risks for the
5 facilities that have been developed for the analyses
6 we do for waste-incidental processing. In both cases,
7 the site-specific analyses no longer drive the risk.
8 It becomes --

9 CHAIRMAN RYAN: And getting insights into
10 what does drive the risk there would be helpful.

11 MR. MCKENNEY: It would be the off-site
12 dose, the off-site dose level.

13 CHAIRMAN RYAN: Okay, then I guess we'll
14 hear from you either way. Okay.

15 MR. LEE: Slide nine.

16 In this slide, what we wanted to do is
17 provide the Committee with a little additional detail
18 on what we've heard relative to the Commission's
19 proposal regarding a tiered approach to the conduct
20 low-level waste PA.

21 Just to summarize, again, we found that
22 there was general support. With respect to the time
23 of compliance concept, we received mixed responses.

24 In the Commission's SRM, they use the term
25 "foreseeable future," which heretofore was an

1 undefined term. It's a new term of art, if you will.

2 We received comments to the effect that
3 1,000 years was an acceptable duration for that
4 calculation of any dose under the first tier. We
5 received comments that 1,000 to 10,000 years was an
6 acceptable duration for the time of compliance. We
7 also received comments to the effect that 10,000 years
8 was a number that was easily achievable in terms of
9 arriving at a meaningful number.

10 Again --

11 MEMBER ARMIJO: Easily achievable -- it's
12 easy to calculate anything, Mike, but I can't
13 understand how anybody could --

14 MR. LEE: I'm playing the tape and telling
15 you what we heard from stakeholders.

16 MEMBER ARMIJO: Okay.

17 MR. LEE: Whether or not it means it's
18 meaningful is really up to the eye of the beholder, I
19 guess.

20 In terms of the period of performance
21 concept, stakeholders told us that it should not be
22 defined in the regulation. They argued that it was
23 technically challenging as well as questionable in
24 terms of its decision-making value.

25 And we also received comments to the

1 effect that you really shouldn't have a dose
2 associated with any performance, longer-term
3 performance period.

4 CHAIRMAN RYAN: When you're dealing with
5 receptor as the --

6 MEMBER ARMIJO: The 500.

7 CHAIRMAN RYAN: Yes.

8 MR. LEE: Yes.

9 Slide 10.

10 In terms of comments on the flexibility of
11 disposal sites to establish a site-specific WAC, the
12 majority of stakeholders commenting on this were in
13 favor of it.

14 To the extent that we heard from the
15 agreement states, they were also in favor of it. In
16 fact, many several of the agreement states have WAC-
17 like features in their regulations licensing
18 conditions today.

19 However, one of the comments we received
20 under this particular topic was the caveat that,
21 again, some agreement states didn't want to be forced
22 to receive large quantities of depleted uranium.

23 A preliminary staff observation is that
24 many is that any many states in fact already have a
25 WAC, if not in name, then certainly in practice.

1 Slide 11.

2 Moving along, the compatibility issue is
3 one that we received a lot of comments on. I guess
4 the short version, for the purposes of time, is that
5 many of the agreement states are interested in
6 maintaining maximum flexibility in terms of how any
7 new amendments to Part 61 might be implemented.

8 We noted that comment. This is an issue
9 the staff will make a recommendation on, for the
10 purposes of the rulemaking, and later on, as the
11 rulemaking package proceeds, there's a compatibility
12 committee that evaluates this in more detail.

13 My last slide is slide 12.

14 In addition to comments on the
15 Commission's four rulemaking proposals, we received
16 other comments, and these comments in some respects
17 fall into that miscellaneous category that I referred
18 to earlier on slide 5.

19 Some of the key comments we received were
20 that the tables at 61.55 should be updated with the
21 latest ICRP dose conversion factors and methodologies.
22 I've already made reference that the duration for the
23 institutional control period should be revisited.

24 We also received comments with respect to
25 the so-called Phantom 4 isotopes, which were found to

1 be the limiting isotopes for the purposes of the
2 groundwater dose in the earlier Part 61 EISs put out
3 --

4 CHAIRMAN RYAN: Just to complete our
5 record, would you mind listing those four?

6 MR. LEE: Okay. This is a test on the
7 Phantom 4.

8 (Laughter.)

9 MR. LEE: Chlorine-36 --

10 CHAIRMAN RYAN: No.

11 MR. LEE: No? I'll let McKenney answer.
12 I'm sure he's --

13 MR. MCKENNEY: He's gets it wrong on the
14 first one.

15 (Laughter.)

16 MR. MCKENNEY: Chris McKenney from the
17 Performance Assessment Branch.

18 The four radionuclides in the hard-to-
19 detects considered to be tritium, which of course is
20 a short-term mobile radionuclide present in most of
21 the issues that we've had in the past disposal sites;
22 iodine-129; technetium-99; and -- now I'm in the --

23 MR. LEE: oh, man.

24 MR. GROSSMAN: Carbon-14.

25 MR. MCKENNEY: Carbon-14, yes.

1 CHAIRMAN RYAN: The reason I asked that --
2 and thanks for getting us the right list among you all
3 -- is that those are interesting in that, in terms of
4 dose consequence in the performance assessment, are
5 they really that important? Are they hard to detect?
6 Are they of relative low importance in terms of
7 importance in terms of an overall PA?

8 MR. ESH: This is Dave Esh from the
9 Performance Assessment Branch.

10 There's an interesting issue with those,
11 in that many times, they do show up in the performance
12 assessments. But is that a real effect, or is that
13 due to the fact that the inventories are over-reported
14 due to limitations in the detection technology?

15 CHAIRMAN RYAN: In the detection.

16 MR. ESH: Yes. I'm not at liberty to say
17 which is the answer for that, but they do show up, and
18 a number of times they will show up in the output of
19 the performance assessments.

20 CHAIRMAN RYAN: Okay. I think that kind
21 of raises a general question, which may be not for
22 today but sometime in the future. What is the real
23 relative certainty or uncertainty of some of the
24 assessments that make assumptions used limited data on
25 those kinds of issues?

1 MR. ESH: Yeah.

2 CHAIRMAN RYAN: You know, in other words,
3 how do we propagate a range of uncertainty in any
4 conclusions for the revised view of a performance
5 assessment? We'll be looking ahead to maybe hearing
6 a little bit about your insights in that area.

7 MR. ESH: Yes, and I can talk about
8 uncertainties during my presentation.

9 CHAIRMAN RYAN: Okay.

10 MR. ESH: And if want to talk about it
11 further --

12 CHAIRMAN RYAN: Okay. Fine. And I'm not
13 looking to get the whole story today, but I just kind
14 of want to have a placeholder. Maybe that's a more
15 detailed discussion for our follow-up meeting.

16 MEMBER SCHULTZ: Dave, are you -- excuse
17 me.

18 Are you going to talk about the
19 uncertainties as well as other treated?

20 MR. ESH: Yes.

21 MEMBER SCHULTZ: How the uncertainties are
22 treated?

23 MR. ESH: Yes, I can.

24 MEMBER SCHULTZ: I would appreciate that.
25 Thank you.

1 MEMBER ESH: I mean, there are a lot of
2 different methods to manage uncertainties, and there
3 are lots of different types of uncertainties in these
4 assessments. So there's not necessarily one way to
5 treat the problem, and we allow people to do different
6 types of analyses, but they have different
7 implications, how you treat them.

8 One of the biggest issues for me in the
9 whole rulemaking process and moving forward is, if
10 you're going to rely more on site-specific technical
11 analyses, then that requires that those analyses are
12 credible, and it requires that they undergo a
13 sufficient review by an independent entity to ensure
14 that they're credible. Those are the two main
15 pillars.

16 Everything else -- talk about
17 requirements; what they are, time of compliance,
18 intruders -- all that's in the wash if you don't do
19 good analyses, if you don't have a good independent
20 review of those analyses.

21 So those are the two things. If you
22 really want to get them right and make sure your
23 process is truly effective in terms of public health
24 and safety, that's where you really want your energy.

25 CHAIRMAN RYAN: Tell me if I'm summarizing

1 this well in terms of what you just said, David.

2 To me, that says that you have to have a
3 credible representation of the geohydrologic
4 environment at which a site sets. By "geohydrologic
5 environment," I mean all the parts and pieces and how
6 they all interact and over what time frames, you know,
7 at what ranges and interaction and all of that, to
8 say, yeah, I understand how the system works.

9 MR. ESH: One way that a true risk purist
10 gets upset about things is when people try to manage
11 risk with conservatism. But from a regulator's
12 standpoint, that is a valid approach to manage
13 uncertainties and, therefore, manage risk. When you
14 have limited information or you're faced with
15 uncertainties of different types, you can choose
16 conservative representation or conservative approach
17 to evaluate that problem, so that comes into play in
18 these analyses and the review of the analyses.

19 Like I said, there's multiple ways you
20 could handle this problem.

21 And by analogy, saying the XLPR program
22 for the Extremely Low Probability of Rupture in
23 reactor piping systems, you could take a conservative
24 approach there and try to estimate what's the impact
25 to the systems, how you need to redesign the systems

1 and enhance them, what not. You could also do
2 something similar to what they're doing, which is
3 basically do a nested Monte Carlo analysis with an
4 epistemic globe and an aleatory loop to try to fully
5 assess the uncertainty and make estimates of
6 probability and, therefore, decisions about what you
7 what you need to do the system.

8 We don't necessarily dictate in these
9 sites and for these analyses that somebody must use
10 one approach or another. Our objective is to lay out
11 the requirements that allow them to succeed with
12 whatever approach they choose, especially in the area
13 of uncertainty.

14 CHAIRMAN RYAN: Thank you.

15 MR. LEE: So, to finish up this slide, we
16 also received comments that if you're going to go
17 ahead and amend Part 61, you should introduce
18 requirements for the disposal of greater-than-Class-C
19 low-level waste, and lastly, we should introduce
20 criteria for clearance, a la low activity waste.

21 The staff put together a paper designated
22 SECY-13-001 that described what its views were,
23 relative to these issues. We received direction from
24 the Commission previously that if anything came up
25 that would potentially affect the timetable for the

1 completion of the rule, we were to inform the
2 Commission accordingly.

3 In that paper, we lay out some proposals
4 for the Commission to consider relative to these five
5 recommendations. First, relative to the ICRP update,
6 we currently have direction from the Commission to
7 proceed with an update of the 61.55 waste
8 classification tables. That's currently scheduled to
9 begin in Fiscal Year 2015.

10 In reference to the duration of
11 institutional controls, as part of any update to the
12 61.55 tables, we could look at that issue in that
13 context.

14 In terms of the so-called Phantom 4 plus
15 chlorine-36, which was offered up by our friends at
16 Waste Control Specialists in Texas -- I get partial
17 credit for that -- the staff has begun that
18 initiative. We had a meeting earlier this year in
19 Phoenix following the waste management meeting. And
20 Don Lowman of the staff is leading up that initiative,
21 and we're going to have a number of interactions over
22 the next several months to address how the guidance
23 document in NUREG/DR-0204 would be updated to address
24 that stakeholder recommendations.

25 In reference to greater-than-class-C

1 waste, the ball is currently in DOE's court. They
2 have an EIS to prepare. They have to get
3 congressional approval on the preferred approach. So
4 right now, the staff doesn't believe it has any
5 obligations other than to letting that process run its
6 course relative to that decision-making.

7 And lastly, in reference to low-activity
8 waste, that issue was addressed previously a
9 rulemaking to Part 20, and in 2005, the Commission
10 decided to defer any decision-making on any amendments
11 to Part 20, including consideration of clearance.

12 So, with that, unless there are any
13 questions, we'll just segue right into Dave Esh's and
14 Chris Grossman's presentations.

15 CHAIRMAN RYAN: We're going to take one
16 break this morning, and I would suggest that you be
17 the place where it's good to do that. We'll be happy
18 to have you guide that decision.

19 MR. LEE: What time is it?

20 MR. ESH: We have 42 slides. So, if we
21 did Mike five minutes per slide, we're going to eat up
22 four hours.

23 MR. LEE: I tried to go as fast as I could
24 go.

25 CHAIRMAN RYAN: Let's go ahead and get

1 started David. Are you next? Yes. And we'll take a
2 break at a good point when you point it out to us.
3 Okay?

4 MR. ESH: We're going to share the
5 presentation, and we're going to cover three elements
6 and he's going to cover two. So maybe I can cover
7 three and we can break and then Chris can start off
8 with the second part.

9 CHAIRMAN RYAN: That's fine. Whatever
10 suits you all.

11 STAFF EFFORTS TO REVISE PART 61: KEY CONCEPTS

12 DAVID ESH, PERFORMANCE ASSESSMENT BRANCH

13 MR. ESH: It's my pleasure to be here
14 today and talk with you about our efforts on the Part
15 61 rulemaking. Fortunately, I do not have to sing
16 Hail to the Victors before I start this morning. I'm
17 going to talk about our efforts to revise Part 61.

18 Next slide, please.

19 The main topics we're going to cover is,
20 I'm going to cover some key concepts, site-specific
21 low-level waste technical analyses and analysis time
22 frames and then Chris Grossman is going to cover the
23 second two topics.

24 For key concepts, it's important to
25 understand basically the problem context. So what is

1 the risk? How do these systems perform? How are the
2 disposal systems anticipated to perform? And what,
3 especially, are the waste characteristics that we're
4 dealing with?

5 I'm basically going to cover the what,
6 how, and why of site-specific low-level waste
7 technical analyses. And then everybody's favorite
8 topic -- analysis time frames, which is kind of like
9 having a political debate at Thanksgiving dinner, but
10 we will have it nonetheless.

11 (Laughter.)

12 MR. ESH: Basically, we're going to
13 outline for you what we think the requirements should
14 be, why we think the requirements should be that, and
15 how with somebody satisfy these requirements. Part of
16 that is going to be, I think Chris McKenney tried to
17 indicate earlier, in our guidance document. We put a
18 lot of effort into developing our guidance document
19 and outline.

20 If NRC was doing a review, here's how we
21 would go about it, here's how we would go about it,
22 the types information we would look for, and how we
23 would interpret that information.

24 It's important understand -- I think, this
25 is one of the things you asked right from the get go,

1 Dr. Ryan -- you start off with something that's
2 quantitative, and at some point, you move to something
3 that's qualitative. What I'm going to try to express
4 to you here is that the information is quantitative.
5 The decision-making might move from something that is
6 valuing it as quantitative and then values it more as
7 qualitative. But ultimately, these models or analyses
8 are not going to make the decision for you. They
9 provide input to the decision-makers.

10 The way the low-level waste regulations
11 are constructed, there's a whole bunch of things to go
12 into determining safety of that action. One of them
13 is the technical analyses, but there are all sorts of
14 other requirements that go and, I think, have been
15 very effective.

16 So I'll talk about hazard and risk, and I
17 think is a big difference between hazard and risk in
18 this problem. That's a good thing because that means,
19 from when Part 61 was developed, hazard, especially
20 from the short-lived activity, is being managed very
21 well. And you know, whether the long-lived activities
22 being managed well, I think probably is, too. Our
23 requirements that we're putting forth provide a common
24 metric for everybody. I'm going talk about those
25 things.

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1 So, key concepts on slide three, "Low-
2 Level Waste Hazard Versus Risk," I'm going to talk in
3 detail about the inventory a little bit and then some
4 delays in these systems from a barriers and transport
5 perspective. I have a slide on the generic waste
6 qualification system -- I'm not sure how familiar all
7 the Committee members are with it -- and then the
8 inadvertent intruder issue, which we've talked about
9 some.

10 Slide four, please.

11 "Low-Level Waste Hazard Versus Risk."
12 Basically, a large percentage, whether it's 90 or some
13 other higher number, of the hazard comes from the
14 short-lived isotopes. We've heard that discussion a
15 lot: all the inventory is gone at 500 years. A lot
16 of the inventory is gone at 500 years. That's the way
17 the system was constructed, to make sure that the
18 system could contain all the short-lived activity
19 because the short-lived activity is such that it has
20 a high specific activity. If you lose a little bit of
21 it, it can cause a risk, so you have to be pretty
22 certain that you keep that material in the system in
23 order to protect public health and safety.

24 Then, in the analyses, especially for
25 61.41, what you see is, most of the risk is driven

1 from the long-lived isotopes. So that's what comes
2 out in the ground water, or if you have a erosion
3 concerns, or maybe corrosion followed by air pathway.
4 What you see is that the long-lived isotopes are what
5 drives the wrist, specifically in 61.41.

6 So when we're talking about a technical
7 requirements in, say, 61.42 and 43, those are kind of
8 driven by the first bullet, the short-lived isotopes,
9 whereas 61.41 and 44 are driven more by the risks of
10 long-lived isotopes.

11 So you have to understand, there are
12 different things that drive risk in these problems.
13 Therefore, the low-level waste requirements have
14 different requirements to tackle each of those risks.

15 Next slide, please.

16 MEMBER SKILLMAN: Before you go on,
17 Dave,

18 MR. ESH: Yes?

19 MEMBER SKILLMAN: For the portion that
20 is a hazard, cobalt 60 is, what, 5.2 years? Cesium,
21 strontium, and tritium are all approximately 30. Were
22 those isotopes chosen because that is their half-life,
23 or were they chosen for different reason?

24 MR. ESH: That I listed them here?

25 MEMBER SKILLMAN: Yes. What set those

1 four apart, that you have them --

2 MR. ESH: They're on the slide as just
3 examples of the short-lived isotopes that we see in
4 the different analyses of driving the risks from the
5 short-lived isotopes.

6 MEMBER SKILLMAN: So these are the
7 prominent species that come forward when you do this
8 analysis.

9 MR. ESH: Yes, and basically, when the
10 regulation developed, they made their best guess about
11 the inventory that they expected was going to be in
12 the facilities.

13 They made these different waste streams
14 and different isotopic lists for each of those streams
15 and then did estimates of volume, and they basically
16 did a summation over all those streams and all those
17 isotopes and came up with kind of a generic inventory
18 that they thought would be in a low-level waste
19 disposal facility, "they," meaning NRC, so, us.

20 So then NRC took that inventory and did an
21 analysis in the FEIS in the draft EIS and the final
22 EIS, in the early 1980s, to develop basically the
23 structure of her regulatory reporting requirements.
24 So they considered short-lived isotopes and long-lived
25 isotopes. They analyzed them somewhat differently to

1 try to provide protection from the short-lived
2 isotopes, and try to provide protection from long-
3 lived isotopes.

4 I'm not sure if I answered your question
5 fully.

6 MEMBER SKILLMAN: Well, I think you did;
7 just one other follow-up.

8 MR. ESH: Okay.

9 MEMBER SKILLMAN: These were the hazard
10 come basically from the fission process from a light
11 water reactor.

12 Is there another set that comes from a
13 different process?

14 MR. ESH: Well, part of the reason we're
15 doing the rulemaking is, when the initial regulation
16 was developed, there were estimates about what the
17 inventory would be, and that's kind of hard-wired into
18 the whole regulatory structure and other requirements.

19 Now, as we move forward, other waste
20 streams have come into being that people want to
21 disposal of as low-level waste, so depleted uranium,
22 blended waste, and some of the new medical technology,
23 of developing isotopes for medical procedures. You
24 can envision that you might generate special amounts
25 and quantities of certain isotopes in those processes.

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1 And then, also, if in fact they went to reprocessing
2 fuel cycle, you'd generate different isotopes from
3 that type of waste than you would from what comes out
4 of the traditional light-water reactor operation.

5 CHAIRMAN RYAN: I think it's a fair thing
6 to say there's got to be some kind of balance between
7 -- well, cobalt is not a fission product, of course;
8 it's an activation product.

9 MR. ESH: It's irradiated, yes.

10 CHAIRMAN RYAN: It's screaming hot for a
11 relatively short period of time, so it's an
12 operational/management question. And once you get it
13 "in the ground" or in its disposal configuration, it's
14 probably not a huge long time you're really worried
15 about it. In 50 years, it's pretty much done.

16 MR. ESH: Yes, in my experience, I can't
17 remember ever seeing technical analyses where cobalt-60
18 was the driver of the risk.

19 CHAIRMAN RYAN: So I think it's not only
20 does a little bit of -- you know, there's a little bit
21 of how you got to handle it in an operating
22 circumstance at a licensee's facilities to get it
23 ready to be an honorable. Those tend to be buried
24 based on the operational risks of physically handling
25 those materials.

1 And the forward-looking part is, how do I
2 have requirements for waste form, waste packaging,
3 disposal technology, and transportation technology?
4 As David said, all of that has to be balanced into
5 some kind of program that addresses all those
6 component risks in sequence, if you will, to the
7 endpoint.

8 And I appreciate David's thoughtful way of
9 trying to explain that the metrics of thinking about
10 risk. It certainly evolves as the material goes
11 through a process to ultimate disposal.

12 Is that a fair summary?

13 MR. ESH: Yeah, sure.

14 Chris, did you have a comment?

15 MEMBER MCKENNEY: I just wanted to also
16 add that along with the operational, there's an
17 institutional control period, again, and the short-
18 term waste form in the interior varies because, like
19 the cobalt-60 that can disposed of in Class C, at
20 Class C levels, an irradiated hardware can be up to
21 like 20,000- to 60,000 r per hour at the point of
22 disposal. So making sure it's isolated is important
23 because you still need almost 500 years to get that
24 down to where it's fairly innocuous.

25 CHAIRMAN RYAN: Cobalt-60?

1 MEMBER MCKENNEY: Well, at 20,000- to
2 60,000, that's half -- yeah -- half is 10,000 r per
3 hour, then half again. And at 20,000- to 60,000 r per
4 hour, you need a little bit more time than 50 years.

5 MR. ESH: But at 500 years, you're at 100
6 half-lives. That's a lot.

7 MEMBER MCKENNEY: Right. It's very
8 innocuous, dealt with. But I'm just saying that it's
9 a combination of operations and the institutional
10 control, which is why the system does work for short-
11 lived.

12 MR. ESH: Yeah.

13 So let's go on to slide five --

14 MEMBER SKILLMAN: You answered my
15 question.

16 MR. ESH: Okay.

17 MEMBER SKILLMAN: Thank you.

18 MR. ESH: Let's go on to slide five.

19 We showed some of the Committee members
20 this slide before, about the low-level waste inventory
21 analysis.

22 Basically, we took some information that
23 we had on inventories in low-level waste facilities,
24 and we did a hypothetical calculation of, if you
25 wanted to get that inventory down to a level where

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1 you'd meet, say, a 25 millirem standard, how much
2 reduction do you need in that material? So it's
3 trying to address this issue of, is the material
4 inherently riskless? Okay?

5 Some of the isotopes are disposed of below
6 the level you already need to meet.

7 CHAIRMAN RYAN: Just for everybody's
8 benefit, the dashed line across the page, kind of
9 below that is 'low risk'.

10 MR. ESH: Yes, or it would already meet
11 the standard.

12 CHAIRMAN RYAN: That would meet the
13 standard, okay.

14 MR. ESH: As disposed, it automatically
15 would meet the standard because it's at such
16 concentrations.

17 But in most facilities and for many
18 isotopes, you need some reduction out of the system in
19 order to meet the standard. So our approach is about
20 what analyses you need to do to ensure you achieve
21 that reduction.

22 As you can see, on the X-axis here, it's
23 going out in half-lives. There are a lot of isotopes
24 disposed of, in our four operating facilities, that
25 are long-lived and aren't inherently riskless. So, at

1 500 years, you aren't automatically going to meet
2 standard. You have to do an analysis what is the risk
3 from that inventory that you put into your system.

4 So the main point of our rulemaking is,
5 then: What analyses or requirements you need to
6 ensure to achieve this? Conceptually, I think that's
7 a good point for the Committee to understand.

8 So, if we move on the slide six, then,
9 "All existing low-level waste facilities contain
10 sufficient inventory that could result in unacceptable
11 radiological risk." This is for 61.41, primarily. In
12 some cases, you need many orders of magnitude of
13 reduction.

14 The Commission direction, which we talked
15 about earlier, was to perform a limited-scope
16 rulemaking so it would operate within the framework we
17 have, then, what you would need to do within that
18 framework to specify additional technical requirements
19 and develop guidance. As I indicated, we spent an
20 awful lot of time developing the guidance, and we look
21 forward to talking with you about that in the future.
22 I'm proud of the work that my coworkers have done on
23 that.

24 So, if I look at the Commission direction,
25 it's, change what you need to what don't go crazy, and

1 provide the requirements to determine if public health
2 and safety is protected. Like I said, we really put
3 a lot of effort into the guidance because some of
4 these things are not amenable to specifying words in
5 a regulation. They're too detailed and too
6 complicated to write regulatory requirements that
7 would necessarily get people to do what you think they
8 need to do.

9 You need to put the principle or the main
10 idea in the regulatory requirement and then, in the
11 guidance, specify the various approaches that somebody
12 could do to achieve that requirement, and that's one
13 of the approaches we take.

14 MEMBER SCHULTZ: David, just a quick
15 question. There's another step that goes past the
16 guidance, and that is, how do you get it into a
17 license condition?

18 MR. ESH: Yes.

19 MEMBER SCHULTZ: And then, the operator's
20 use of that licensing condition. So have you thought
21 about that or addressed that the guidance?

22 MR. ESH: No. I don't think we've
23 addressed that in any detail in the guidance. That's
24 a good point.

25 MEMBER SCHULTZ: You know, if you get

1 guidance that says, if you use these kinds of words to
2 describe this implementation, which is what the
3 guidance should help people do, it might be helpful to
4 think about whether or not you can point agreement
5 states or whoever the regulator is to -- this should
6 be addressed in the license condition.

7 MR. ESH: Yes, sure.

8 MEMBER SCHULTZ: Or it could be crafted
9 using something like that, just to point folks in the
10 right direction.

11 MR. ESH: And I think that is a very
12 useful and worthwhile avenue for the agreement states
13 to impose what they see fit in their systems and for
14 their stakeholders, and it gives them some
15 flexibility. But it is a mechanism that they can
16 ensure, if there's something important to them, that
17 it happens for their particular facility in the
18 licensing.

19 MEMBER SCHULTZ: Yeah, or it could be
20 something that's very particular to a given site for
21 some reason.

22 MR. ESH: Yes.

23 MEMBER SCHULTZ: So, you know, that gives
24 him a lot of flexibility. But if you recognize that
25 in the guidance, that probably would be helpful to

1 everybody.

2 MR. ESH: Yes. A lot of the challenges
3 with this problem is because you're dealing with
4 things that are in multiple dimensions, and you're
5 trying to make requirements that are one-dimensional.

6 So we have variability in inventories and
7 site characteristics and half-lives and a variety of
8 things. And then you're trying to make a requirement
9 that applies to all of those, but it's really maybe
10 unfair to ask that. So you can't necessarily do the
11 reduction and make that simple requirement that's
12 going to apply to all the cases.

13 That's why, if we look at the low-level
14 waste regulation overall, my personal opinion is, if
15 we weren't limited in this limited-scope rulemaking,
16 I would have loved to change the waste classification
17 system to separate out long-lived waste from short-
18 lived waste. And you could make special requirements
19 for short-lived waste that are different than the
20 requirements for long-lived waste.

21 So, if you have a waste stream like
22 depleted uranium, which is not necessarily a short-
23 lived concern at all but poses a pretty large long-
24 lived concern, you could make special requirements for
25 that waste stream. But in the low-level waste

1 classification system as it exists right now, all the
2 waste classes, the short- and long-lived, are mixed
3 together throughout the classes, so it makes it really
4 cumbersome to try to do that. We still tried to do
5 that in our revised language, which we'll talk to you
6 about in the next meeting, for how we handle the need
7 for someone to do the performance analyses. So was
8 still tried to do that. But it's not easy; it's a
9 little bit messy, how you do it.

10 We did have an extensive stakeholder
11 interaction, and they basically said don't limit the
12 technical requirements to the particular waste streams
13 initiated it best, meaning depleted uranium and
14 blended low-level waste.

15 We have had some stakeholders after that
16 express that opinion though: Do we limit it just to
17 those waste streams? But the majority was, don't
18 limit it to the waste streams. We think that's smart
19 because, number one, the majority of our stakeholders
20 didn't want it. It's very difficult to do, as I was
21 trying to express in a technically sensible way. And
22 we end up at the same place we are now, potentially.
23 So, if there's a new waste stream we aren't
24 anticipating right now in this rulemaking, then we
25 have to go back, and the new waste stream that has

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1 somewhat different characteristics, well, we now have
2 to add it into the rulemaking process. My personal
3 opinion is I would like to get out of the regulatory
4 business and move on with other regulatory business.

5 So let's move on to slide --

6 MEMBER SCHULTZ: Dave, before you move on

7 --

8 MR. ESH: Yes?

9 MEMBER SCHULTZ: The discussion you had on
10 the second bullet suggested to me that you wouldn't be
11 able to achieve the request of the stakeholders in the
12 third bullet. In other words, the prescriptive waste
13 forms that currently exist may prevent the proposed
14 analysis process to achieve not limiting the
15 requirements of waste streams.

16 MR. ESH: Yeah, it's definitely a
17 balancing act of how we develop requirements that we
18 think are going to work for the waste streams that
19 came into being that initiated the process, and future
20 waste streams, while still operating within the
21 structure of the existing regulation without modifying
22 it substantially. And that's where this intruder
23 issue comes into play.

24 MEMBER SCHULTZ: Right.

25 MR. ESH: Now, the "intruder" part of the

1 whole analyses is one of the four Subpart C
2 performance objectives. It's fundamental to the
3 regulation. We felt, we don't have the ability to
4 remove one of the legs of the chair, so to speak. We
5 can change the length of the leg or maybe change the
6 size of the leg, but we can't remove it completely.

7 So, that's conceptually what we were doing
8 in the rulemaking process. And I think we've achieved
9 that, but you'll have to see some of the details and
10 tell us whether you think we've achieved that or not.

11 So, on slide seven, "Delays, Barriers, and
12 Transport," this is just to communicate that in these
13 systems, there are different types of barriers, and
14 there are different types of functions for those
15 barriers. We have both engineered and natural
16 barriers, and they can reduce and delay risk.

17 So, on the left-hand side, I listed some
18 things that act as risk reduction in these problems,
19 and then on the right-hand side, things that delay
20 risk. The technical requirements must account for
21 both of these types of processes in the system.

22 Barriers that reduce risk are generally
23 preferred over things that delay risk because, if
24 you're just shifting risk and time, eventually, the
25 risk is realized. Whereas, if you achieve a true

1 reduction, then you can have more confidence the
2 public health and safety will be protected regardless
3 of when that risk may be realized.

4 Slide eight, please -- the generic waste
5 classification system.

6 The generic waste classification systems
7 serves a variety of functions, and I think it was a
8 good system for its desired purpose. So, when the
9 regulation was developed, they said, we think we're
10 going to have a lot of low-level waste sites, and do
11 we want to have everybody analyzing this kind of
12 hypothetical, subjective process of what we think
13 people are going to be doing and how they might
14 disturb the system? They decided, well, we think that
15 it's better done by the regulator, and the regulator
16 will do that analyses and develop limits on
17 concentrations that can be disposed, and that will be
18 imposed on everybody. So those limits provide some
19 sort of limit on the suitable concentrations for near-
20 surface disposal.

21 It also constrains this issue of the
22 societal uncertainty. So, you know, we have different
23 types of uncertainties in the problem. There are
24 technical uncertainties associated with the natural
25 system for performance of engineer, those sorts of

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1 things. We also have the societal uncertainty of what
2 people are going to be doing. What do they do now,
3 what are they going to be doing in the future, and how
4 does that impact the regulatory analyses?

5 The societal uncertainties, I think, is an
6 area where I think it's prudent to choose a
7 conservative approach based on what people do today,
8 and I think that's what the Commission did. They
9 said, look, generally, people, regardless of what may
10 happen in the future, they're going to be trying to
11 seek shelter and use resources. And if we design our
12 scenarios around that sort of philosophy, that should
13 apply in the future as well as it does today.

14 What technologies they may have a
15 billable, whether they solve cancer or whether they
16 have better protection systems to know they're exposed
17 to radioactivity, all those sorts of things are beyond
18 our capability today to say what impact they are going
19 to be in the future.

20 So this approach limits speculation about
21 the component of the problem. It goes both ways. If
22 you open up the part of the problem, I've dealt with
23 stakeholders who have very specific and extreme views
24 about future land use and activities that may be based
25 on personal experience. You know, one of their

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1 relatives does such and such, and they live within X
2 of the facility. And it's hard to dispute that sort
3 of activity.

4 Of course, you have to put in context.
5 Well, how many people do that? This is where you're
6 driving up the probability. What's the probability of
7 that particular behavior in action? I don't think
8 it's fruitful to open up that area of analysis because
9 it's very subjective and people have very strong and
10 different opinions.

11 The regulatory approach that NRC has come
12 up with is, let's choose something that we think is
13 reasonable, conservative, and is robust for regulatory
14 decision-making. Ultimately, I think some of the
15 confusion is derived from, this is not a prediction of
16 the future; it's a regulatory analysis to justify that
17 a decision from a safety standpoint. And those two
18 things can be divergent.

19 So risk in the future might be quite
20 different than the regulatory safety decision and the
21 information that goes into it. That's what we want to
22 try to communicate the Committee here, is the purpose
23 of this type of analysis. It's a regulatory analysis.
24 It's not a prediction protection of the future.

25 CHAIRMAN RYAN: Yes, I think that's a very

1 important point. Thank you for articulating it well.

2 MR. ESH: As I said, there's a 'combined
3 long- and short-lived isotopes' in the waste
4 classification system that causes some challenges now
5 for how we would develop requirements.

6 The downside using the generic waste
7 classification approach is there are embedded
8 assumptions in the system. So there are embedded
9 assumptions about inventory; there are embedded
10 assumptions about future activity of the people.

11 If you read the comments on the original
12 draft EIS and FEIS -- I don't remember which national
13 lab it was -- one of the national labs basically said,
14 we see that you've developed classification tables for
15 the humid site. People say, it's very conservative to
16 use a humid site and apply it to all. It is for some
17 pathways and some behavior; it's not, for other
18 pathways and other behavior.

19 So, if you're talking about resuspension
20 of plutonium in a dry climate, that's a lot higher
21 than it is in a humid climate. And so that issue
22 comes into play when you try to reduce something
23 complicated into something more simple. I think the
24 system that's been done is very effective for the
25 inventory, but that's the issue of why we're doing the

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1 rulemaking, that the inventory that was analyzed then
2 is now different.

3 So our approach is, well, how would we do
4 that today? NRC could have done an analysis and came
5 up with new tables, but then it's still being
6 constrained by our assessment of a generic
7 representation for all sites.

8 Instead, we go with the ability to do the
9 WAC approach, or this site specific analysis for the
10 intruder, more specifically, which is, take into
11 account your actual conditions at that site, and land
12 use and behaviors and everything else, and develop
13 what you think is representative of your specific
14 site, instead of being driven by the decisions that we
15 make in some sort of generic scenario by the
16 regulator.

17 I think that is a good approach and it
18 will work very well, but as I said, it requires you to
19 have good oversight of the evaluation and the analysis
20 and that appropriate detail went into that analysis to
21 begin with.

22  CHAIRMAN RYAN: One part of that I think
23 is very important, too, David -- correct me if you
24 disagree -- I think it's fair to put in the regulation
25 somewhere along the line -- all right, let's say we've

1 got a new segment. There's got to be a modeling
2 effort that will get the regulator, whether it's
3 through an agreement state, to say, yes, this is okay;
4 we can proceed.

5 What about the ongoing requirement that as
6 a site continues to do monitoring and all that sort of
7 stuff, they can build the body of evidence that can
8 become decades long in terms of the ability to better
9 protect what they first thought, and say, we're on
10 track to being where we thought we'd be, or, we need
11 to make these adjustments based on these new findings
12 from the data that we now have.

13 Is that something you've built in?

14 MR. ESH: Yes, that's part of the process
15 right now. If you look at Part 61, at closure, it
16 basically says, considerable all those things that
17 you've learned, whether it's monitoring data or
18 technical analyses or whatever, and factor those into
19 your closure, design, and decision, basically.

20 CHAIRMAN RYAN: Yeah. I think the real
21 option for the guidance to do that in the guidance
22 document might be to make sure you've captured the
23 depth of what you just said and all the things that
24 back it up.

25 MR. ESH: Yes, in our guidance document,

1 we are much more focused on the front-end regulatory
2 analysis than on the back-end parts of the process.
3 That was driven by, what do we need to put on the
4 front end, based on the new waste streams, to ensure
5 that the appropriate analysis done? Rather than, on
6 the back end of the process, what could be done better
7 to improve the back end of the process?

8 We did change a few things there, like
9 requiring the analysis at the end --

10 Right, Chris?

11 MR. MCKENNEY: Okay.

12 Chris McKenney -- as we'll discuss in
13 June, there is more of an emphasis, even in our
14 previous NUREG-1573, which is a performance assessment
15 rule on waste.

16 In 2000, we did note that this is an
17 iterative process, meaning that as you get through,
18 you need to review the program, review your
19 assessments and say, are you still within the
20 envelope? Can you make a better estimation? And
21 there would be an expectation that they could, if they
22 got better data, make a new performance assessment,
23 which, the way the ruling is, they could take more
24 waste, take more inventory, either concentration or
25 inventory, and take advantage of that. Or, if other

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1 information becomes available, they need to reassess
2 their performance assessment because something isn't
3 working as it should.

4 That also should be triggered by their --
5 one is the fact that in Part 20, of course, there's an
6 annual review in the radiation protection, and the
7 envelope which your performance assessment as part of,
8 should be part of the review of saying, do we have new
9 information that says we need to either question or we
10 can come in for amendment to do a revisal.

11 CHAIRMAN RYAN: Thanks.

12 MR. ESH: So the most important part of
13 the slide, though, are the last two bullets. So, if
14 there's anything that you remember from what I say
15 today, it's the last two bullets that I want people to
16 remember.

17 The generic waste classification system
18 doesn't, and was never intended to, ensure that you
19 will meet 61.41. And not all isotopes important for
20 61.41 are necessarily reflected in these tables of
21 61.55. Because it was driven by the analysis of the
22 intruder for 61.42, that concept is important to
23 understand.

24 There's always been the expectation in
25 Part 61 that you will do an analysis to demonstrate

1 that you can meet 61.41. That's an analysis that's
2 basically a modeling or a projection or whatever you
3 want to call it, but it's some sort of forward-looking
4 assessment of what radioactivity can you take in your
5 facility? How is it going to be transported through
6 the system? And what's the potential dose to
7 receptors to result from the transport of that
8 material?

9 Okay, so inadvertent intruders -- slide
10 nine.

11 This is the concept that the Commission
12 used when the intruders were put into play in the
13 regulation. Some of our stakeholders and made various
14 comments on this area, and I wanted to just talk about
15 it at a high level conceptually. so the Committee
16 understands what is assumed and what's not. It is not
17 based on the assumption of failure of society. It is
18 based on the assumption of error of the government.

19 As somebody was talking about earlier
20 today -- I think it was Mike -- it's basically, you
21 have 100-year institutional control period, which is
22 an active institutional control. At the end of that
23 hundred-year period, you have a passive institutional
24 control period.

25 NRC expects that that passive system is

1 going to be effective, but not 100-percent effective,
2 because governments make mistakes. And they'll make
3 mistakes in ways like inappropriately looking at the
4 zoning plan or, you know, something about land-use, is
5 basically what it boils down to, and managing future
6 land use. And over long periods of time, you have
7 records that are destroyed, you have all sorts of
8 things like that, that can happen, so there can't be
9 assurance that that sort of passive system, where you
10 don't have a fence and people patrolling is going to
11 keep people out of that area.

12 There was also the assumption that the
13 intruder, as 61.42 is written, is protected, it says,
14 at all times. There's no limited to time of when that
15 person is protected in the system. But conceptually,
16 they expected that low-level waste is going to have
17 limited quantities of long-lived waste and that the
18 decay hazard, as Dr. Ryan has said, is reduced
19 tremendously over the 500-year period. New waste
20 streams might not necessarily meet that description.
21 In particular, the depleted uranium stream waste
22 stream, more waste streams that are generated from
23 some of the other processes, might not necessarily be
24 waste streams with low amounts of long-lived waste.

25 So the issue becomes, how do you assess

1 that part of the problem? That's where the
2 inadvertent intruder comes into play in the site-
3 specific intruder analysis. The inadvertent intruder
4 concept, and the way it goes about, it relieves
5 licensees of financial responsibility after the
6 institutional control period. So they develop a fund,
7 as you're well aware, and they use that fund to do
8 closure activities. But then, ultimately, the site is
9 given to state and federal ownership, and license are
10 off the hook.

11 If you want to go to an approach of longer
12 institutional control, then I think that has financial
13 impacts for your assurance fund and things like that.
14 Or, if you wanted to go to a perpetuity-type approach,
15 which is the Commission in the past has said does not
16 support or isn't reasonable in developing the approach
17 that they did here originally in Part 61.

18 That isn't to say that the necessarily
19 change that position now, but those are alternatives
20 that we can considered in the process. That is because
21 there wasn't at the time, and I don't think there is
22 still is, an adequate basis for long-term robustness
23 of passive control issues.

24 This should say "passive," I think, not
25 "active," on the fourth bullet down.

1 The concept for the intruders was that the
2 intruders were on unlikely, albeit possible. Not
3 expected; unlikely, albeit possible. So, while you're
4 right that there is a conditional probability of one,
5 we're going to assume, for intrusion, the fact that we
6 are applying the 500-millirem dose limit the NRC did
7 in developing the classification tables, and which
8 we're proposing in the rulemaking process, implies a
9 probability of five percent.

10 If you draw an imaginary line at the edge
11 of the buffer zone and you put a public receptor at
12 one side of the buffer and you move the receptor to
13 the other side of the buffer zone, if you think the
14 probability is one that they're going to be inside the
15 buffer zone, there's no reason to set the dose limit
16 at 25 on one side of the line and 500 on the other.
17 The limits should be the same if, in fact, you think
18 that than expected behavior.

19 So, conceptually, that what's done with
20 the intruder, and we're not moving far away from that,
21 except, as I indicated, we want to allow people to do
22 that in a site-specific way now that takes into
23 account things like the depth of the waste, the
24 barriers that are present, the materials that they
25 have, the site-specific environmental conditions. And

1 all those things that go into that type of evaluation.

2 It is still a regulatory analysis. It's
3 not projection of the expected future. It's a
4 regulatory analysis to make a safety decision, and
5 that's an important distinction that I think needs to
6 be understood.

7 So, slide 10, please.

8 The low-level waste technical analyses --
9 the requirements must apply -- and there are a couple
10 of important points here. They must apply to all
11 sites and inventories.

12 The low-level waste disposal sites have
13 vastly different inventories, engineered barriers,
14 natural barriers, and environmental conditions. The
15 approach that we took is that the technical
16 requirements have to be established for the most
17 challenging inventories and site conditions or else we
18 can't ensure that health and safety will be protected.

19 So, if you said, well, I have a site that
20 has all short-lived waste and, therefore, they should
21 only analyze for 500,000 years, I would agree with
22 that. Technically, that makes sense. Why wouldn't
23 you do that? But, if we put 500 or 1,000 years into
24 the regulatory requirement and somebody comes along
25 with large quantities of long-lived waste, well,

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1 there's no bets at all that the dose results, in these
2 types of analyses, that they get in 500 or 1,000 years
3 will in any way be representative of what they get in
4 the period after 1,000 years and, say, 10,000 years.

5 Generally, the engineered system and the
6 radionuclide transport in the groundwater system can
7 get you delays of at least 1,000 years in many cases.
8 But for a lot of for a lot of systems, and especially
9 for a humid site, they don't get delays past 10,000
10 years. So, if you want to see what the risk is, the
11 risk usually occurs after a thousand, not before a
12 thousand, for 61.41 in particular.

13 The approach we took was to specify the
14 requirements that would ensure that the challenging
15 sites in inventories are, that public health and
16 safety is protected for them, but in the guidance
17 document and the analysis, allow somebody to do
18 something that's simpler and more straightforward when
19 they have a low-risk condition. So, if they have a
20 low-risk inventory at long times, sure, the
21 requirement says analyze for 10,000 years.

22 But if I was a licensee, I'd go in there
23 and say, look, my inventory is gone; what's the point
24 of me estimated that? And as a regulator, I would
25 say, there's really no point in that. But there's no

1 pain to projecting the numbers at that point if the
2 risk is low or zero. The risk is going to come out of
3 the analysis based on there being no inventory there.

4 So it's like a nuclear version of Occam's
5 razor. So, when we have this issue of having two
6 competing decisions, and one is not necessarily much
7 different than the other, we'll err on the side of
8 protectiveness or safety, and that's what we're
9 attempting to do with these regulatory requirements.
10 So we think the best approach is to risk-inform the
11 technical analyses.

12 So, if we could go to slide 11, and this
13 is what I want to convey to you -- I know the
14 Committee probably don't like the fact that I'm saying
15 what we're doing is risk-informed, but that's the
16 argument that I'm going to try to make. But we do a
17 lot of things in this revision that I believe are
18 risk-informed.

19 Now, we aren't abandoning the intruder
20 performance objective, which I think is one of the
21 hang-ups of the Committee with the whole approach.

22 MEMBER ARMIJO: It's mine, yes.

23 (Laughter.)

24 MR. ESH: We aren't abandoning that
25 because, as I said, we were given direction for a

1 limited scope. We think it's one of the fundamental
2 components that they put in their analysis originally,
3 and we don't feel like we have the ability to move
4 away from that. There are a diversity of opinions,
5 and some people understand or agree with why it's
6 there in the approach that it serves, including many
7 of the staff.

8 But putting that to the side, the rest of
9 it, I would say, are examples of how we are trying to
10 be risk-informed in this process. So the tiered
11 approach to the analysis time frames, it's trying to
12 work with the uncertainties and the problems while
13 still trying to ensure that appropriate analysis that
14 appropriate analyses of done for the more risky waste,
15 especially for 61.41.

16 We are, in the proposed revisions,
17 allowing for site-specific technical analysis rather
18 than generic waste classification. We're trying to
19 still avoid what I would call unnecessary speculation
20 about the societal uncertainty component. Maybe it's
21 a lot like the rulemaking; you go around and around
22 and around and you end up at the same place anyway.

23 But the higher dose limit for the intruder
24 scenario, if we weren't being risk-informed, we would
25 set the probability of one to the intruder and say,

1 use the same dose limit for the intruder.

2 The site stability is based on the impacts
3 to 61.41 and 42 not and some abstract concept about,
4 like, dimensional change at the facility, or
5 structural change, because we don't think it is
6 reasonable for somebody not to tie changes in the
7 stability and structure of the system to how it may
8 impact the public health and safety. So, as we wrote
9 the requirements, that's how we tie it in, and we
10 explain it in the guidance.

11 And then one area of the regulation that
12 the Committee probably hasn't talked a lot about, but
13 we've gotten some good comments from stakeholders on
14 it, was 61.50, Site Suitability Characteristics. What
15 we decided to do there was to say the site suitability
16 characteristics are only exclusionary, the
17 hydrological ones, for 500 years because, basically,
18 if you're having hydrological problems within the
19 first 500 years of your facility, you're likely to
20 have very big problems after 500 years from those
21 processes.

22 But the other things --

23 CHAIRMAN RYAN: What would be the limits
24 of those? I can understand a meandering stream or
25 river or something that's --

1 MR. ESH: Well, to put it more simply, the
2 issue is this: The site suitability characteristics
3 have something like, the facility may not be in the
4 location of the 100-year floodplain. How would
5 somebody demonstrate that over thousands of years,
6 whether you're in a 100-year floodplain or not? It's
7 based on things like you just sited, how rivers move
8 and all the geomorphology that goes on. I think that
9 would be almost impossible to demonstrate.

10 You should be able to demonstrate it for
11 500-year period. I think that's credible to
12 demonstrate based on all the science I know about
13 geomorphology and the programs available and what not.
14 But after that, if it doesn't impact public health and
15 safety, it shouldn't be exclusionary.

16 That's the approach we took, and an
17 example for you of what we decided to do there.

18 → CHAIRMAN RYAN: I guess what I'm reaching
19 for is, would that kind of analysis suggest that
20 engineered barriers or engineered aspects of the
21 disposal system would be credited?

22 MR. ESH: Yes. Certainly after, for
23 hydrological characteristics, after 500 years. We
24 intend for this to be smart and performance-based. If
25 you can credit any engineered barrier for whatever

1 period of time, you're free to credit that in your
2 analysis.

3 CHAIRMAN RYAN: Okay. That's the answer
4 to my question.

5 MR. ESH: Yes.

6 And then also, as you are well aware, in
7 the dose modeling area, we recommend moving away from
8 something that's quite dated at this point and doing
9 something that we said people can do any way in other
10 analogous programs.

11 So, Analysis Time Frames -- I have, I
12 guess, three --

13 CHAIRMAN RYAN: So just to make sure
14 everybody is on the same page right now one, that's
15 basically using the more updated ICRP models for
16 internal radiation protection analysis.

17 MR. ESH: Yes. That's right.

18 CHAIRMAN RYAN: That's really very focused
19 on the internal part because all the radionuclide
20 stuff has been updated.

21 MR. ESH: Yes.

22 CHAIRMAN RYAN: Okay.

23 MR. ESH: Slide 12 -- Chris?

24 MR. MCKENNEY: Actually, because of the
25 way we're writing the rule, if there were to be a

1 change in the external assessment process, they could
2 be able to take advantage of that as soon as the new
3 federal guidance report came out.

4 CHAIRMAN RYAN: Okay.

5 MR. McKENNEY: So, the way the rule is set
6 up, it's not stuck on a specific federal guidance
7 report anymore.

8 CHAIRMAN RYAN: Ah, okay, so that's the
9 tie.

10 MR. McKENNEY: They can update their
11 assessments to take account of the latest science.

12 CHAIRMAN RYAN: Thanks. That's great.

13 MR. ESH: So slide 12 -- Analysis Time
14 Frames -- is a summary of the international
15 experience.

16 We went out and tried to find as much
17 literature as we could on the subject. And the bottom
18 line, as you can imagine, is there is a variety of
19 different approaches, but they have a common theme to
20 them. They usually do one of the things I've listed
21 on the subtexts under "approaches included."

22 Some countries will do long-term analyses.
23 Some countries will just say, go to peak, whenever
24 that is. And others will set regulatory defined
25 limits on the near-surface disposal of long-lived

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1 alpha, especially. So they say we're going to limit
2 how much long-lived you can take, and once we do that,
3 then you can analyze for a short period of time
4 because we've placed a limit on what the risk may be
5 for the long-lived component.

6 If you're not going to place a limit on
7 what the risks can be for the long-lived component,
8 then my opinion is you at least have to do an analysis
9 looking out sufficiently long to see what the risk is,
10 from that component.

11 Some --

12 MR. WIDMAYER: Hey, Dave?

13 MR. ESH: Yes?

14 MR. WIDMAYER: Sorry. Can you tell us
15 what the bases are for those countries placing a limit
16 on the long-lived alpha? I mean they must have done
17 some sort of analysis to come up with a --

18 MR. ESH: I don't know how detailed the
19 analyses are, because it's very difficult --

20 MR. WIDMAYER: Do they have ranges all
21 over the place, or are they --

22 MR. ESH: They're kind of condensed in,
23 like, the 4 E to the -5, 4 E to the -6 Becquerels per
24 kilogram, I think; I forget the units. It's in the
25 paper; we can talk about it. But basically, it's not

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1 clear how they derive those values.

2 You know, is it a case of herding
3 behavior, where somebody came up with one and then the
4 next guy is doing his regulations, and he says, they
5 have that, so let's make it about that. So I don't
6 know. We couldn't find sufficient detail to see
7 specifically how those numbers were derived. But the
8 fact of the matter is that they do set them, and some
9 people, instead of setting the number like that, they
10 just say, no near-surface disposal.

11 So some countries put all their waste,
12 even the most benign waste, deep because what's the
13 primary mechanism for people who are trying to manage
14 risk from different types of waste? It's disposal
15 depths. High-level waste, geologic repository;
16 intermediate waste, intermediate depth; more benign
17 waste, near-surface.

18 So, if you have waste that you think is
19 kind of intermediate-level waste or kind of pushing
20 towards there, I would search for a site where I can
21 bury it deeper and mitigate a lot of these concerns
22 about changes to the environment, what people are
23 doing, all those sorts of things. It's a really
24 simple and effective way to properly mitigate those
25 risks.

1 Many of our existing facilities, though,
2 do not have sufficient depth in their locations that
3 they can take that approach. So that would be a
4 problem to use that for some existing facilities. Or
5 if we were to say, you know, if NRC was to derive, you
6 should put this type of waste at least this depth,
7 that also, then, adds a problem, just like the generic
8 waste classification system, in that value based on
9 some analyses that may not be representative for
10 another site or another condition, and we're going to
11 impose that on all.

12 So, while it's smart from a policy and
13 technical perspective, it could also not necessarily
14 be risk-informed from a site-to-site variation and
15 inventory perspective. Our approach for analysis time
16 frames, we think, is consistent with this
17 international experience, which is kind of congealed
18 around some of these main elements.

19 Now, the domestic experience in low-level
20 waste, as summarized of slide 13, as you know, all
21 currently operational low-level waste disposal
22 facilities are in agreement states. There are
23 different interpretations of our regulations because
24 our regulations are silent on time frame for the
25 analyses.

1 It does mention time frames were slow the
2 things -- say, the Class-C intruder barrier, for
3 instance, or site characteristics that says 'consider
4 for at least 500 years.' The institutional control
5 period is 100 years. By putting some of those numbers
6 in that are conditional for specific parts of the
7 analyses and then being silent on this other part, it
8 has led to some various, quite diverse interpretations
9 of what we expect.

10 But for different interpretations in the
11 various agreement states, Washington used 10,000 years
12 and they looked longer in their EIS. Texas went out
13 to 50,000 years in their analyses. Both of those
14 licensed operating facilities. Utah had 500 years,
15 and now they're currently reviewing a performance
16 assessment that goes to 10,000 years. And then they
17 do something that they call a deep-time analysis after
18 that, which will look at very long-term effects at
19 that site. And then South Carolina did 2,000 years,
20 have I understand it.

21 In 2000, the NRC staff performed a
22 detailed technical analysis for low-level waste
23 disposal, looking at this and other issues in the
24 development of NUREG-1573. They basically said, look,
25 you need 10,000 years because, otherwise, you can have

1 situations where you design a facility and you put in
2 an engineered barrier and you defer the risk for some
3 period of time, especially 500 years or maybe slightly
4 more than 1000, but then you have a big risk pop up
5 for certain inventories and designs, and that's not
6 something we want.

7 We want to ensure that the criteria are
8 met for a reasonable time frame due to the reduction
9 to the system, and not necessarily the delays in the
10 system. Delays are good; don't get me wrong. You
11 definitely want delays.

12 So, if I'm worried about my family or
13 future generations of my family, it's really important
14 for people to understand that even hundreds of years
15 is are very long periods of time. But from a
16 regulatory analysis standpoint, the reductions in risk
17 are much more powerful, and this is about ensuring
18 that the analysis communicates what those reductions
19 are or are not.

20 In addition to the international and
21 domestic experience, we also considered some technical
22 things on slide 14.

23 As I discussed earlier, we have this
24 traditional waste. The traditional waste, all of it
25 in all of the operating facilities has a long-lived

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1 component to it, and the long-lived component is the
2 driver of the projected doses for 61.41. In fact, for
3 three of the four facilities that went out longer, all
4 of their peak doses occur after 1,000 years, so the
5 peaks are larger.

6 So, if you want to talk about risk, based
7 on what they know today and their analyses, the risk
8 is larger in the longer-term period than it is in the
9 shorter-term.

10 Now, depleted uranium is a different
11 beast. It's a much more extreme case of what I just
12 described, and it's due to the fact that it's, as
13 currently envisioned, essentially pure powdered
14 uranium, where the daughters then grow in over long
15 periods of time.

16 The problem with it is, at 1,000 years,
17 your only capturing one one-thousandth of the impact
18 of where it ends up as those daughters build in over
19 time. At 10,000 years, you are roughly in an order of
20 magnitude. It depends on the isotopic ratio U-234 and
21 U-238, but you're roughly within an order of
22 magnitude.

23 So our concept was, if we're dealing with
24 a system that has a lot of different types of
25 uncertainties, whether they're from performance of

1 natural or engineered barriers, or the waste
2 characteristics themselves, we should at least be able
3 to get within an order of magnitude.

4 We realize that there are a lot of
5 uncertainties as you go out in time, and that causes
6 challenges to the value of information, but for
7 regulatory decision-making, if we look at what's done
8 internationally and domestically, there are decisions
9 that are made using information from those time
10 frames. It's not that that information is valueless;
11 it has been used, and those facilities are licensed.
12 We think it's prudent to continue with that approach,
13 considering some of the waste streams that we were
14 told to do this rulemaking for.

15 Another example I would use for the
16 traditional waste that's interesting is, I think, the
17 ILAW facility at Hanford. Although DOE uses 1,000
18 years under DOE Order 435.1, at Hanford, they present
19 results usually that they communicate a 1,000-year
20 impact and then the 10,000-year impact. And what you
21 see is that in many cases, a 1,000-year impact is only
22 a five-hundredth or a thousandth of what you see that
23 in a period of 1,000 years to 10,000 years.

24 So that system does a good job in pushing
25 risk out. But the magnitude of it, and whether you

1 need to evaluate that magnitude to assure that public
2 health and safety is protected, is quite different for
3 those different time frames. We think that the
4 analysis should be done to communicate what that is,
5 and the decision should be based off that.

6 So the guidance that we got from ACNW in
7 slide 15, or ACNW and then ACRS, was to use a two-
8 tiered approach, so the time at which the more mobile
9 radionuclides produce doses, and then, avoid
10 catastrophic impacts after. Consider things like teal
11 hydrology, the waste isolation technology, and other
12 controls.

13 And we really appreciated this
14 recommendation -- I appreciated it when it was first
15 generated and 1997 and then again in 2011, and I said,
16 yeah, that looks great; okay, how do we do that.

17 So then we move to slide 16.

18 Well, when we tried to say, how do we do
19 that? What requirements will be right for this?
20 Well, when we tried to say, well, how will we do that,
21 to try to make the requirement be flexible to adjust
22 with the problem, we ran into all sorts of challenges
23 of what these things would mean. So we said, okay,
24 what are the more mobile radionuclides? How would you
25 define that?

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1 The challenges are listed in these
2 subtexts, like, "Radionuclide A maybe more mobile at
3 one site and less mobile at the next; Radionuclide A
4 may be less mobile than Radionuclide B at one site and
5 more mobile at another. So how do you define more
6 mobile?

7 Then, in addition --

8 MEMBER ARMIJO: Dave?

9 MR. ESH: Yes?

10 MEMBER ARMIJO: Could you give a specific
11 example of that mobility difference from one site to
12 another?

13 MR. ESH: Yeah, any isotopes. So, if you
14 look at the distribution of most of the -- usually,
15 the engineers condense the geochemistry of transport
16 down into a single parameter called the Distribution
17 Coefficient, which is kind of a linear absorption
18 isotherm for the partitioning of the material between
19 a solid and a liquid phase. It's a crude
20 representation all the complicated geochemistry that
21 can go on in some of the systems, but it's --

22 MEMBER ARMIJO: Is it a water-soluble
23 element --

24 MR. ESH: Yes --

25 MEMBER ARMIJO: -- in a dry site versus a

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1 wet site. The example would be, say, take uranium.
2 Uranium, if you look at the observed values and say
3 there's generic references of compiled KD values. The
4 one that we'll look at is the Shepherd and Thibodeaux
5 reference. The uranium KDs have been measured from
6 like 0.02 milliliters per gram up to like 20,000
7 milliliters per gram.

8 So, at one site, uranium would be
9 effectively immobile, and at another site, it could be
10 quite mobile. It would depend on the geochemistry and
11 mineralogy and all the sorts of things.

12 MR. GROSSMAN: An example there might be
13 if you have like a carbonated groundwater source, for
14 the uranium case.

15 MEMBER ARMIJO: Sure, pH changes.

16 MR. GROSSMAN: Yes.

17 MR. ESH: Yes.

18 So the challenge becomes, then, you're
19 dealing with these distributions of quite variable
20 information that you're trying to evaluate. And if we
21 can't get people, just from a fundamental standpoint,
22 to do a similar analysis in this area, if we were
23 really specific about how you might go about doing
24 this, I can see we'd get even more diverse results in
25 terms of the types of analyses that were done.

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1 And then you run into additional
2 challenges like, say, you have a site where tritium
3 comes out first, then a little bit later iodine-129
4 come so and then maybe technetium-99, then carbon-14.
5 Where do you draw the line? Which ones do you call
6 more mobile, and which ones are less mobile? And I
7 don't know.

8 If the Committee can give us insights on
9 that as what you intended -- I think that's a
10 challenge for finding the more mobile radionuclides in
11 using this sort of approach.

12 CHAIRMAN RYAN: That's a really
13 complicated question because, for sample, you could
14 have tritium in physical forms in waste that are
15 relatively immobile, where tritium is obviously, you
16 know, mobile in a liquid form --

17 MR. ESH: Yeah.

18 CHAIRMAN RYAN: -- or a not-absorbed form,
19 or something like that.

20 So I guess maybe we're hitting on the idea
21 that that has to be site-specific.

22 MR. ESH: Yeah, the problem --

23 CHAIRMAN RYAN: So the guidance you offer
24 should be, you need to these things for any specific
25 kind of determination of the questions you just asked.

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1 MR. ESH: Yeah. My problem is I don't see
2 that, even in guidance phase, that we could put
3 something down that would lead people to interpret it
4 the same way or come up to a similar conclusion. So
5 it would be --

6 CHAIRMAN RYAN: Well, maybe it's not the
7 same way, but maybe it's within some range of, you
8 know, high, medium, or low sorts of thinking for
9 mobility, for example.

10 MR. ESH: Yeah.

11 CHAIRMAN RYAN: Come up with some
12 qualitative decision-making that would allow you to
13 say, okay, in this bracket, we're going to do this,
14 and in this bracket, we're going to do that. So --
15 I'm sort of thinking a lot.

16 MR. ESH: Yeah, it's even worse, though,
17 because we focus on groundwater, but there are
18 multiple pathways. So, you know, an air pathway or
19 suspension or surface water or something else.

20 CHAIRMAN RYAN: And combinations of them,
21 yeah.

22 MR. ESH: And then colloids -- what does
23 that mean? You know, colloids have the ability to
24 move things that really don't move, quite some
25 distance in a short amount of time. And so, exactly

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1 how would that impact whether you determine something
2 is more mobile? You know, it can impact the whole
3 inventory, not just a specific isotope, or the ones
4 that are prone to form colloids. So that's the first
5 part of it.

6 The second part, the catastrophic impacts,
7 you know, what would that be? What sort of impact
8 does the Committee feel is a catastrophic impact?

9 → MEMBER ARMIJO: Well, it certainly isn't
10 an exposure of individual to some, even fatal dose;
11 it's thousands of people, large numbers of people.

12 That's where I get hung up on the intruder
13 assessment. It's certainly not catastrophic in any
14 sense of the word "catastrophe."

15 MR. ESH: Yes, and I would like to have
16 you with me whenever I'm getting challenged by
17 stakeholders that 25 millirem is not protective, for
18 you to explain that line of thinking that thousands of
19 people exposed to very large doses is what you mean as
20 catastrophic, and that that's consistent with the
21 Agency's mission of protecting public health and
22 safety. That seems like a very difficult discussion
23 --

24 MEMBER ARMIJO: Well, it is for people
25 will really moping about any kind of radiation

1 exposure. What I'm talking about, as a regulator, is,
2 you say, what is a catastrophic exposure and impact,
3 and it's certainly not a hypothetical intruder at
4 1,000 years or 10,000 years, 20,000 years. Clearly,
5 that doesn't meet any definition of "catastrophic."

6 So that's what we were trying to say, you
7 know, that when you do this analysis, what could
8 possibly go wrong way out in time for low-level waste
9 that could even come close to being catastrophic?

10 You don't have a burden to protect against
11 some individual exposure of one individual. We don't
12 have a moral or an ethical or legal burden unless we
13 impose it on ourselves for our particular reasons, and
14 I don't think that's of value from a public health and
15 safety perspective.

16 MR. ESH: Yes, I understand what you're
17 saying there, but also remember, we're talking about
18 more so, 61.41 here, for the protection through the
19 61.41 performance objective, not necessarily the
20 61.42, the intruder performance objective --

21 So would your same line of thought apply
22 to 61.41?

23 MEMBER ARMIJO: For you --

24 MR. ESH: -- because, because we didn't get
25 direction from the Committee to limit this to the

1 intruder. This is just basically, for the time frame
2 for the analyses, this two-tiered approach, with the
3 first phase being the more mobile, and the second
4 phase, catastrophic, was to all analyses of time
5 frames. It wasn't limited to just the intruder.

6 MEMBER ARMIJO: I think it was in the
7 intrusion, the long-term intrusion. That was my
8 thinking when we were working on this letter.

9 But I can't envision a low-level waste
10 facility ever leading to a catastrophic impact, even
11 in 100 years or 50 years or 300 years. We'd really
12 have to be poor engineers and regulators to ever have
13 that happen.

14 MR. ESH: Well, I think the issue is, if
15 you have requirements where you could potentially,
16 based on what allowed by the definition of low-level
17 wastes, put in large concentrations of long-lived
18 isotopes into the facility, and you'd only analyze for
19 a short period of time, you can in fact have something
20 that I think some of our stakeholders would call a
21 catastrophe because you end up with very large
22 groundwater impacts over a very large area,
23 potentially.

24 So it's a difference of opinion. I'm just
25 trying to communicate that we have stakeholders who

1 feel that the obligation to protect is not limited.
2 The obligation to protect is what it is. So, whether
3 you take the strong anthropocentric approach to the
4 protection of future generations, or a weak approach,
5 the NRC has some obligation to protect.

6 If you go back and look at the
7 congressional testimony around the time when Part 61
8 was developed, they talk about protecting for as long
9 as it's hazardous. They don't talk about limiting it
10 to some period of time based on the fact that future
11 generations can solve those problems.

12 So it gets us in a little bit of an
13 uncomfortable position if we try to take that approach
14 because I don't think it's consistent with the
15 international experience. It's certainly not
16 consistent with the domestic low-level waste
17 experience, but of course, we may have driven that, so
18 that point is understood. And the technical
19 characteristics of the problem, I think, challenge
20 that approach.

21 So that's kind of where we're coming from.
22 We're more comfortable with being where we are than
23 taking that approach. We certainly understand the
24 opinion, and we understand where you're coming from.

25 I tried to express this in some of the

1 early meetings about, if we're going to talk about
2 risk, let's really talk about risk. What's the risk
3 that I hit a deer on the way home and I'm killed,
4 compared to my risk from 25 millirem in groundwater
5 from a low-level waste site? We deal with real risks
6 all the time, in our own lives and in our families,
7 that are much more significant than these radiation
8 risks. But that discussion went nowhere, when I tried
9 to take it.

10 MEMBER ARMIJO: Well, it's still valid.
11 And the point is that, you know, unless we keep
12 raising that issue and saying, we really want to be
13 based on a real health and real risk, you can't live
14 in two worlds where, in one case, we deal with
15 reality, and in the other case, we elevate radiation
16 exposure in low-level waste to an extreme, when there
17 is no basis for it.

18 MR. ESH: Yes.

19 MEMBER ARMIJO: So the idea behind this
20 letter was just, hey, try to get it into a real-world
21 situation; what is the obligation for the regulator?

22 MR. ESH: Yes, I understand.

23 MEMBER ARMIJO: Obviously, you know, there
24 are some people who say, hey, look, we have a duty to
25 protect any individual as far out into the future, as

1 long as there's a miniscule possibility of any health
2 risk, and I don't believe that.

3 MR. ESH: Well, it should be clear that --

4 MEMBER ARMIJO: I just don't think that's at all
5 reasonable.

6 MR. ESH: I mean it would be helpful if,
7 whenever you eventually write on this subject, you
8 communicate on the difference between technically what
9 you think should be done, and then the more
10 fundamental issue of, say, the policy of what NRC
11 should be doing with respect to protection of future
12 generations.

13 On one hand, you know, we can deal with
14 the technical things at our level, but to make a
15 fundamental decision about protection of future
16 generations and, you know, the policy of that approach
17 is something that, if we got direction on it,
18 certainly, we'll implement it. But we don't feel
19 comfortable charging ahead without trying to make that
20 sort of change.

21 CHAIRMAN RYAN: That's a very important
22 point, David. I appreciate Sam's comments, but to me,
23 you can build a mountain so high in all of this
24 thinking, you could never climb it. I think that's
25 what we're trying to avoid.

1 MR. ESH: Yeah.

2 CHAIRMAN RYAN: What is technically sound?
3 What is technically reasonable? What are the kinds of
4 materials to try to manage and get some envelope
5 around it? You've described that pretty well this
6 morning so far.

7 MR. ESH: My opinion boils down to this:
8 You know, we have operating facilities that have been
9 licensed using requirements that are similar to what
10 we've propose, so it's not a hurdle that's impossible
11 to get over. Whether the hurdle should be in place to
12 begin with is a different story. But the fact is that
13 it's not something that's going to prevent licensing
14 and regulation of low-level waste sites.

15 MEMBER ARMIJO: Dave, that's very
16 important to me because, I'll tell you, the regulation
17 seems to be getting bigger and more complicated. And
18 maybe because I'm far from being a next work in this
19 area, but there is in the in this country for low-
20 level waste facilities to be signed.

21 If we make the regulations so difficult to
22 meet and we prevent the signing of these low-level
23 waste facilities, then a lot of other benefits to
24 society will not be available.

25 MR. ESH: Yes, I understand.

1 MEMBER ARMIJO: So, you know, the question
2 is, if this is just some calculational method that you
3 can use to assure yourself, that's not a big problem.

4 But if it creates an impossible barrier
5 that you can't get over, and it can be easily
6 challenged in court or by intervenors -- like, for
7 example, I can say, I don't believe any analysis you
8 made for 50,000 years, and I will take you to court on
9 that. You can't defend that. If two different people
10 make up 50,000-your analyses, they're going to get
11 very different results.

12 So, if you set up some hurdles that can't
13 overcome or are easily challenged by someone who
14 simply wants to stop a low-level waste facility,
15 you're not doing a service to the country.

16 MR. ESH: Yeah, I understand that. That's
17 --

18 MEMBER ARMIJO: That's where I'm at.

19 CHAIRMAN RYAN: Sam, just to be fair to
20 David's presentation this morning, I think several
21 times, we talked about how this leads into decision-
22 making.

23 MR. ESH: Yes.

24 → CHAIRMAN RYAN: I think that's the real
25 tough part of this, which is, how does the technical

1 analysis you laid out and will be in the guidance and
2 the documents that will come out, how does that get
3 translated into non-science and non-regulatory
4 decision-making about "yes" or "no" on facilities, and
5 that kind of thing?

6 MR. ESH: Yes.

7 CHAIRMAN RYAN: So I think there's
8 certainly something to think about there. But having
9 you all think about you can discuss that, at least in
10 part, in your work would be -- or value work. You
11 know, here's the technical part, and here's what we
12 think its best use is -- that's something to think a
13 little bit more about.

14 MR. ESH: I mean our standard is a
15 reasonable assurance that we use in evaluating those
16 sorts of things. So it's not actually --

17 (Simultaneous speaking.)

18 CHAIRMAN RYAN: So what you're saying is
19 it's reasonable assurance in the context of all these
20 things we just talked about.

21 MR. ESH: It's not absolute proof. There
22 are lots of things that go into it. You know, I could
23 envision as a regulator that somebody gives me an
24 analysis that way below the limit, and I can't find a
25 reasonable assurance with it because of technical

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1 things one through 72 step into that were deficient in
2 the analysis that they did.

3 CHAIRMAN RYAN: Right.

4 MR. ESH: Likewise, I could find that
5 somebody that might estimate something right at the
6 limit, or maybe the above, that I can say, all things
7 considered, they have a lot of conservatism in their
8 analysis for this, that, and the other thing that I
9 could easily argue for and justify that maybe supports
10 a decision-making.

11 CHAIRMAN RYAN: Well, that kind of
12 presence of certainty or uncertainty and how you deal
13 with it as a regulator in getting it into the
14 documentation would be very, very helpful.

15 MR. ESH: Decision-makers are really
16 uncomfortable with uncertainty. So they do not like
17 it and they don't want it. 'Tell me what the number
18 is.' For fans of The Office, it's it's like --

19 CHAIRMAN RYAN: Well, no, I'm not saying,
20 in the regulation or requirement. I'm saying that
21 when you make a decision about it, the decision might
22 have an analysis or a thought process about
23 uncertainty, but you're going to say yes or no at the
24 end of the day, and you're going to base it on this
25 kind of thinking and analysis.

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1 I think that getting insights as to how
2 the material will be used and judged is a helpful
3 thing to try to figure out how to write it down.

4 MR. ESH: The modeling and analysis
5 provides input to the decision, but it does not make
6 the decision.

7 CHAIRMAN RYAN: Right.

8 MR. ESH: There's a whole bunch of things
9 that go into the decision, especially in low-level
10 waste regulation. There is defense-in-depth there.

11 So all the waste characteristics of
12 limiting certain things that can go into the facility,
13 that's a defense in depth. You know, is it smart to
14 put chelating agents in the disposal facility?
15 Probably not. Is it smart to put a lot of liquids in
16 the facility? Probably not. So there's all these
17 things that go into providing a defense in depth, of
18 which the analysis is one of them.

19 But the analysis, in our opinion, has to
20 look at the problem. In some cases, based on done
21 changes to the inventory over time, that problem is
22 different than when it was in 1982. So the
23 requirements need to be aligned with the types of
24 materials that are going to be disposed of.

25 And on the bottom part of slide 16 -- just

1 a couple more points -- for the WCS facility and the
2 projected time of the peak dose for the more mobile
3 radionuclides, the first radionuclide to show up
4 was at 30,000 years or greater than 30,000 years. So
5 based on the direction in your letter, should they be
6 doing a 30,000-year analysis? And should some other
7 facility, if their first isotope shows up at 50 years,
8 be doing a 50-year analysis?

9 And if, in fact, you did that, what sort
10 of unintended consequences and disincentives would
11 result in the system?

12 And that's what I'm going to talk about on
13 the next slide.

14 CHAIRMAN RYAN: Okay.

15 MR. ESH: Slide 17, Site-Specific Analysis
16 Time Frames, the disposal practices and selection of
17 sites -- so licensees are for-profit entities. And of
18 course, they're stewards of the environment. People
19 laugh at me for saying that, but I think most people
20 have good intentions. They want to do the right
21 thing. They have people that live in those
22 communities. They aren't out just to make a buck.
23 But they are for-profit entities.

24 So, if you're going to maintain to me that
25 it's much more difficult and expensive to do this

1 longer analysis as opposed to a shorter analysis, then
2 why wouldn't they pick a site and design that would
3 allow them to do the short analysis?

4 Then likewise, how does that ensure, from
5 a national standpoint, that our regulations and
6 policies are having people do the right thing from a
7 waste management perspective? I don't think the
8 Committee would disagree with us that they should pick
9 as good of sites as possible and do as good of
10 engineering as possible.

11 Some of those may have very long time
12 frames that they are able to defer the risk to, to and
13 reduce the risk to, and some may have less. But the
14 overall requirement should make sure that people are
15 trying to operate with that mindset of, have I
16 demonstrated that I picked a good site? Have I put in
17 as much engineering as practical, not being overly
18 burdensome and expensive, and show that I met the
19 criteria? That's kind of a fundamental policy
20 approach that we have in our mind that probably we'd
21 run into with doing the site-specific approach.

22 We think that defining a number and having
23 everybody work from that number, allowing them to
24 scale their analyses or the sophistication of their
25 analyses, based on the risk of their problem, is a

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1 much cleaner, smarter way to go, all things
2 considered. Because, we have some people, licensees,
3 in agreement states that are much more sophisticated
4 than others, and we have to take that into
5 consideration when we develop our requirements.

6 We do think that the Commission policy
7 regarding stability in waste isolation, you know, they
8 basically say, keep the material stable for as long as
9 you need to. And if you went to the site-specific
10 approach, then why would people have an incentive to
11 try to do that?

12 The reality is, if you said, I put my
13 material in a site which was very unstable, which
14 allows me to analyze for shorter period of time --
15 say, as a practical example, the state-licensed and
16 NRC-licensed disposal areas at West Valley is not an
17 ideal location for a disposal facility.

18 But in fact, that was a decision that was
19 made many decades ago, and now it's considered as part
20 of the scope of the decommissioning process of that
21 site. Who knows what the eventual disposition will
22 be. But why wouldn't you pick a site like that as
23 opposed to, you know, the NTS in Nevada, which might
24 be stable for hundreds of thousands or millions of
25 years from a geomorphic standpoint? There would be a

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1 disincentive to maybe not doing the right thing from
2 the requirements.

3 I'm not necessarily saying it would
4 happen, but we think the requirements should be
5 aligned with the incentives we want people to choose,
6 and those would be things like choosing to the sites,
7 having stability for as long as possible, consistency
8 with the international approaches, and so on and so
9 forth.

10 So that's pretty much it for me if we want
11 a break time.

12 CHAIRMAN RYAN: Yes.

13 Let's go ahead and take a 15-minute break
14 and come back at 11:00 for the last hour.

15 (Whereupon, the above-titled meeting went
16 off the record at 10:41 a.m. and reconvened at 11:00
17 a.m.)

18 CHAIRMAN RYAN: Okay, we'll come back to
19 order, please.

20 I've been advised that sometimes, from the
21 table, it's hard for folks in the back to hear us. So
22 maybe it's just us facing you that it's hard. So
23 we'll speak a little louder. Maybe we can be mindful
24 to speak up a little bit.

25 So, back to you, David. Or, Christopher?

1 MR. GROSSMAN: I've got this one.

2 STAFF EFFORTS TO REVISE PART 61:

3 SITE-SPECIFIC LOW-LEVEL

4 WASTE TECHNICAL ANALYSES

5 CHRIS GROSSMAN, NRC STAFF

6 MR. GROSSMAN: I'm Chris Grossman, with
7 the NRC staff, so I'll be covering the rest of this
8 presentation on the technical topics.

9 The Commission's direction last year gave
10 us or items, which Mike previewed earlier today and
11 Dave has covered, the time frame part of that
12 direction, and so I'll cover two of the remaining
13 three. The compatibility, we don't plan to talk to in
14 great detail today. It's a fairly simple issue.

15 So the two that I'll be talking about our
16 flexibility to use the latest ICRP dose methodologies
17 in the PA and then flexibility for site-specific waste
18 acceptance criteria. So we'll start with the
19 dosimetry part.

20 Slide 19.

21 Just to reiterate, the Commission directed
22 the staff to weigh the pros and cons of allowing the
23 licensees the flexibility to use ICRP dose
24 methodologies in a site-specific PA. We won't spend
25 a lot of time on that flight.


1 Slide 20.

2 Just to give you a little context, that we
3 weren't sure of the familiarity level with Part 61 and
4 the different methodologies, so just to kind of set
5 the stage, NRC regulations are based on or derived
6 from varying ICRP methodologies over years. Part 61,
7 I think, may be the oldest methodology that draws.
8 And then it draws from ICRP 2, which is from the late
9 1950s, early 1960s. That was an organ dose approach.

10 ICRP's recommendations have been updated
11 significantly since then. There was a major revision
12 in the 1970s for 26.30, which largely formed the basis
13 for Part 20 as well as Part 60, which some of those
14 were pulled forward into Part 20 as well.

15 And then the most recent recommendations
16 were issued in 2007 in ICRP 103.

17 So, again, you --

18  CHAIRMAN RYAN: Again, which have not been
19 adopted in any regulation at this point; correct?

20 MR. GROSSMAN: That's correct. That's
21 correct.

22 And ICRP 103, it's my understanding -- and
23 I haven't gotten the most up-to-date -- but in terms
24 of what we would use in the analyses, the dose
25 conversion factors, those numbers have not been

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1 developed for that yet. So ICRP 68/72 are the latest
2 dose conversion factors that would be available.

3 The other thing to note on this slide is
4 that Commission policy in SRM SECY-01-0148 allows for
5 exemptions for current models on a case-by-case basis.
6 So that is a possibility.

7 MEMBER ARMIJO: So somebody could use the
8 ICRP 103.

9 MR. GROSSMAN: Well, practically, no,
10 because the conversion factors have not been developed
11 yet. So the latest that would be available would be
12 68/72. When must become available, we anticipate
13 roughly a 2014, 2015 timeframe for those numbers.
14 Then that possibility would be available on a case-by-
15 case basis.

16 CHAIRMAN RYAN: Just so it's clear to
17 everybody, you're not showing that fancy bullet for 72
18 in the picture.

19 MR. GROSSMAN: No. The reason for that is
20 the bullets for the recommendations.

21 CHAIRMAN RYAN: Yeah.

22 MR. GROSSMAN: The parameters and so forth
23 come in under other ICRP guidance.

24 MEMBER ARMIJO: In between --

25 (Simultaneous speaking.)

1 CHAIRMAN RYAN: -- Document 72 actually
2 augments 60.

3 MR. GROSSMAN: Thank you, Mike. I
4 appreciate that.

5 MEMBER ARMIJO: Okay, and that is what can
6 be used under the --

7 CHAIRMAN RYAN: This is where the dose
8 factors are. That's the basis for the dose factors.

9 MEMBER ARMIJO: Okay, got it.

10 CHAIRMAN RYAN: So that's correct.

11 MR. GROSSMAN: Sorry about that. Okay.

12 Slide 21, then.

13 In analyzing this to present a proposal to
14 the Commission, we considered, obviously, Commission
15 direction. We also looked at the different
16 methodologies and how the updates had provided a more
17 realistic evaluation of radiation risks from what is
18 currently used in Part 61, which would be the organ
19 doses.

20 The methodologies account for the radio
21 sensitivity of the organ. That's something that
22 wasn't incorporated and ICRP 2, and thus, Part 61.
23 And they consider a wider range of organ and issues.

24 The other thing that we considered was
25 public feedback, and I'll go into some of that in a

1 little more detail in the following slides.

2 MEMBER SKILLMAN: Chris?

3 MR. GROSSMAN: Yes?

4 MEMBER SKILLMAN: When you identify in the
5 first bullet, under the second big bullet, "holistic,"
6 do you mean thorough?

7 MR. GROSSMAN: Holistic in the sense that
8 you're looking at kind of the whole body, so the
9 different organs are weighted in that system. And
10 then you take an aggregation of that risk.

11 The methodology used in Part 61 would be
12 more, if you look at target organs in each case and
13 there's no weighting by the radio sensitivity of the
14 organ and so forth.

15 MR. McKENNEY: Basically, it's from a
16 holistic point of view. For optimization in ALARA,
17 you can make a consideration of comparing because one
18 radionuclide would focus on certain organs and another
19 radionuclide would focus on other organs. So what is
20 a 20-millirem dose to the lung versus 30 to the
21 kidneys? What is more important?

22 The ICRP methodologies, from 26 on, were
23 able to take the radio sensitivity of each organ and
24 say, what is 20 millirem to that organ, and associate
25 it into cancer risks long term, versus being fully

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1 exposed to the whole body the same amount of those?

2 So, each organ has a different radio
3 sensitivity, so that gets taken into account.
4 Therefore, you're allowed to holistically evaluate.
5 When you have a mix of different radionuclides, you
6 can look at different things. If you were to control
7 these radionuclides, would you reduce the risk, or
8 would you just have an exchange because a different
9 radionuclide is now being realized.

10 MEMBER ARMIJO: Is it fair to say that the
11 new ICRP dose recommendations would be, are more
12 restrictive in that the --

13 MR. MCKENNEY: No. No, it is not.

14 MEMBER ARMIJO: That is not correct.

15 MR. MCKENNEY: No, because they take into
16 account the latest understandings of how the elements
17 move through the body, and with the latest age-based
18 models associated with it, and include the latest
19 updates on the risk associated with all that stuff.
20 So actually, they tend to get better.

21 Now, on a radionuclide-by-radionuclide
22 basis, the allowable intake in picocuries per year to
23 a certain dose may change, and some go up and some go
24 down as the science changes, but it's not getting more
25 restrictive. In the old system, it actually was that

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1 way. It was whatever organ got 25 millirem first --

2 MEMBER ARMIJO: That was the end of the
3 line.

4 MR. MCKENNEY: -- was its stop.

5 In the new system, because they are all --
6 almost every organ is, first of all, subfractioned.
7 So you multiply by a fraction for every organ because
8 there is no organ that is as radio sensitive as the
9 entire body. The lung is a multiplier of 12 percent.
10 The breast is 25 percent in the current model. And
11 it's not necessarily as limiting in the system.

12 MR. GROSSMAN: Okay.

13 Slide 22, then.

14 The options that we considered were
15 specifying a specific methodology in the regulation
16 for adopting a neutral stance where we wouldn't
17 specify, and the licensees could elect to use a
18 different methodology or the latest methodology, or to
19 address this in guidance and for the rule to be silent
20 on it.

21 Slide 23.

22 I'll talk a little bit about the public
23 views that were received for the technical basis to
24 the develop the rule.

25 MEMBER ARMIJO: Just to make sure I

1 understand --

2 MR. GROSSMAN: Sure.

3 MEMBER ARMIJO: -- currently, we don't
4 specify a methodology, or we do?

5 MR. GROSSMAN: Well, it's implicit through
6 the dose requirements in 61.41. And so, because of
7 the way -- the dose currently is not a 25-millirem
8 TEDE, although it can be implemented that way if the
9 dose is actually -- I don't remember the specifics
10 from the regulation. It's 25-75-25.

11 MR. McKENNEY: It's 25 millirem, full
12 body; 25 millirem, any other organ; and 75 millirem
13 for thyroid.

14 MR. GROSSMAN: Right.

15 MR. McKENNEY: And because it's listed out
16 by organ, that tells you that it's an ICRP-2
17 methodology system and that you should be using that
18 methodology with those dose limits.

19 There's a similar issue in Appendix I of
20 Part 50. It has similar language, and of course, the
21 Commission just ruled, told the staff this last year
22 that they should go forward with updating Appendix I,
23 and also Part 20, to the latest recommendations to
24 that.

25 MEMBER ARMIJO: Okay.

1 MR. GROSSMAN: So back on slide 23, we
2 received both supportive and critical views. I think,
3 in this case, most of the views were supportive of the
4 approach, reflecting that it would be using the latest
5 science.

6 Specifically, some of the views were mixed
7 between whether we should allow flexibility for the
8 licensees to elect the latest methodology versus
9 directly citing it in the regulation, which would tie
10 it then to a methodology. We received comments, I
11 think, on both sides of that.

12 And then there was also a comment to
13 periodically revisit this in the PAs, and this was all
14 the DOE's approach for PA maintenance, where they come
15 back, and if new information becomes available, say,
16 on a five- to ten-year basis, they would reconsider
17 the analyses using the latest methodology.

18 The critical comment we received largely
19 was around the safety significance in removing the
20 critical organ limits. They thought that was more
21 conservative approach and, therefore, should be
22 retained, than some of the more modern methodologies.

23 Slide 24.

24 The staff's proposal was to adopt a
25 neutral approach. We felt this was consistent with

1 Commission direction through some of the policies. It
2 allowed exemption on a case-by-case basis. It allowed
3 for use of current science. There is a precedent in
4 Part 63 to using more recent methodology.

5 Part 63, for those of you who may not be
6 familiar, is the regulation for the disposal at Yucca
7 Mountain. And also, we felt it would help minimize
8 future revisions to Part 61. So, by not tying it to
9 a specific methodology, there was flexibility for the
10 future. One of the underlying goals in all of these
11 changes was, how do we avoid tinkering with the rule
12 nonstop in the future?

13 So that's all I have on the dosimetry
14 part. If there any questions, we can take them at
15 this time, or I can move forward to the waste
16 acceptance.

17 MEMBER ARMIJO: Just on the issue of the
18 public view that the safety significance of removing
19 the critical organ limits was in the wrong direction
20 and being less conservative, how much merit does that
21 argument have? It will be less conservative, but the
22 question is, is it safe?

23 MR. GROSSMAN: Right. I think, in some
24 cases, it would be more conservative; in some cases,
25 it wouldn't be as conservative. So that argument is

1 a little mixed, in reality.

2 And I think, as a society, we've learned
3 quite a bit about how radionuclides move through the
4 body, and I think the staff's position is that to
5 ignore that information and to use some of the more
6 modern methodologies would be bad science.

7 CHAIRMAN RYAN: Okay.

8 MR. GROSSMAN: So that's all we would move
9 forward with, the neutral approach as a proposal.

10 The next topic then is waste acceptance,
11 and it will be a similar format to the last one. The
12 Commission's direction was to weigh the pros and cons
13 of allowing flexibility for disposal facilities to
14 establish site-specific waste acceptance criteria
15 based on the results of the PA and intruder
16 assessment.

17 Slide 27.

18 I'll walk through a little bit of what
19 Part 61 is today in terms of waste acceptance. We
20 don't use that terminology in Part 61 explicitly, but
21 it's there through the requirements. So I'll kind of
22 point out how the waste acceptance is in the
23 regulation today, to bring everyone kind of up to the
24 same page.

25 You'll see it largely through three

1 sections of regulation -- 61.55 deals with
2 classification scheme, or system; 61.56 are the
3 requirements on waste characteristics and waste forms,
4 and then 61.68 is a provision that allows, on case-by-
5 case basis, alternative classification and
6 characteristic requirements. So licensees could come
7 in and request an alternative scheme to what is in
8 61.55 and 56.

9 Fifty-five lays out the concentration
10 limits for the different classes of low-level waste.
11 So there are three classes and then, by default,
12 because low-level waste is defined by what it is not
13 -- there's also actually a fourth class that would be
14 a greater than Class C, which falls into low-level
15 waste but is generally not acceptable for near-surface
16 disposal.

17 As Dave mentioned, one thing to note with
18 the waste classification system is that it does not
19 ensure protection of the public via the 61.13 analysis
20 for 61.41, which is the offsite releases, so there
21 needs to be an analysis, and the rule recognizes an
22 analysis to evaluate that.

23 On slide 28, this is just a snippet from
24 61.55. We have two tables there. There's a long-
25 lived table, Table 1, and a short-lived table, so they

1 consider both long-lived and short-lived
2 radionuclides. And I'll talk a little bit more about
3 how these numbers were derived from the environmental
4 impact statement in the early 1980s.

5 The thing that's not on this slide is
6 there is what I'll term an escape hatch. There's
7 section of the rule or a statement in the rule that
8 says, basically, if they're not in the tables, they're
9 Class A by default, and this is kind of a tie back to
10 the estimate of the inventories that were assumed for
11 the original analysis. And you can begin seeing how
12 those assumptions are hardwired into the regulation in
13 some instances.

14 CHAIRMAN RYAN: Chris, tell me if I'm
15 wrong, but my recollection is that reactor waste was
16 really where everybody was thinking, or at least fuel
17 fabrication reactor waste. And some of the other uses
18 of radioactive material really were -- I don't want to
19 say "offhandedly assumed," -- but they were assumed to
20 be covered by this blanket. And these are really
21 based on reactor considerations.

22 MR. GROSSMAN: Yeah, there were 36 or 37
23 waste streams.

24 MR. ESH: Thirty-seven.

25 MR. GROSSMAN: Thirty-seven in the end.

1 And they covered the gamut of BWR- and PWR-type
2 wastes, but they also covered institutional wastes
3 from large and small facilities. So I would say those
4 are probably -- I don't know the volume off the top of
5 my head -- but for each of those. They probably
6 dominated the waste streams.

7 CHAIRMAN RYAN: Yeah.

8 MR. GROSSMAN: But there were
9 considerations of other waste streams, as well, that
10 were expected.

11 CHAIRMAN RYAN: There was not a lot of
12 detail analysis as I recall, just sort of, these are
13 covered because these are more important.

14 Okay, thanks.

15 MR. GROSSMAN: Okay.

16 On Slide 29, we'll talk about a little bit
17 about how those tables were derived.

18 They essentially did a reverse calculation
19 using three scenarios.

20 The intruder construction scenario, which
21 is an inadvertent intruder comes on site to build a
22 residence of some sort and begin excavating into the
23 site and removes or exhumes waste, and it's deposited
24 on the surface, and so, during those construction
25 activities, they would be exposed to the waste.

1 There is a variant to that, which is
2 called intruder discovery scenario in which the
3 construction crew, because the waste is in a stable
4 form and it maintains that stability, it's
5 recognizable to the crew, so, as soon as the crew
6 discovers it, they back off and so your exposure
7 durations are much shorter in that case. And that
8 largely, then, forms the limits for Class B waste,
9 which is the first category of stable waste.

10 So Class A would be kind of your unstable
11 waste and then Class B and C would be stable waste.
12 And then C takes it one step further with intruder
13 protections.

14 So they looked at layering of the waste
15 and waste that needed to be placed deeper than was
16 assumed to have some intruder protections, so those
17 wastes then were deemed Class C wastes.

18 The third scenario is called with intruder
19 agriculture.


20 So these three scenarios were used to
21 evaluate radionuclides in those waste streams that
22 were considered and then to come back and calculate
23 what sort of limits we're looking at to meet a 500-
24 millirem dose limit for the intruder.

25 Another big assumption in this, and this,

1 I think, gets to one of the questions we had earlier
2 about the institutional control period. Dave
3 mentioned this and I'll follow up on it.

4 The intent of the rule is that there will
5 be permanent system control, but there's a recognition
6 that after 100 years, we can't guarantee that. So the
7 assumption in the analysis is that after 100 years,
8 the institutional controls are deemed ineffective at
9 limiting access.

10 Then the analysis also recognized a need
11 for certain radionuclides that were likely to be
12 driven by site-specific analysis for water-dependent
13 pathways. That, then, formed the basis for the
14 requirement for 61.13(a) analysis, which is the
15 pathways analysis for an outside receptor.

16  MEMBER SKILLMAN: If the institutional
17 controls were changed from 100 to 200 years or 300
18 years, would that make much of a difference?

19 MR. GROSSMAN: Yes, I think it would,
20 mostly for your short-lived nuclides. So, depending
21 on which way you went, it could have an influence.
22 Like, some comments were on the order of 300 years for
23 an institutional control period. I think at that
24 point, you're probably looking different cesium levels
25 certainly than what we have in the tables today.

1 MEMBER SKILLMAN: Okay.

2 MR. GROSSMAN: So that would be an
3 influence there.

4 CHAIRMAN RYAN: You've got cesium and
5 strontium at 300 years that will pretty much decay a
6 pretty small amounts.

7 MR. GROSSMAN: Yes. Intruder, yes.

8 CHAIRMAN RYAN: And they capture a few
9 more radionuclides with that 300 years.

10 MEMBER SKILLMAN: The reason that I ask is
11 --

12 CHAIRMAN RYAN: It doesn't solve the
13 problem; it makes it smaller.

14 MEMBER SKILLMAN: Yes, that's what I was
15 pointing to when Dave was talking earlier.

16 If there is isn't a case for challenging
17 that 100 years from the perspective of requiring for
18 a site a re-up every 30 years for 60 years something
19 that's in our conscious lifetimes -- you do your
20 driver's license every two years or five years; if you
21 have a concealed weapons permit, I think it's every
22 five years, depending on what state you're in.
23 There are other portions of our existence that require
24 us to show up, sign a paper, have our picture taken,
25 and re-up, whatever it is.

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1 If we think we just let this go for 100
2 years and then all is forgotten, doesn't that make the
3 case for a periodic re-do? One says, I applied for
4 this site use permit, and about every 10 years, I've
5 got to certify I'm still on watch or I've transferred
6 the title for this to this gentleman, something that
7 makes it necessary to keep the institutional memory
8 alive. It seems to me that that's not difficult.

9 CHAIRMAN RYAN: I think the site, at least
10 the sites that I'm familiar with, most of them have an
11 institutional monitoring program that's going to
12 answer your question, I think, over time. It's
13 closed, and then the institutional maintenance and
14 monitoring effort kicks and that's sort of site-
15 specific in the sense that it's tailing that site.
16 But I don't think there's any period during that
17 institutional control where people would just not be
18 knowledgeable about what's going on. At least that's
19 the current scheme I'm familiar with.

20 MR. GROSSMAN: The idea isn't that all is
21 forgotten on purpose after 100 years. This is an
22 assumption that is made for the purposes of
23 establishing concentration limits.

24 MEMBER SKILLMAN: I understand that.

25 CHAIRMAN RYAN: Well, one concept we

1 thought about -- "we," meaning when I was at a site --
2 is that there's no reason to assume that at the end of
3 that first institutional control period, you have to
4 walk away. There may be information that says, well,
5 there's plenty of money in the institutional control
6 fund, and we want to watch these three little things
7 that are going on, and there's no reason you couldn't
8 continue.

9 The way I've always looked at it, and
10 maybe it's wrong, is that the institutional control
11 period is set as the first period. Then, you know,
12 there can be a regulatory decision to decide, well,
13 that's enough or that's not enough, or what do we need
14 to do going forward?

15 MR. WIDMAYER: frankly, the notion was
16 that the maintenance or whatever it is that you were
17 talking about wouldn't be necessary. I was the
18 thinking, was that --

19 MEMBER SKILLMAN: Well, I kind of got
20 back, except if you say that there is a hazard that is
21 not too far after 100 years, whether it's 200 or 300
22 because you want to let the cesium AND the strontium
23 die out, one might say the time to let go of
24 institutional controls is after that time period.

25 CHAIRMAN RYAN: Well, but don't forget,

1 you've got the power of groundwater monitoring,
2 surface water monitoring, erosion monitoring, and
3 every other kind of cutting the grass and everything
4 else under the sun, for a very long period of time.

5 You can make whatever decision you want to
6 make about what to do moving forward from year 100
7 plus zero days into that next period. And it can be
8 everything from nothing to continuing doing the same
9 thing to ramping up and doing something different or
10 any combination thereof.

11 The point is, you would be informed of the
12 information that's been gathered to make a decision
13 that makes sense.

14 MEMBER SKILLMAN: Well, they can establish
15 a comfort level at that time with doing an analysis of
16 100 years with the expectation that the institutional
17 controls would not be lost. That was their thinking.

18 MR. GROSSMAN: I think Chris McKenney
19 wants to add something to this discussion.

20 MR. MCKENNEY: I think we're going off
21 Derek, off Derek, but this is sort of like a defense-
22 in-depth sort of thing, from the concept from the
23 calculation of, you're putting waste in the ground
24 someplace for it to be there over time. And if you do
25 the analysis first, it doesn't give full credit for

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1 these management processes, then again, your decay
2 risk is finite. And in case something actually were
3 to occur, you'd still have some buffer on the risk/

4 There is no intention for somebody to say,
5 it's 100 years; you've got to leave. It's that we
6 wouldn't mind that continuing for a long time, but you
7 don't want to make a decision where, because of what
8 you put in the site, you have to have perfect
9 institutional controls for 300 years.

10 Remember, when we talked about
11 institutional controls in Part 61, we were saying that
12 that has absolutely zero chance for an intrusion event
13 because that is part of the analysis. We don't do a
14 PRA, an analysis of any risk level to the public for
15 intruding onto the site or anything like that during
16 the institutional control period. So, when we talked
17 about action on that, it's all there.

18 This is a completely different assumption,
19 which the Commission had in front of it at the same
20 time, which was versus the standard, do assume
21 perpetual institutional controls. But the Commission
22 chose at the time to go an assumption of being
23 conservative in the first place when you license a
24 facility so that you don't cause the site that you are
25 required to have perfect institutional controls for

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1 very long time.

2 MEMBER SKILLMAN: I understand. Thank
3 you.

4 MR. GROSSMAN: Okay, moving on the slide
5 30.

6 We're still talking about Part 61 today.
7 And so 61.56 deals with waste characteristics and what
8 would be acceptable waste to be received. It defines
9 two large classes, a minimum requirement for all waste
10 that facilitate handling and then afford protection of
11 public health and safety. These would be things like
12 no cardboard boxes; minimize water. I think the
13 chelating agents is on that list. There's a list of
14 best practices, of these kinds of forms should not be
15 accepted for any waste.

16 And then the second class are what I call
17 stability requirements. These are for wastes that
18 need to be stable, so the B and C wastes. They're
19 designed to minimize the water infiltration, which was
20 some of the initial problems that pushed the Part 61
21 forward in the first place is that some of the sites
22 were having trouble with that. And then also, to
23 limit the intruder exposures in the form of
24 recognizable and non-dispersible waste forms.

25 CHAIRMAN RYAN: I think there's one part

1 that we haven't touched on very much, Chris, that fits
2 well in there, and that's engineered features of the
3 disposal system. I mean what comes to my mind is
4 Byerhoff, for example, has very thick slabs of the
5 class B and C cells that have brass plates that say
6 "Radioactive material: do not dig every" -- I forget
7 how many feet.

8 But there's ways to at least push back an
9 intruder.

10 MR. GROSSMAN: You're exactly right.

11 MEMBER ARMIJO: It assumes an intruder can
12 read.

13 MR. GROSSMAN: That's a great segue into
14 slide 31. So, thank you.

15 (Laughter.)

16 MR. GROSSMAN: So one of the things I hope
17 you get out of this -- and this kind of guided our
18 thinking in this waste acceptance area -- is that the
19 classification system is integral to the regulation as
20 it is today, and this graphic here kind of illustrates
21 that, and it gets to one of Dr. Ryan's points: You
22 have ties from classification to -- it's not directly,
23 it's implied throughout the other parts of the
24 regulation through a lot of the other parts of the
25 regulation, and I've listed some of the direct ties

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1 here.

2 Once you define the class of waste, then
3 you have certain characteristics that you need to meet
4 in 61.56. Once you define the classification of the
5 waste, then you have certain segregation requirements.
6 So unstable A waste can't be put in with B and C
7 waste, which needs stability, and so you won't get the
8 infiltration issues or you minimize those. Same thing
9 with intruder barriers.

10 As you'll see with our proposal, this
11 influenced our thinking quite a bit. We tried to
12 minimize tinkering too much with the existing
13 regulation to meet the Commission's direction. We
14 felt that if you did too much with waste
15 classification now, you've blown up a whole rule, and
16 you're maybe starting over from ground zero. So we
17 didn't want to do that, and we didn't feel the Commission
18 was directed to do that.

19 Just to finish out today, there's also
20 waste acceptance guidance, predominantly, in two
21 guidance documents. There's a guidance document on
22 waste form from the early 1980s and then also guidance
23 on concentration averaging, which deals with how you
24 identify what class it's in, and encapsulation. That
25 is currently undergoing revision. I think it may be

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1 Jim Kennedy who's working on that, and Christian
2 Ridge.

3 Is that this summer that we're looking at?

4 MR. KENNEDY: Later this year.

5 MR. GROSSMAN: Later this year, okay.

6 Thank you.

7 Sorry to put him on the spot.

8 Okay, slide 33, then.

9 To analyze the Commission's direction, we
10 looked at the direction and also some domestic and
11 international regulatory approaches as well as the
12 public feedback we received, to derive from options.

13 And on 34, then, I lay out those options
14 for waste acceptance. One was to continue with just
15 the existing waste classification system. One of the
16 things I didn't talk about is 61.58. I mentioned
17 early on as part of the waste acceptance requirements
18 of Part 61. That allows the use of alternative
19 classifications and characteristic requirements. That
20 could be used on a site-by-site basis and so we
21 thought this could be an option, under the
22 Commission's direction still, to allow that
23 flexibility but do it with the existing system
24 unchanged. We looked at that. We received comments
25 to that and as well.

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1 The second option was to replace the
2 classification system with site-specific waste
3 acceptance criteria; so, to abandon the classification
4 system, essentially, and just go site-specific WAG.

5 And the third one was kind of a hybrid
6 approach, which was to maintain the classification
7 system alongside flexibility for site-specific waste
8 acceptance criteria.

9 MEMBER SKILLMAN: From your stakeholders,
10 is there any preference among the three?

11 MR. GROSSMAN: Well, you'll see in the
12 comments -- I'll talk a little bit about that --
13 there's kind of mixed opinion about why and there's
14 lots of reasons why one versus the other, and so
15 forth. And so, if I don't answer your question there
16 --

17 MEMBER SKILLMAN: Okay. Thank you.
18 That's all right. Thank you.

19 MR. GROSSMAN: Bring it back up please.

20 MEMBER ARMIJO: But you kind of keep
21 everybody happy with the third bullet; right?

22 MR. GROSSMAN: Yeah, it's the Three Bears
23 briefing, yeah.

24 (Simultaneous speaking.)

25 MEMBER ARMIJO: Well, hold it. Is there

1 anything technically deficient with option three?

2 MR. GROSSMAN: We don't believe so.

3 That's our proposal to the Commission.

4 MEMBER ARMIJO: Okay.

5 MR. GROSSMAN: You'll see it come forward.

6 Based on our analysis, we don't see anything at this
7 point, but we won't say it isn't.

8 MEMBER ARMIJO: Thank you.

9 MR. GROSSMAN: Some of our goals, then, in
10 selecting one of the options or proposing one of the
11 options to the Commission -- it's theirs to select,
12 ultimately -- was to ensure protection of public
13 health and safety consistent with the mission, look at
14 risk-informed, performance-based regulatory processes
15 to the extent that we can incorporate those, provide
16 flexibility for the WAC, per the Commission's
17 direction -- that's obviously a prime goal here -- and
18 minimize disruptions to the existing framework so that
19 we're not "blowing up" Part 61 and starting over.

20 MEMBER ARMIJO: I just want to make sure
21 that I -- let's assume that the rule gets written and
22 it's got a number of new things in it. Do the
23 existing sites that are currently operational, will
24 they have to comply with this? Will they have to do
25 a re-analysis to be in compliance with the new rule?

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1 Or is there something equivalent to --

2 MR. GROSSMAN: There is, in fact, that, in
3 Part 61. And so the intent is that but all licensees,
4 existing and prospective, would be doing the analyses.
5 They would all have to do them eventually anyway
6 through the closure analysis, but that's the intent of
7 the way our proposal is set forth.

8 MEMBER ARMIJO: So it would impact the
9 existing operating low-level waste facilities, whether
10 they were through an agreement state or under direct
11 NRC control.

12 MR. GROSSMAN: Yes, so the way that would
13 work is, assuming the Commission went forward with the
14 proposal and implemented it, the agreement states
15 would have three years to write conforming
16 regulations. Then there would be some time for the
17 licensees to develop their WAC or whatever, whatever
18 approach they took, as you'll see. I haven't gotten
19 to the approach yet, exactly.

20 But there would be some time for that to
21 happen.

22 CHAIRMAN RYAN: Mike?

23 MR. MCKENNEY: Let the record recognize
24 Larry Camper.

25 MR. CAMPER: Larry Camper, Director of

1 Division Waste Management and Environmental
2 Protection.

3 The simple answer to your question is yes,
4 and it's one year after the state has its implementing
5 regulations in place, but they'll have three years to
6 do that, in terms of our compatibility requirements.
7 But yes, it impacts them all.

8 MR. GROSSMAN: Now, along that line, Mr.
9 Armijo, as we mentioned -- I think Mike may have
10 mentioned earlier in his talk -- most of these sites
11 are actually developing waste acceptance plans, which
12 you'll see -- well, we don't talk to those examples,
13 but we certainly look at those, and we feel they align
14 pretty well with the requirements. So most of the
15 sites would be are going to be a long way to meeting
16 that. And again, some of it depends on which option
17 they select.

18 Okay, moving on to slide 36, here's where
19 I talk about the viewpoints. I've got a slide of
20 viewpoints that are generally supportive of the
21 flexibility for site-specific waste acceptance
22 criteria. And the next slide then talks about
23 critical viewpoints.

24 Stakeholders who were supportive believe
25 that this would allow a recognition of the

1 improvements that have been made in the engineering
2 and site selection and facility design from the
3 environmental impact statement and its assumptions
4 that originally developed the rule.

5 There were some mixed views on the types
6 of scenarios that the public felt should be
7 considered. Some felt that they should be limited to
8 hypothetical scenarios, all of the intruder scenarios
9 that were used in Part 61. And others argued that it
10 should be only site-specific scenarios. So we heard
11 both sides of that -- even if they were supportive of
12 site-specific WAC.

13 There was some concern about abandoning
14 the classification system, and this is a little quirk
15 maybe with US legislation. That long, garbled acronym
16 is the Low-Level Radioactive Policy Amendments Act of
17 1985, and it lays out federal and state
18 responsibilities low-level waste.

19 The quirk here is that it ties the
20 dividing line between federal and state to Part 61.55.
21 It ties it back to a regulation, and that created a
22 little bit of a wrinkle, not necessarily
23 insurmountable if you wanted to move away from the
24 classification system. But we thought it certainly
25 would create confusion if you abandoned the

1 classification system, about whose responsibility is
2 the waste then?

3 We don't think that banning it in the
4 regulation would change the legislation because that's
5 not how things work. But it could lead to some
6 confusion among generators on this, among the disposal
7 sites about that, unless there was some clarity. So
8 we received a lot of comment on that, as a concern
9 about abandoning classification in that option.

10 There were some comments about 61.58 and
11 the case-by-case allowance for alternative
12 requirements. Some of the concerns that we had in
13 that regard were that they may create some
14 transboundary issues, so you might have some different
15 sites operating on different requirements and the
16 implication that might have at a national level for
17 commerce, so to speak, in terms of the movement waste
18 and so forth in the country.

19 And there were some mixed views on the
20 waste acceptability requirements. Some were happy
21 with some of the requirements currently in Part 61,
22 which tend to be a little more prescriptive, like you
23 shall not have waste with a certain amount of liquids,
24 and so forth. And some thought they should be
25 performance-based, where, whatever I can demonstrate,

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1 I'm allowed to do, essentially.

2 So we heard both sides, even if they were
3 supportive, that, in some cases, you might need to
4 keep some of that prescriptiveness, and in some cases,
5 you may need -- some people don't, but that should be
6 opened up for consideration.

7 MEMBER SKILLMAN: Chris, at the next to
8 last bullet, 61.50, transboundary concerns, you
9 mentioned movement of waste in the country. Does that
10 suggest that could be 49 CFR impact, transportation
11 regulations or 10 CFR 71, which is fuel?

12 MR. GROSSMAN: I don't foresee anything to
13 the transportation issue. It's more of you have a
14 kind of a different playing field for different states
15 in terms of -- and the generators in those states --
16 and what can I do with my waste? And so that was kind
17 of the issue, versus having a kind of stable national
18 framework of, I have a consistent requirement across
19 the country, and I know by generate this waste that
20 there is a disposal option at some point for it.

21 MEMBER SKILLMAN: Thank you.

22 MR. GROSSMAN: That's more what the
23 transboundary deals with.

24 MEMBER SKILLMAN: Thank you.

25 MR. GROSSMAN: That's jargon from our

1 compatibility criteria. I apologize for using that.

2 MEMBER SKILLMAN: Okay.

3 MR. GROSSMAN: So slide 37, then, we get
4 into some of the critical viewpoints from people who
5 were generally not supportive. Or, in some cases,
6 they were supportive, but they had some major concerns
7 beyond what I identified previously.

8 Dr. Schultz had a question earlier with
9 Mike about the agreement state comments, and this is
10 an example that I can point to. The first two bullets
11 were specifically agreement state comments.

12 The first bullet was also made by people
13 who were parties outside the agreement states.
14 Basically, this would create a resource burden on the
15 agreement states in the sense that they would have to
16 then evaluate the waste acceptance criteria. It's
17 maybe a more complicated process and involved more
18 resources on their part. That being said, I think,
19 overall, the agreement states were generally
20 supportive of that flexibility, but they wanted to
21 note these concerns.

22 The second was the potential impact on
23 state laws. The example I can give there is from the
24 state of Utah. The state of Utah was concerned about,
25 they have a law on the books about limiting disposal

1 of Class A waste in the state, and they were concerned
2 that this might be an end run around that legislation,
3 so they expressed those concerns as kind of a critical
4 viewpoint here.

5 Some of the other stakeholders expressed
6 concern about the negative effects on public
7 confidence, and this was largely, you know, the public
8 was kind of invested in Part 61. They went through
9 the rulemaking and began to understand how it was
10 developed and so forth. And there's some acceptance
11 of the limits that have been imposed by it and that
12 they were afraid -- I think the sentiment was there
13 was some fear that if you're doing this in each state,
14 it's hard to follow and keep up with, and maybe the
15 amount of public would be not as high as it might have
16 when it's done at the federal level.

17 Some stakeholders expressed viewpoints
18 which have emphasized conservatism rather than
19 maximizing capacity, in their words, and they felt
20 that this was an attempt to maximize the capacity.

21 There were some concerns about perverse
22 economic incentives to maximize capacity at the
23 expense of safety.

24 And then the complexity and lack
25 transparency of the analyses was another comment that

1 we received, and this is related back to that negative
2 effect on public confidence.

3 Some stakeholders viewed these analyses as
4 black boxes, and very complicated and hard to for the
5 average member of the public to follow.

6 Slide 38.

7 Then we get our proposal, so ta-dah.

8 What we've done in the proposal is we
9 replaced 6158, which was the option for alternative
10 classification and characteristic requirements with a
11 waste acceptance criteria section. We felt this would
12 basically obviate a need for those alternatives
13 because it allows the licensee to do this through the
14 rule.

15 There are three components of waste
16 acceptance, the primary one being the criteria -- so,
17 what's acceptable at this disposal facility and how
18 you develop that -- and the second being
19 characterization methods the facilities would need to
20 identify what parameters and what level of uncertainty
21 in characterization would be needed to demonstrate
22 that the criteria are met. A third would be a
23 certification program, basically someone to certify an
24 administrative process that this waste meets the
25 acceptance criteria. The idea would be that this

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1 would apply to all licensees, this we mentioned
2 earlier.

3 We adapted this approach heavily from the
4 Department of Energy's approach in DOE Order 435.1.
5 I think it's a good example of the approach that's
6 been used domestically, so we adopted it where we
7 thought it would be useful and relevant for Part 61.
8 And generally, it's consistent with the international
9 approaches, which vary quite a bit from the current
10 Part 61, where you specify concentration limits to
11 fully site-specific. So it's kind of a Three Bears
12 approach. It certainly fits in that range.

13 Slide 39, I'll go through it quickly. I
14 don't want to take too much time, I've gone on too
15 long already.

16 We reach those three legs of the stool.

17 CHAIRMAN RYAN: I would ask you to just --

18 MR. GROSSMAN: Okay.

19 So, you've got -- this is where
20 flexibility comes in. You've got to approaches. You
21 can rely on the 61.55 concentration limits, or you can
22 develop your WAC from the 61.13 analyses, which are
23 the four analyses, to demonstrate the four performance
24 objectives. You also need to specify acceptable waste
25 form characteristics, container specifications and

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1 restrictions, and prohibitions.

2 Slide 40 gets into the characterization
3 methods, and again, here, identifying parameters and
4 what's the acceptable uncertainty. That section of
5 the regulation also specifies minimum characterization
6 information, such as the dates samples were taken, the
7 weights of samples, those basic things that you have
8 to have.

9 Slide 41, then, talks about the
10 certification program, and these are administrative
11 procedures to ensure that the waste is acceptable. So
12 you're looking at who are the appropriate authorities
13 to certify the waste is acceptable for disposal,
14 identifying any documentation that need to be
15 developed and maintained to support that decision, and
16 then approaches for maintaining certification once the
17 waste has been certified; how do you ensure that, from
18 the time it's shipped to receipt at the disposal
19 facility, that that certification is still intact.

20 Quickly, on slide 42 -- this is my last
21 slide -- this will result in some accommodating
22 changes because we've essentially taken with
23 classification as central to the ruling and made waste
24 acceptance now central to the ruling. Waste
25 classification is a subset of waste exceptions if you

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1 can visualize that.

2 So waste classification has ties around
3 the rules. We needed to generalize those ties, and
4 that's what these largely revolve around, is making it
5 more for the waste acceptance; so, if you chose the
6 61.13 route of developing site-specific WAC, how these
7 parts of the regulation would apply to you in that
8 case.

9 CHAIRMAN RYAN: Any thoughts about moving
10 Appendix G to Part 61?

11 MR. GROSSMAN: Yeah --

12 (Simultaneous speaking.)

13 CHAIRMAN RYAN: -- Part 20.

14 MR. GROSSMAN: We didn't think about that
15 specifically, but there was some thought above, for
16 the approach of abandoning the waste classification
17 system, of potentially putting it there if we too were
18 to abandon, but the proposal wasn't something we were
19 moving forward with necessarily.

20 CHAIRMAN RYAN: It just seems odd that
21 that requirement is holding up our --

22 MR. MCKENNEY: The real reason is that
23 Part 61 applies to the land disposal facility, and
24 that's why it starts, for the purposes as that applies
25 to Part 61, the Part 61 facility, while Appendix G

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1 applies to all people who produce waste.

2 CHAIRMAN RYAN: Right.

3 MR. McKENNEY: So, because Part 20 applies
4 to all licensees. That's why -- and it's all about
5 shipping.

6 So, unless it go put in transportation, it
7 could be put there, but it wouldn't belong in Part 61.

8 CHAIRMAN RYAN: So it really doesn't
9 belong and 61 or 20. Is that what you're telling me?

10 (Laughter.)

11 CHAIRMAN RYAN: It's fine where it is, but
12 it's just kind of a --

13 MR. GROSSMAN: We figured that was beyond
14 the scope of limited --

15 CHAIRMAN RYAN: Okay.

16 MR. GROSSMAN: So that's all I have.

17 Are there any questions?

18 CHAIRMAN RYAN: Thanks, Chris. That was
19 a good presentation.

20 MR. GROSSMAN: Dr. Ryan, in Andrew's
21 presentation, he's actually going to go through those
22 changes in the rulemaking language. Do you want to
23 skip that?

24 CHAIRMAN RYAN: I want to let Andrew to
25 have some time to make his comments.

1 MR. CARRERA: I can make a really quick.

2 STAFF EFFORTS TO REVISE PART 61:

3 TIME LINE

4 ANDREW CARRERA, NRC STAFF

5 MR. CARRERA: Thank you, Dr. Ryan, ACRS
6 members. My name is Andrew Carrera, and I'm the
7 project manager for the Part 61 rulemaking. And
8 naturally, as a PM, none of my team members likes me,
9 so they only gave me five minutes to cover what is
10 here.

11 (Laughter.)

12 MR. GROSSMAN: I tried to give you zero.

13 (Laughter.)

14 MR. CARRERA: And, you know, the committee
15 asked me to cover my materials up to December 2012.
16 So my goal is to provide you with a high level of
17 awareness of the proposed ruling which will be put
18 out. And in June's meeting, will go into the weeds of
19 how we adjusted this language based on stakeholders'
20 comments.

21 So we received the request from the
22 Commission to proceed forward with the proposed
23 rulemaking, and the staff revised the regulatory basis
24 document to support the rulemaking. A team of
25 multidisciplinary staff was assembled, composed of

1 representatives, obviously, from across the NRC as
2 well as the representative from the agreement states,
3 Mark Yeager, who is from South Carolina.

4 The rulemaking team developed the purpose
5 of the rule, and that's to specify site-specific
6 technical analysis requirements, permit development of
7 criteria of waste disposal, as Chris just covered, and
8 better align the requirements with current health and
9 safety standards.

10 We developed the preliminary proposed
11 rule, which was published on regulations.gov for
12 public comments in December 2012.

13 And slide number four is a summary of the
14 centerpiece of this language. It contains site-
15 specific analysis of requirements for performance
16 assessment, intruder assessment, long-term analysis,
17 but it's also performance period analysis and updated
18 technical analysis.

19 The staff is also proposing waste
20 acceptance, which Chris just covered.

21 The staff also proposed other supporting
22 changes to facilitate the implementation of proposed
23 requirement, adding new definitions in concept to
24 Appendix G, which is 10 CFR Part 20, and also allow
25 the use of up-to-date ICRP recommendations.

1 So I'll quickly go over the actual ruling,
2 which is offered as 61.41. This is a current
3 regulation, and we're proposing to revise it to
4 incorporate the time components into this layer of
5 this section, the compliance period and the
6 performance period. The compliance period would be
7 covered in revised 61.40 1(a), which points back to
8 the performance assessment requirement and 61.13(a)
9 instead of (b).

10 The second part of 61.41 is proposed to be
11 (b), which we added, a long-term performance analysis
12 which has -- we proposed ALARA's lowest achievable
13 metrics to dose analysis.

14 Section 61.42, protection of inadvertent
15 intruder -- similarly, we proposed, we wanted to
16 incorporate the time components into this section.

17 Section 61.42(a), we've pulled the 500-
18 millirem dose limit out of the table and we put it
19 into this section.

20 Section 61.42(b) -- similarly, we have a
21 performance assessment requirement with an ALARA
22 metric associated to it.

23 The long-term analysis or performance
24 period analysis -- this analysis applies only to land
25 disposal facilities that have long-lived wastes that

1 contain alpha-emitting radionuclides with average
2 concentrations exceeding 10 per gram, a radionuclide
3 with average concentration exceeding one tenth value,
4 at table 1, as necessitated by site-specific
5 conditions.

6 Slide number eight, waste acceptance --
7 I'll skip that. It was covered in greater detail
8 previously.

9 Slide number nine, contents of application
10 for closure -- well, currently, we don't have the
11 requirement to do all these internal analysis of
12 exposure, and we'd like to have that incorporated into
13 the revised analysis, into application proposal.

14 Slide nine -- this is my last slide. We
15 also proposed other changes, supporting changes, and
16 new definition, concentrated intruder assessment, low-
17 risk waste, et cetera. And also, in Appendix G for 10
18 CFR Part 20, we also propose a revision to Section 2
19 and Section 3 of that appendix.

20 And that's all I have.

21 CHAIRMAN RYAN: Good.

22 Any questions for Andy?

23 (No response.)

24 MR. CARRERA: The final piece -- I hope so
25 far, we've answered some of your questions that you

1 had earlier.

2 CHAIRMAN RYAN: Yes. You have.

3 MR. CARRERA: Good. It's been a very
4 informative discussion. We appreciate your time.

5 Looking forward, we're scheduled to have
6 one more subcommittee discussion in June.

7 CHAIRMAN RYAN: Yes.

8 MR. CARRERA: And we'll close the loop
9 with you on the remaining, the rest of the story as
10 votes have developed, and then full committee of ACRS
11 in July.

12 CHAIRMAN RYAN: Okay. ACRS.

13 MR. CARRERA: Maybe it leads to a letter.
14 That's up to you guys to decide.

15 CHAIRMAN RYAN: I would say --

16 (Simultaneous speaking.)

17 MR. CARRERA: Okay. And in July, same
18 month, we'll probably submit to the Commission the
19 proposed rule for its consideration.

20 If the Commission approves, we will issue
21 for public comment, in the Federal Register notice and
22 all that, later in calendar year 2013. Early in 2014,
23 we'll have public interactions on receiving comments,
24 which will finally lead, finally, to a final
25 rulemaking by end of 2014.

1 CHAIRMAN RYAN: Just so you're familiar
2 with our procedure -- I'm sure you are -- we have a
3 meeting in July. We will be preparing the letter at
4 that July full committee meeting.

5 MR. CARRERA: Yes.

6 CHAIRMAN RYAN: So that will be concurrent
7 with that week.

8 MR. CARRERA: Yes. Right.

9 Well, thank you very much.

10 CHAIRMAN RYAN: Thank you.

11 Thank you all. Look at a few minutes for
12 any questions.

13 Steve?

14 MEMBER SCHULTZ: No questions, just a
15 comment. From what I've heard today, the work was
16 done to try to get engagement with, with the agreement
17 states, especially the sited agreement states, but
18 there was not a huge response to date, in 2012 at
19 least. Perhaps there's been more information that's
20 been developed in 2013 that we can talk about in June.

21 Silence doesn't mean agreement to the
22 proposals. I still feel there might be a lot of
23 concern among the agreement states related to the
24 proposal, so I hope that engagement is continuing to
25 see how that information might be developed.

1 Then again, maybe we'll hear it. Maybe
2 you've got more information that your present in June,
3 and we'll look forward to hearing that.

4 MR. LEE: This is Mike Lee of the staff.

5 We understand from past experience, the
6 agreement states usually wind up becoming more vocal,
7 the closer we get to issuing rulemaking for public
8 comment.

9 MEMBER SCHULTZ: That's what I expect.

10 MR. LEE: We've already begun to hear from
11 some of them. So silence is not intended as implied
12 consent, and we expect to hear a lot from them in the
13 near future.

14 MR. ESH: And I would even say -- this is
15 Dave Esh -- I would even say that silence is a
16 mischaracterization.

17 MR. LEE: Yes.

18 MR. ESH: So we have received feedback
19 from agreement states. The problem is this process
20 has been pretty long with lots of steps. So we've
21 heard from them at different steps, so it depends on
22 which step of the process, what we may have heard.

23 In the areas I'm responsible for, they've
24 given some very good feedback that in some cases has
25 caused us to change rule language and things like

1 that. So with the agreement-state regulators, it's
2 not like they've been unresponsive, but they are
3 selectively responsive. But their feedback has been
4 good.

5 MEMBER SCHULTZ: That's important.

6 CHAIRMAN RYAN: Real quickly, I'd add,
7 Steve, just as an example of the low-level waste
8 forum, which met in Charleston, South Carolina just a
9 week ago, and had a very good participation by the NRC
10 staff. And that's, you know, really the state
11 representatives who were there at that meeting. So
12 that was a very positive interaction.

13 MEMBER SCHULTZ: Okay.

14 CHAIRMAN RYAN: It's right along the lines
15 that you were asking about.

16 MEMBER SCHULTZ: For this year's meeting.


17 CHAIRMAN RYAN: Low-Level Waste Forum
18 Meeting.

19 MEMBER SCHULTZ: Good. That's important,
20 especially in the area that you've described, that
21 you're getting feedback specifically on that, and I
22 appreciate this. That, I'm sure, has been helpful for
23 you.

24 That's all I have.

25 CHAIRMAN RYAN: Okay.

1 Let's see; Sam?

2  MEMBER ARMIJO: Yes. I just wanted to ask
3 -- and maybe it's in the rule the way you've got it
4 structured -- is there any way to separate depleted
5 uranium from low-level waste in this rule in such a
6 way that -- it seems to me it's confusing everything,
7 and it appears to put requirements on the whole
8 community when it's a very special type of waste,
9 especially for this long-life issue.

10 Is there, in the regulations that you're
11 currently writing, is there a way to separate that and
12 make that a special case? And if you don't have, do
13 you -- or if you have it in just one location in your
14 facility, you could treat it in a very different way
15 and assess it in a very different way and the rest?
16 Is that built into your regulations, or is that your
17 intent?

18 MR. ESH: This is Dave Esh.

19 At this point in time, we didn't intend
20 that. As I explained in our presentation, we
21 considered it. The feedback from stakeholders was,
22 don't do that.

23 MEMBER ARMIJO: Why?

24 MR. ESH: Because, they basically said,
25 you may have new waste streams in the future that look

1 and smell similar to this waste stream, that if you
2 want to get some stability to the regulatory
3 environment with requirements that are going to be
4 able to take any waste stream that may have those
5 sorts of characteristics, and have the analysis done
6 for them.

7 And as I sat in my talk, sure, depleted
8 uranium is a much bigger step technically than
9 traditional low-level waste, but you still have this
10 issue with traditional low-level waste as to how much
11 long-lived radioactivity is in it, and is it safe or
12 not? That still applies, whether it's traditional
13 low-level waste or depleted uranium.

14 MEMBER ARMIJO: Right.

15 MR. ESH: The other issue that you'd run
16 into if you tried to specify something for depleted
17 uranium is something Dr. Ryan has talked about many
18 times in the past, and I agree with him
19 wholeheartedly, which is quantity matters.

20 People focus on concentrations. But, say,
21 I want to take 1,000 pounds of DU counterweights.
22 Well, I'd have to be really careful about how I wrote
23 that DU rule, so to speak, or DU requirements that
24 from a risk perspective, I wasn't drawing people into
25 it that I don't intend.

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1 MEMBER ARMIJO: Yeah.

2 MR. ESH: And all those things considered,
3 we reviewed it and said, look, the issue is probably
4 better handled by putting in the requirements that
5 apply for the traditional low-level waste that might
6 have long-lived radioactivity for the depleted uranium
7 and then explain very clearly in our guidance document
8 how people should be smart about how they do these
9 analyses and justify their analyses.

10 It's not like in some cases, you might
11 need a primary school analysis for your site. And in
12 other cases, you might need the equivalent of the PhD
13 analysis. You know, you have to structure what you
14 need for the problem, and we think specifying the
15 requirements that capture all of those but then
16 allowing some people the flexibility in what they do
17 to show how they meet them is probably the right way
18 to go.

19 MEMBER ARMIJO: And quantity being one of
20 the things that would scream out.

21 MR. ESH: Quantity being one of those
22 things. So, if I'm a licensee and I say, look, I have
23 long-lived isotopes, but I only have this amount, and
24 it's limited to these quantities and concentrations,
25 my problem is much problem is much simpler than the

1 guy over here who really wants to take a lot of long-
2 lived waste.

3 CHAIRMAN RYAN: And I guess, David, I may
4 have put words in your mouth. It's much easier to
5 revise guidance or amend guidance than it is to revise
6 or amend a rule. We can handle those case issues, I
7 think, more straightforwardly than you could by trying
8 to make a comprehensive rule. Is that right?

9 MR. ESH: Yes. And I'm excited that we
10 did not even intend to -- we need to make requirements
11 that we believe are adequately protective for any low-
12 level waste that people want to dispose of. But if
13 you made a special rule for depleted uranium, you
14 might do some things different than we have in this
15 regulation because we can be more specific for that
16 particular problem. So depleted uranium is unique in
17 that you get this radon problem over time, and the
18 radon problem can be pretty lard.

19 So, in our home, many of us deal with
20 radon in our homes, and it's driven by concentrations
21 in the environment surrounding our homes. It's many,
22 many orders of magnitude lower than what you have
23 here.

24 Mike likes to bring up the example of the
25 Fernald facility, where they disposed of some radium-

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1 and thorium-based waste in the silos there. And
2 they're estimated to have created some pretty large
3 doses some pretty large distances away from the
4 facilities before remedial action were put into place.
5 We have to deal with those sorts in the rulemaking
6 process, too.

7 I understand the comment. We did think it
8 through thoroughly, and we think this is the best
9 approach to go with.

10 CHAIRMAN RYAN: Dick.

11 MEMBER SKILLMAN: Four comments:

12 First, excellent presentation -- thank you
13 for a very thorough and comprehensive presentation
14 today.

15 Second, I'm with Dr. Armijo on DU. I've
16 spent time at two field plants, and I see that forest
17 of exit containers setting on the back lot. And I'm
18 not talking hundreds; I'm talking thousands. And I
19 know that for the LES application, the greatest
20 concern by the public was, what's going to happen to
21 all that stuff? That's what we're talking about here.

22 So it seems to me that the magnitude, in
23 terms of kilograms of waste and curies of waste,
24 deserves its own treatment. And if that were
25 extracted from 61 through its own rule or its own

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1 portion, then maybe some of the other issues that
2 you're dealing with would not be as complex. So it
3 seems to me that there may be some value to
4 considering that.

5 I have a difficult time grasping an
6 intruder at 10,000 or 5,000 years. I really don't
7 know what I'll be doing the day after tomorrow, or I
8 think I know. I'm not trying to be facetious. It
9 just seems like that is such an extension of our
10 thinking that we may be on thin ice, and I don't know
11 how to resolve that really, but it certainly causes me
12 pause.

13 And finally, I want to thank Derek for
14 doing a very good job in dealing with SR homework
15 packages and reading materials.

16 MR. WIDMAYER: I'm going to write that
17 down.

18 (Laughter.)

19 MEMBER SKILLMAN: Because you really did
20 get us prepared.

21 MR. WIDMAYER: Thank you.

22 MEMBER SKILLMAN: And I thank you.

23 MEMBER ARMIJO: I just want to go back.

24 I may have --

25 (Simultaneous speaking.)

1 MEMBER ARMIJO: -- bridge line.

2 MEMBER SKILLMAN: I really thought you
3 guys did a really good job.

4 → MEMBER ARMIJO: I did, too. I think
5 intruders as archeologists or grave robbers. That's
6 what got to the pyramids. This is sort of our
7 pyramid. And I really couldn't care less about what
8 happens to those guys. But I don't have a problem
9 with an assessment of an intrusion event, albeit
10 unlikely.

11 But to kind of put flesh and bones on an
12 intruder, a human being or group of human beings, far
13 out into the future, it gets so artificial that I just
14 can't accept it. Whereas, in today's world, we say
15 this is how we're going to assess this site, we're
16 going to just assume there's an intrusion event, and
17 what would happen? A what-if. That, I could live
18 with. I mean, you put in some conservatisms, and
19 you're done with it.

20 And I got the impression that's what you
21 actually are thinking about; I'm not sure. Maybe it's
22 semantics.

23 CHAIRMAN RYAN: Maybe it's a
24 recommendation.

25 MEMBER ARMIJO: Maybe the label is

1 intrusion assessment rather than intruder protection.
2 It gets across the reality of what you're doing as
3 opposed to someone in the public saying, this stuff is
4 so dangerous that we have to worry about human beings
5 somehow wandering onto this area and getting harmed,
6 and it's so unrealistic, so unlikely, and everything
7 else.

8 But as a conservative engineer, you do an
9 assessment of a what-if in the licensing process, you
10 put it to bed, and you're done with it.

11 MR. LEE: The NRC deserves credit for
12 first introducing the intruder analysis to the waste
13 management community, so I think it would be hard for
14 us to walk away from it right now because, again, it
15 represents an acute situation.

16 We're looking at way to try to make it
17 more realistic. With that being said, we were kind of
18 --

19 MEMBER ARMIJO: But it's clearly a policy
20 issue. I just think it's language in your rule that
21 will make a big difference in the way that it's
22 perceive, even though you do nothing different.

23 MR. LEE: Yeah, and segueing into the
24 policy issue, again, the direction from the staff was
25 to try to come up -- the staff was to develop a

1 regulation that is a one-size-fits-all. We weren't
2 given a direction to develop a DU-specific rule, even
3 though that might in some quarters be viewed as a
4 better way of dividing and conquering the issue.

5 But given the limitations we have right
6 now, we're trying to make it fit within the Part 61
7 context. You're certainly free to make that
8 recommendation to the Commission.

9 CHAIRMAN RYAN: All right, I'd like to
10 open the bridge line from any participants on the
11 bridge line.

12 Are there any questions or comments from
13 participants? I assume the bridge line is open.

14 (No response.)

15 CHAIRMAN RYAN: Okay, hearing none, we
16 will move to adjourn.

17 Thank you very much.

18 (Whereupon, the Subcommittee was adjourned
19 at 12:07 p.m.)
20
21
22
23
24
25

Low-Level Radioactive Waste Disposal (10 CFR Part 61)

Deborah Jackson, Deputy Director

Division of Intergovernmental Liaison and Rulemaking
Office of Federal and State Materials and Environmental
Management Programs

Advisory Committee on Reactor Safeguards
Meeting of the Radiation Protection and Nuclear
Materials Subcommittee

April 9, 2013

Why are we here today:

- Provide update of Part 61 rulemaking
- ACRS briefing
 - ❖ Subcommittee (December 2009, June 2011, and August 2011)
 - ❖ Full Committee (March 2010, July 2011, and September 2011)
- ACRS 2011 Comment Letter
 - ❖ Four recommendations
 - ❖ Staff's responses

Commission Directions:

- **SRM-SECY-08-0147 and SRM-SECY-10-0043**
Require site-specific analysis for disposal of large quantities of DU, specify criteria needed for analysis, develop supporting guidance, and incorporate blending issue into the existing rulemaking for DU.
- **SRM-COMWDM-11-0002/COMGEA-11-0002**
 1. Allowing licensees the flexibility to use ICRP dose methodology;
 2. A two tiered approach that establishes a compliance period that covers the reasonably foreseeable future and a longer period of performance that is not a priori;
 3. Flexibility for disposal facilities to establish site-specific waste acceptance criteria based on the results of the site's performance assessment and intruder assessment;
 4. A compatibility category...that ensures alignment between the States and Federal government on safety fundamentals, while providing the States with the flexibility to determine how to implement these safety requirements.

Today's topics and presenters:

Topic

Presenter

Disposition of Earlier ACRS 2011 Comment

Mike Lee, DWMEP

2012 Public Outreach Initiative

2012 Regulatory Basis Document: *Options Considered and Staff's Proposed Approach*

Dave Esh and
Chris Grossman,
DWMEP

2012 Preliminary Proposed Rule: *Summary of Preliminary Proposed Rule Language*

Andrew Carrera,
DILR

Current Status and Next Steps

Aby Mohseni,
DWMEP

Disposition of Earlier 2011 ACRS Comments

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Advisory Committee on Reactor Safeguards
Meeting of the Radiation Protection and Nuclear Materials
Subcommittee
April 9, 2013

Background & Context

- **Rulemaking direction initially provided in SRM-SECY-08-0147 (March 18, 2009)**
- **ACRS letter dated September 22, 2011**
 - Reflects series of earlier 2011 meetings
 - Committee issued four recommendations
- **Staff response dated November 3, 2011**

ACRS 2011

Recommendation #1

| | |
|-----------------------|--|
| Recommendation | 10 CFR Part 61 should not be amended in accordance with the staff's recommendations. |
| Staff Response | The staff's draft proposed rule is consistent with Commission direction for a limited scope Part 61 rulemaking in SRM-SECY-08-0147. |
| <i>Implementation</i> | <i>Staff proposed new explicit performance assessment and intruder analysis requirements consistent with earlier Commission direction.</i> |

ACRS 2011

Recommendation #2

| | |
|----------------|---|
| Recommendation | Implementation guidance for 10 CFR Part 61 should not specify an a priori <u>period of performance</u> . |
| Staff Response | The staff agrees and did not originally specify a longer-term performance period. However, the staff believes that it is important to specify a compliance period in the rule. |
| Implementation | <i>Consistent with earlier stakeholder feedback (and Commission direction), staff originally proposed a requirement for calculation of peak dose within 20,000-years. In the December 2012 version of the draft rule text, the staff is now proposing 10,000 years for the length of the <u>time of compliance</u>.</i> |

ACRS 2011

Recommendation #3

| | |
|-----------------------|---|
| Recommendation | The approaches in Recommendations 1 and 2 are equally applicable to the disposal of depleted uranium as well as other LLW. |
| Staff Response | The staff agrees that development of a risk informed, performance based LLW site assessment methodology using realistic characterizations of disposed radioactive materials; the features, events, and processes that can disrupt disposed waste; natural and engineered barriers; environmental transport mechanisms; and subsequent human exposure scenarios is appropriate for DU and other LLW. |
| <i>Implementation</i> | <i>See 2011 edition of proposed rule text.</i> |

ACRS 2011

Recommendation #4

| | |
|-----------------------|---|
| Recommendation | Compliance with performance objectives of the disposal system after the institutional control period ends, as well as the possible doses to hypothetical intruders, should be evaluated considering the natural features, events, and processes for a given site for a period of time commensurate with the risk for a specific facility and site. |
| Staff Response | The staff agrees. The staff believes that it has developed a proposed rule that considers the natural features, events, and processes for a given site for a period of time commensurate with the risk for a specific facility and site |
| Implementation | <i>See 2011 edition of proposed rule text.</i> |

2012 Public Outreach Initiative

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Advisory Committee on Reactor Safeguards
Meeting of the Radiation Protection and Nuclear Materials
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April 9, 2013

2012 Commission Direction

- **Seek stakeholder feedback on four expanded regulatory requirements**
- **Staff initiatives**
 - Issued Federal Register notices
 - Both participated in and hosted public meetings
 - Contacted NRC Agreement States

2012 Public Outreach Efforts

| LOCATION | DATE | EVENT |
|---------------|----------|--|
| Phoenix | March 2 | NRC-Sponsored Public Meeting #1* (following WM2012 Meeting) |
| San Francisco | April 23 | LLW Forum Spring Meeting |
| Orlando | May 7 | CRCPD/OAS Annual Meeting |
| Dallas | May 15 | NRC-Sponsored Public Meeting #2* |
| Tucson | June 22 | EPRI Annual LLW Meeting |
| Rockville | July 19 | NRC-Sponsored Public Meeting #3* |

Letters ...

~200 comments

- Council of Radiation Control Program Directors
- Council on Radionuclides and Radiopharmaceuticals
- EnergySolutions
- Electric Power Research Institute
- Norman Eisenberg
- NSF Environmental
- Heal Utah
- Health Physics Society
- LLW Forum
- Nuclear Energy Institute
- Neptune & Associates
- Howard Pope
- State of Utah
- State of Texas
- State of Washington
- Waste Control Specialists

Written Comment Distribution

| | |
|--|------------|
| • TOC/POP Definition* | 20% |
| • “Other” | 10% |
| • Waste Classification Tables | 10% |
| • Site-Specific Performance Assessment | 9% |
| • ICRP* | 9% |
| • Compatibility Issues* | 9% |
| • Disposition of Depleted Uranium | 8% |
| • WAC* | 6% |
| • Human Intrusion | 6% |
| • Duration of Institutional Controls | 5% |

Response Summary

- Generally no disputing need for rulemaking
- Differing views on scope and details
- Not all Agreement States expressed an opinion
 - Budget constraints
 - Some limited comments
 - Extend duration of active institutional control period to 300 years
 - States should not be compelled to receive depleted uranium

Commission Direction

Proposal #1

| | |
|--------------------------------------|---|
| Commission Proposal | Allowing licensees the flexibility to use ICRP dose methodologies |
| Stakeholder Response | The majority of stakeholders expressing a view on this topic at the 2012 public meetings were mostly in support of this Commission proposal |
| Agreement State Response | Those Agreement States expressing a view on this topic were mostly in support of this Commission proposal. |
| <i>Preliminary Staff Observation</i> | <i>Allowing licensees the flexibility to use more up-to-date ICRP recommendations would align with past agency practice</i> |

Commission Direction

Proposal #2

| | |
|---|--|
| Commission Proposal | Implement a two-tiered approach to performance assessment that establishes a compliance period that covers the reasonably foreseeable future and a longer period of performance that is not defined <i>a priori</i> |
| Stakeholder Response | The majority of stakeholders expressing a view on this topic at the 2012 public meetings were mostly in support of this Commission proposal |
| Agreement State Response | Not all Agreement States expressed an opinion on the merits of a two-tiered approach proposed by the Commission at this time. Comments received thus far are mixed. |
| <i>Preliminary Staff Observation</i> | <i>Staff have previously advocated the adoption of a two-tiered approach to the conduct of a LLW performance assessment</i> |

Commission Direction

Question #2 (continued)

- **Two-tiered approach ...**
 - General support
 - *Time of Compliance* concept
 - Mixed responses
 - “Foreseeable Future” term undefined
 - <1000 yrs; 1000-10,000 yrs; >10,000 yrs
 - *Period of Performance* concept
 - Should not be defined in regulation
 - Technically challenging
 - Questionable decision-making value
 - Shouldn’t be based on dose to receptor

Commission Direction

Proposal #3

| | |
|--------------------------------------|---|
| Commission Proposal | Flexibility for disposal facilities to establish a site-specific WAC based on the results of a site's performance assessment and intruder analysis |
| Stakeholder Response | The majority of stakeholders expressing a view on this topic at the 2012 public meetings were mostly in support of this Commission proposal. |
| Agreement State Response | <p>For those Agreement States expressing a view on this topic, most were in support of this Commission proposal. However, in voicing their support, some States acknowledged the need to verify that the waste generators complied with the disposal sites' WAC (a new burden).</p> <p>Also, some of the Agreement States cautioned against the NRC compelling them to accept large quantities of DU.</p> |
| Preliminary Staff Observation | <i>In practice, most Agreement States already impose some form of a site-specific WAC</i> |

Commission Direction

Proposal #4

| | |
|---|--|
| Commission Proposal | A compatibility category for elements of the revised rule that ensures alignment between States and the Federal government on safety fundamentals while providing the States with some flexibility |
| Stakeholder Response | The majority of stakeholders expressing a view on this topic at the 2012 public meetings were mostly in support of this Commission proposal so long as it does not introduce some unintentional complete advantage |
| Agreement State Response | Some Agreement States expressed concerns about maintaining flexibility in implementation of new requirements. |
| <i>Preliminary Staff Observation</i> | <i>This comment is noted.</i> |

Miscellaneous Comments

See SECY-13-0001

| | |
|--|--|
| Updating the existing waste concentration tables at §61.55 to reflect the latest ICRP dose conversion factors and methodologies | <i>Staff has current direction to begin to address in FY2015</i> |
| Revisiting the current regulatory basis for the duration of 100-year active institutional control period | <i>Should revisit this issue in context of any §61.55 table update in FY2015</i> |
| Revisit earlier assumptions concerning the minimum reporting requirements for certain isotopes cited in the Part 20 Appendix G LLW shipping manifest | <i>Staff agrees. Held its first public meeting in March 2013</i> |
| Developing criteria for the disposal of greater-than-class C LLW | <i>DOE must first address GTCC disposition through its NEPA process</i> |
| Developing clearance criteria for low-activity radioactive waste | <i>In 2005, Commission decided to defer any decision on LAW</i> |

10 CFR Part 61: 2012 Regulatory Basis

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Advisory Committee on Reactor Safeguards
Meeting of the Radiation Protection and Nuclear
Materials Subcommittee

April 9, 2013

Main Topics

- Key concepts
- Site-specific LLW technical analyses
- Analysis timeframes
- Dose assessment – ICRP recommendations
- Waste acceptance

Key Concepts

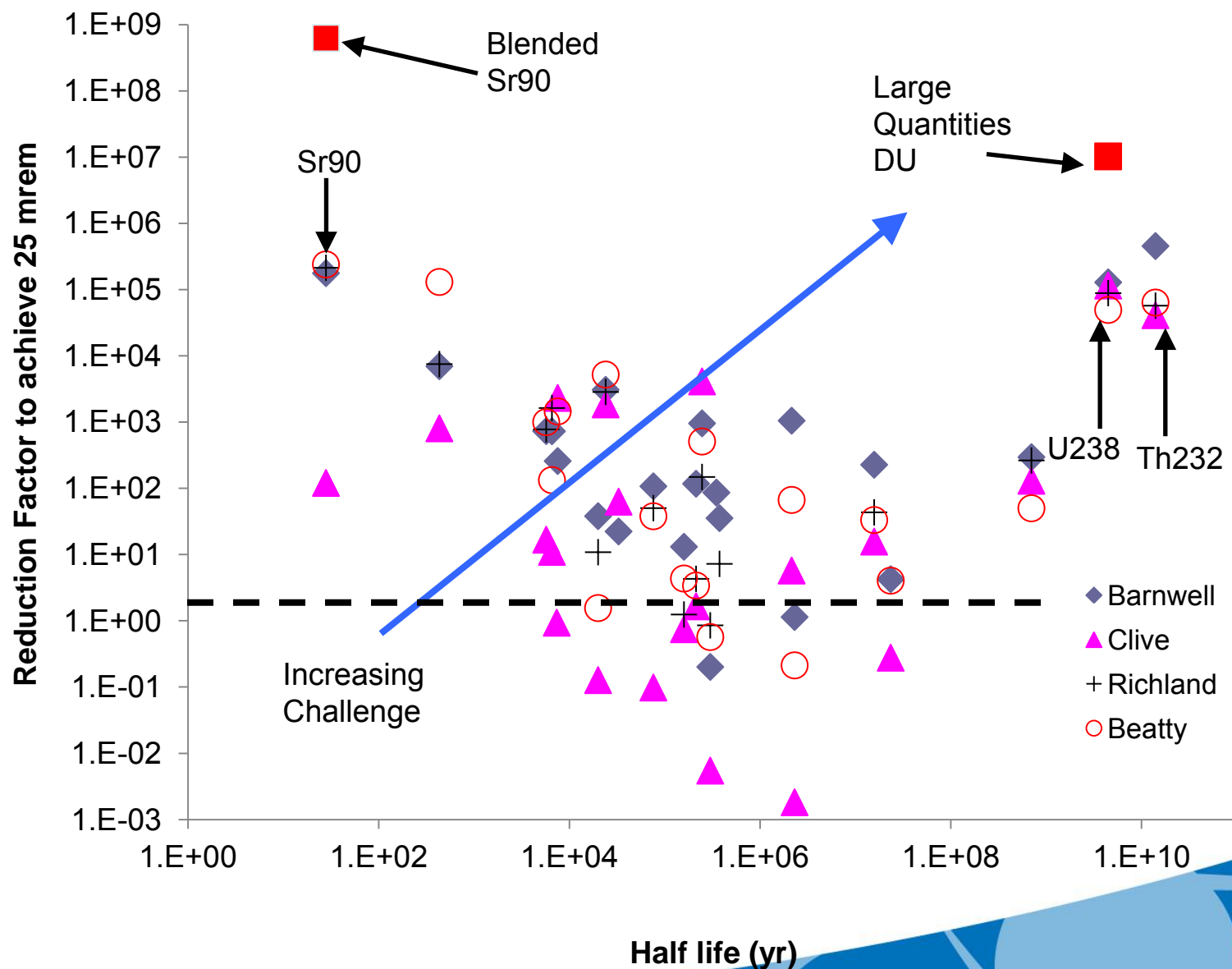
- LLW - hazard vs. risk
- Inventory
- Delays – barriers and transport
- Generic waste classification
- Inadvertent intruders

LLW – Hazard vs. Risk

- > 90% of the hazard from short-lived isotopes:
 - Co-60, Cs-137, Sr-90, H-3
- > 90% of the risk (61.41) from long-lived isotopes:
 - Tc-99, I-129, C-14, Cl-36, U-isotopes, Np-237

Risk \neq Hazard

LLW Inventory Analysis



Inventory Analysis

- All existing LLW facilities contain sufficient inventory that could result in unacceptable radiological risk (61.41).
 - Many orders of magnitude reduction needed for some isotopes
- Commission directed the staff to:
 - Perform limited rulemaking to require a site-specific analyses prior to the disposal of significant quantities of depleted uranium and blended waste.
 - Identify technical requirements of the site-specific analyses.
 - Develop guidance.
- Extensive stakeholder interaction -> do not limit technical requirements to these waste streams

Delays – Barriers and Transport

- Engineered and natural barriers reduce and delay risk

Reduce

Release from wasteform

Solubility limits

Dilution during transport

Dispersion

Delay

Resistive barrier failure

Waste package

Sorption – transport

Site control

Technical requirements must account for both types.

- Limits concentration suitable for near-surface disposal
- Constrains societal uncertainty
- Embedded assumptions – inventory, waste disposal
- Combined short- and long-lived isotopes
- Focused on inadvertent intruder protection (61.42)
- Does not ensure that 61.41 will be met
- Not all isotopes important for 61.41 are reflected in Tables 1 and 2 of 61.55

Inadvertent Intruders

- Not based on assumption of failure of society
- Based on the assumption of error of government
- Relieves licensees of financial responsibility after the institutional control period
- No adequate technical basis for the long-term robustness of active controls
- Commission assumed intruders were unlikely albeit possible
- Conditional probability of 1; intruder dose limit implies a probability of 5%.

LLW Technical Analyses

- Technical requirements must apply to all sites and inventories.
- LLW disposal sites may have vastly different:
 - Inventories
 - Engineered barriers
 - Natural barriers
 - Environmental conditions
- If technical requirements are not established for the most challenging inventory/site, public health and safety will not be protected.
- Best approach is to risk-inform the technical analyses.

Regulatory Requirements - Technical Analyses

- Tiered approach to analysis timeframe.
- Site-specific technical analyses vs. generic waste classification.
- Avoid unnecessary speculation about societal uncertainties.
- Higher dose limit for intruder scenario.
- Site-stability based on impacts to 61.41 and 61.42 performance objectives.
- Site-suitability characteristics only exclusionary for hydrological characteristics for 500 years.
- Dose modeling (ICRP)

Risk-informed

Analyses Timeframes - International

- Staff performed an extensive review of international experience – different approaches used.
- Approaches included:
 - Long-term analyses (numerical or general (e.g. “peak”))
 - Regulatory-defined limits on near surface disposal of long-lived α
 - Prohibition of near surface disposal
 - Multiple
- The staff recommended approach is consistent with the international experience.

Analyses Timeframes – Domestic LLW

- All currently operational LLW disposal facilities are located in Agreement States.
- Different interpretations of NRC regulations:
 - Washington: 10,000 years (longer in EIS)
 - Texas: Analyses to 50,000 years
 - Utah: 500 years, 10,000 years for uranium (under review)
 - South Carolina: 2,000 years
- In 2000, NRC staff performed a detailed technical analysis of a LLW disposal facility at a humid site and recommended 10,000 years (NUREG-1573).

Analyses Timeframes - Technical

Traditional Waste

- All current LLW disposal facilities contain long-lived waste.
- Long-lived waste is the driver of projected doses for 61.41.
- Three of four facilities project peak doses to occur after 1,000 years for 61.41.

Depleted Uranium

- At 1,000 years, only 1/1000th of the potential impact would be assessed.
- At 10,000 years, approximately 1/10th of the potential impact would be assessed.
- Second tier captures the other 9/10th.

Site-specific Analyses

Timeframes

- ACRS 2011 (based in part on ACNW 1997):
 - Two tiered approach:
 - 1) Time at which more mobile radionuclides produce peak dose to designated receptor
 - 2) Avoid catastrophic impacts after
 - Consider geohydrology, waste isolation technology, other controls

Site-specific Analyses

Timeframes

- What are **more mobile radionuclides**? How to define?
 - Radionuclide A may be more mobile at site 1 and less mobile at site 2
 - Radionuclide A may be less mobile than radionuclide B at one site and more mobile at another site
- What are **catastrophic impacts**?
- Why not list **waste characteristics**?
- For WCS the projected time of peak dose from the more mobile radionuclides was $> 30,000$ years.
- Material can be transported in many different pathways.

Site-specific Analyses Timeframes

- Disposal practices and selection of sites.
- Commission policy regarding stability and waste isolation.
- Consistency with international approaches.
- ALARA – national.
- Obligations to future generations regarding protection from waste disposal.

DOSIMETRY

Commission Direction

Provide an expanded proposed rule...which includes the following issues, along with staff's analysis of the issues and stakeholder feedback and the pros and cons of the specific revisions:

- Allowing licensees the flexibility to use ICRP dose methodologies in a site-specific performance assessment for the disposal of all radioactive waste.

Context



- NRC regulations based on various methodologies
- Commission policy¹ presently allows exemption for current methodology

Staff Analysis

- Commission direction
- ICRP methodologies
 - Updates provide holistic evaluation of radiation risks
 - Account for radiosensitivity of the organ
 - Consider a wider range of organs and tissues
- Public feedback

Options Considered

- Specifying ICRP methodology in regulation
- Adopting ICRP methodology-neutral approach
- Address in guidance

Public Views

- Supportive:
 - Directly cited vs. flexibility
 - Periodically revisit PA dosimetry
- Critical:
 - Safety significance in removing critical organ limits

Proposal

- Adopt ICRP methodology-neutral approach
 - Consistent with Commission direction
 - Current science
 - Precedence: 10 CFR Part 63 approach
 - Minimize future revisions to 10 CFR Part 61

WASTE ACCEPTANCE

Commission Direction

Provide an expanded proposed rule...which includes the following issues, along with staff's analysis of the issues and stakeholder feedback and the pros and cons of the specific revisions:

- Flexibility for disposal facilities to establish site-specific waste acceptance criteria based on the results of the site's performance assessment and intruder assessment.

10 CFR 61 Today

- Existing “waste acceptance” requirements include:
 - 61.55 – Waste classification
 - Allowable concentration limits; Class A, B, C.
 - Total activity limits site-specific and derived from 61.13(a)
 - 61.56 – Waste characteristics
 - 61.58 – Alternative classification and characteristics

Waste Classification

Long-lived

TABLE 1

| Radionuclide | Concentration, curies per cubic meter |
|---|---------------------------------------|
| C-14 | 8 |
| C-14 in activated metal | 80 |
| Ni-59 in activated metal | 220 |
| Nb-94 in activated metal | 0.2 |
| Tc-99 | 3 |
| I-129 | 0.08 |
| Alpha emitting transuranic nuclides with half-life greater than 5 years | ¹ 100 |
| Pu-241 | ¹ 3,500 |
| Cm-242 | ¹ 20,000 |

¹ Units are nanocuries per gram.

Short-lived

TABLE 2

| Radionuclide | Concentration, curies per cubic meter | | |
|---|---------------------------------------|------------------|------------------|
| | Col. 1 | Col. 2 | Col. 3 |
| Total of all nuclides with less than 5 year half-life | 700 | (¹) | (¹) |
| H-3 | 40 | (¹) | (¹) |
| Co-60 | 700 | (¹) | (¹) |
| Ni-63 | 3.5 | 70 | 700 |
| Ni-63 in activated metal | 35 | 700 | 7000 |
| Sr-90 | 0.04 | 150 | 7000 |
| Cs-137 | 1 | 44 | 4600 |

¹ There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other nuclides in Table 2 determine the waste to be Class C independent of these nuclides.

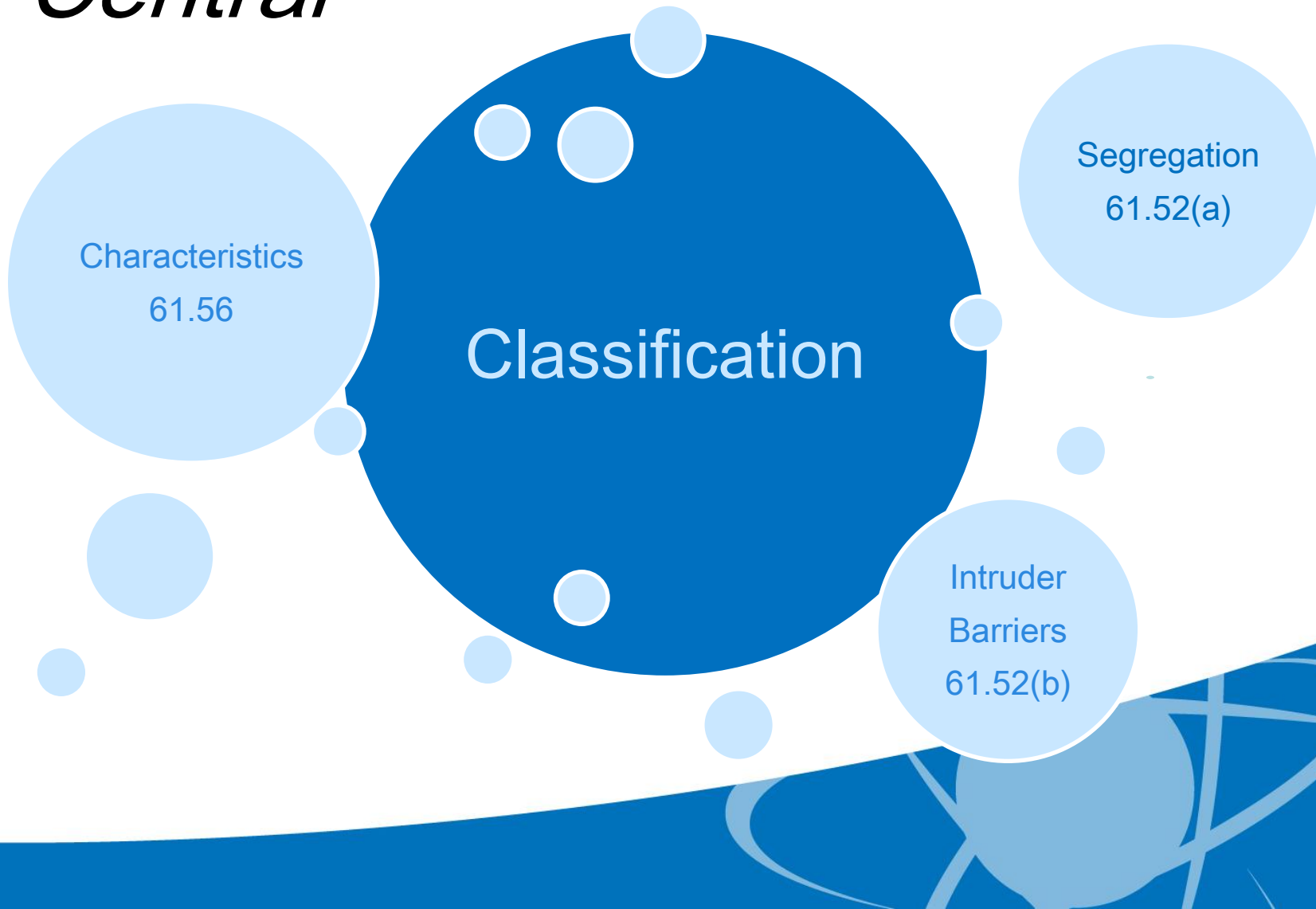
Waste Classification

- Derived from NUREG-0782 analysis
 - Inadvertent intruder scenarios
 - Intruder-Construction
 - Intruder-Discovery
 - Intruder-Agriculture
 - 500-mrem Dose limit (implies 5% likelihood)
 - Ineffective institutional controls after 100 yr.
 - Recognized need for site-specific analysis for water-dependent pathways
 - 61.13(a) analysis

Waste Characteristics

- Minimum (all waste)
 - Facilitate handling
 - Protection of public health and safety
- Stability (stable waste)
 - Minimize water infiltration
 - Limit intruder exposures (recognizable, non-dispersible)

Waste Classification is *Central*



Waste Acceptance Guidance

- Waste form
- Concentration averaging and encapsulation

Staff Analysis

- Commission direction
- Domestic and international regulatory approaches
- Public feedback

Options Considered

- Continue with existing waste classification system
- Replace classification system with site-specific WAC
- Maintain classification system with flexibility for site-specific WAC

Goals

- Ensure protection of public health and safety
- Risk-informed, performance-based regulatory processes
- Provide flexibility for site-specific WAC per Commission direction
- Minimize disruptions to existing Part 61 framework
- Minimize resource burdens

Supportive Viewpoints

- Recognizes improvements
 - site selection, facility design, and disposal methods
- Mixed views on scenarios
 - hypothetical vs. site-specific
- Some concern about abandoning classification
 - LLRWPA: Federal-State Responsibilities
- 61.58, case-by-case
 - Transboundary concerns
- Mixed views on waste acceptability requirements
 - Performance-based (not prescriptive)

Critical Viewpoints

- Additional resource burden on Agreement States
- Impact on State law
- Negative effects on public confidence
- Emphasize conservatism rather than maximizing capacity
- Economic incentives
- Complexity and lack of transparency of analyses

Waste Acceptance

Criteria

Characterization
Methods

Certification
Program

- Apply to all licensees
- Adapted from U.S. DOE
- Consistent with international approaches

Waste Acceptance Criteria

- Allowable limits
 - 61.55 concentration limits or
 - 61.13 analyses
- Acceptable wasteform characteristics and container specifications
- Restrictions or prohibitions

Waste Characterization Methods

- Identify parameters and acceptable uncertainty
- Minimum characterization information

Waste Certification Program

- Administrative procedures to ensure waste is acceptable for disposal
 - Designate authority
 - Identify documentation and records
 - Characterization
 - Shipment
 - Certification
 - Approaches for maintaining certification

Accommodating Changes

- LLW Manifests – App. G to 10 CFR Part 20
- Concepts – 10 CFR 61.7
- Standards – 10 CFR 61.23
- Performance Objectives – 10 CFR 61.42
- Labeling – 10 CFR 61.57
- Operations – 10 CFR 61.52
- Records – 10 CFR 61.80

10 CFR PART 61 Preliminary Proposed Rule Language

Andrew Carrera

Division of Intergovernmental Liaison and Rulemaking
Office of Federal and State Materials and Environmental
Management Programs

Advisory Committee on Reactor Safeguards
Meeting of the Radiation Protection and Nuclear
Materials Subcommittee

April 9, 2011

Working group

| Office | Working Group Members |
|------------------|--|
| FSME/DILR/RB-A | Andrew Carrera, Gary Comfort |
| FSME/DILR/RB-B | Robert MacDougall |
| FSME/DWMEP/EPPAD | Priya Yadav, Mike Lee, |
| FSME/DWMEP/EPPAD | Christopher Grossman, David Esh |
| FSME/DWMEP/ERB-A | Stephen Lemont |
| ADM/DAS/RADB | Anthony DeJesus |
| OGC | Lisa London, Sarah Price, Tison Campbell |
| NRR | Shawn Harwell |
| OIS | Kristen Benney |
| NMSS | Timothy McCartin |
| Agreement States | Mark Yeager (South Carolina) |

Purpose of the Rule

- Specify site-specific technical analyses requirements.
- Permit development of criteria for waste disposal based on the results of these analyses.
- Better align the requirements with current health and safety standards.

Preliminary Amendments to Part 61 Regulations (Dec. 2012)

- Site-Specific Analyses:
 1. Performance assessment
 2. Intruder assessment
 3. Performance period analyses
 4. Update technical analyses
- Waste acceptance
- Other Supporting Changes:
 1. Adding new definitions and concepts
 2. Implementing changes to Appendix G to 10 CFR Part 20
 3. Allowing the use of up-to-date ICRP recommendations

Site-Specific Analyses: Performance Assessment

- § 61.41 Protection of the general population from releases of radioactivity.

Revised requirements:

§ 61.41(a)—Added requirement to demonstrate compliance through analyses that meet the requirements specified in §61.13(b).

§ 61.41(b)—Added requirement to demonstrate that reasonable effort should be made to maintain releases of radioactivity from a disposal facility to the general environment as low as reasonably achievable at any time during the performance period. Compliance with this paragraph must be demonstrated through analyses that meet the requirements specified in §61.13(e).

Site-Specific Analyses: Intruder Assessment

- § 61.42 Protection of inadvertent intruders.

Revised requirements:

§ 61.42(a)—Added annual dose of 500 mrem and requirement to demonstrate compliance through analyses that meet the requirements specified in § 61.13(b).

§ 61.42(b)—Added requirement to demonstrate reasonable effort should be made to maintain exposures to any inadvertent intruder as low as reasonably achievable at any time during the performance period. Compliance with this paragraph must be demonstrated through analyses that meet the requirements specified in § 61.13(e).

Site-Specific Analyses: Long-Term Analyses

- § 61.13 Technical analyses.

New requirements:

§ 61.13(e)—Added requirement for analyses that assess how the disposal facility and site characteristics limit the potential long-term radiological impacts, consistent with available data and current scientific understanding. The analyses shall only be required for land disposal facilities with long-lived waste that contains alpha-emitting radionuclides with average concentrations exceeding 10 nCi/g or radionuclides with average concentrations exceeding one tenth of the values listed in Table 1 of § 61.55, or if necessitated by site-specific factors including engineering design, operational practices, and site characteristics. The analyses must identify and describe the features of the design and site characteristics that will demonstrate that the performance objectives set forth in §§ 61.41(b) and 61.42(b) will be met.

Waste Acceptance:

- § 61.58 Waste acceptance.

New requirements:

§ 61.58(a)—Added requirement for waste acceptance criteria to be developed from the technical analyses required by either § 61.13 for any land disposal facility or the waste classification requirements set forth in § 61.55 for a near-surface disposal facility.

§ 61.58(b)—Added requirement for waste characterization.

§ 61.58(c)—Added requirement for waste certification.

Site-Specific Analyses: Updated Analyses

- § 61.28 Contents of application for closure.

New requirement:

§ 61.28(a)(2)—Added requirement to submit revised analyses for §61.13 using the details of the final closure plan and waste inventory.

Other Supporting Changes:

- § 61.2 Definitions and § 61.7 Concepts.

New definitions and concepts:

Compliance period, intruder assessment, long-lived waste, performance assessment, waste acceptance, and implementation of dose methodology.

- Appendix G to 10 CFR Part 20.

Revise requirements:

Section II, “Certification,” and
Section III, “Control and Tracking.”

Current Status and Next Steps

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Advisory Committee on Reactor Safeguards
Meeting of the Radiation Protection and Nuclear Materials
Subcommittee

April 9, 2013

Current Plans

- **Second ACRS Subcommittee briefing: June 2013**
 - Discuss rule text and guidance document currently in concurrence
 - Changes reflect Commission's 2012 SRM
 - Focus on changes made in response to December 2012 public comments
- **ACRS Committee briefing: July 2013**
 - Anticipating Committee letter report
- **Draft rule text and guidance document due to Commission: July 2013**

Next Steps ...

- **If Commission approves of rulemaking package ...**
 - Publish in *Federal Register* later in calendar year (Fall/Winter 2013)
 - Conduct public meetings in 2014 (locations and dates yet to be determined)
 - Deliver final rulemaking package to Commission in late calendar year 2014