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Radiation Protection and Nuclear Materials

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16
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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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RADIATION PROTECTION AND NUCLEAR MATERIALS

SUBCOMMITTEE

+ + + + +

TUESDAY

OCTOBER 18, 2016

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 12:59 p.m., Margaret Chu, Chair, presiding.

COMMITTEE MEMBERS:

MARGARET CHU, Chair

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

WALTER L. KIRCHNER, Member

JOSE MARCH-LEUBA, Member

JOY REMPE, Member

GORDON R. SKILLMAN, Member

JOHN W. STETKAR, Member

ACRS CONSULTANT:

JAMES CLARKE*

DESIGNATED FEDERAL OFFICIAL:

DEREK WIDMAYER

ALSO PRESENT:

HANS ARLT, NMSS

GARY COMFORT, NMSS

DAVID ESH, NMSS

JOHN GREAVES, Public Participant*

LISA LONDON, OGC

CHRIS McKENNEY, NMSS

ROGER SEITZ, Savannah River National Lab

JOHN TAPPERT, NMSS

DOUGLAS TONKAY, DOE

ANDREA D. VEIL, Executive Director, ACRS

PRIYA YADAV, NMSS*

*Present via telephone

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

2 12:59 p.m.

3 CHAIR CHU: Good afternoon. The

4 meeting will now come to order. This is a meeting

5 of the Advisory Committee on Reactor Safeguards,

6 Subcommittee on Radiation Protection and Nuclear

7 Materials.

8 I'm Margaret Chu, Chairman of the

9 Subcommittee. ACRS members in attendance are Joy

10 Rempe, Charlie Brown, Jose March-Leuba, and John

11 Stetkar, Dennis Bley, Dick Skillman, and Walt

12 Kirchner.

13 Dr. James Clark from Vanderbilt

14 University is participating in the meeting and

15 joins us today by telephone. Dr. Clark will

16 provide a summary of comments provided on previous

17 versions of Part 61, submitted by the Consortium

18 for Risk Evaluation with Stakeholder Participation.

19 We call it CRESP. Which is a research

20 organization funded by the DOE. And then he will

21 provide comments on the current version of the Part

22 61 in the role as a consultant to the ACRS.

23 Derek Widmayer of the ACRS staff is the

24 designated Federal Official for this meeting. Now

25 the purpose of today's meeting is for the NRC staff

1 to discuss and propose the final 10 CFR Part 61,
2 Low Level Radioactive Disposal.
3 The Subcommittee will gather
4 information, analyze relevant issues and facts, and
5 formulate proposed positions and actions as
6 appropriate for further consideration by the full
7 Committee.
8 Detailed proceedings for conduct of
9 ACRS meetings was previously published in the
10 Federal Register on October 1, 2014. The meeting
11 is open to public attendance.
12 And we have received two requests for
13 time to make oral statements. Time for these
14 statements is provided on the Agenda after the
15 presentation on this matter.
16 A transcript of today's meeting is
17 being kept. Therefore, we request that meeting
18 participants use the microphones located throughout
19 the meeting room when addressing the Subcommittee.
20 Participants should first identify themselves and
21 speak with sufficient clarity and volume so they
22 can be readily heard.
23 There's a telephone bridge line
24 established for this meeting. So we request that
25 participants on the bridge line please keep their

phone on mute to minimize interference with the audio reception on the meeting room.

At this time I ask that attendees in the room please silence all cell phones and other devices that will make noise to minimize distractions. And I remind speakers at the front table to turn on the microphone when speaking. And likewise to turn off the microphone when you're not speaking.

Before we being, I would like to take a moment to acknowledge one of our presenters today, Dr. David Esh from the office of Nuclear Material Safety and Safeguards, was the recipient of the 2016 NRC Honorary Distinguished Service Award. Namely for his work in the area of performance assessment, which we'll hear later.

The Distinguished Service Award is the highest honor granted by the NRC to an individual based on outstanding achievement. Congratulations Dr. Ech. And we look forward to hearing from you today.

We will now proceed with the meeting. I call on John Tappert, Director of the Divisions of Decommissioning Uranium Recovery and Waste Programs of the Office of NMSS to make introductory

1 remarks.

2 MR. TAPPERT: Thank you, Chairman.

3 Again, my name is John Tappert. I'm with the

4 Office of Nuclear Material Safety and Safeguards.

5 The staff appreciates the opportunity

6 to brief the Committee today on the draft final

7 rule for Part 61. We've been on a bit of a

8 journey. The routes of this Rule go as far back as

9 2005 when the Commission directed the staff to look

10 at the depleted uranium which was being introduced

11 in the waste streams, and determine whether Part 61

12 should be modified as a result.

13 In the intervening years, there have

14 been a number of SECY papers, Commission briefings,

15 briefings with the ACRS, briefings with the

16 Compacts and then various other stakeholders. And

17 the culmination of that work was the draft on the

18 Rule which we just presented to the Commission

19 recently.

20 So we look forward to the opportunity

21 to share the results of our work and responds to

22 your questions.

23 Today's presentation will be given by

24 two of our senior staff, Gary Comfort, who is a

25 Senior Project Manager in our Rule Making Group.

1 And has been responsible for shepherding it through
2 the rule making process.
3 And Dr. David Esh, who you just spoke
4 of, is with our Performance Assessment Group. And
5 he'll be relaying more of the technical elements of
6 the Rule.
7 So, without further ado, I'd like to
8 turn it over to Gary.
9 MR. COMFORT: Well good afternoon
10 everybody. As John indicated, my name is Gary
11 Comfort. I'm in NMSS, in our Division of Material,
12 Safety, State, Tribal and Rule Making Programs.
13 Today Dave and I are planning on
14 providing an overview of our draft final Rule that
15 we recently submitted to the Commission on -- that
16 would update the low level radioactive waste
17 disposal regulations in 10 CFR Part 61.
18 We last discussed this issued before
19 the ACRS in 2013. So it's been a number of years
20 since we've last seen you all. Go to the next
21 slide.
22 During my portion of the presentation,
23 I'm planning to summerize the activities that have
24 occurred since we last met with you. And provide
25 an overview of the changes that would result from

1 this draft final Rule being implemented.
2 But first I'm going to go over what the
3 purpose of the Rule is. Why we're doing the Rule.
4 And what Commission direction it was based on.
5 Also I'll go over a quick summary for
6 you of the part interactions that we've had with
7 ACRS and some of the comments that we've gotten out
8 of ACRS. After that I'll provide an overview of
9 the draft final Rule itself. What the major, you
10 know, summary of the changes as well as get into a
11 little bit of the specific Rule language.
12 Dave will then follow up with getting
13 into the technical basis for some of that Rule
14 language that we -- and Rule changes that we've
15 done.
16 You know, and then after that I'll
17 provide basically a summary of where we're going to
18 go from here. What happens to the rest of the rule
19 making processing? Just so you're familiar with
20 it.
21 We welcome your questions and comments.
22 And you know, we're looking forward to, you know,
23 final draft letter -- or the final letter that goes
24 to the Commission. And they'll use that in their
25 review of the final Rule and they're, you know,

1 during the decision to approve or affirm it.

2 On the next slide, first I'd like to

3 get into the purpose of what the Rule is really

4 supposed to be doing and what it's intended to

5 solve. The current 10 CFR Part 61 regulations were

6 mostly developed in the early 1980s.

7 As such they focused in dealing with

8 wastes that were currently being disposed of at

9 that time period. Most of the evalu -- or the

10 evaluations were based upon inventories that were

11 being disposed of at the time.

12 In the following 30 years since that

13 time, there's been a lot of other types of wastes

14 that weren't initially envisioned at that -- or

15 that weren't ongoing at that time that are now

16 potentially being disposed of.

17 For example, in the 1980s uranium

18 enrichment was exclusively operated by the

19 Department of Energy and the Government. And the

20 wastes were therefore disposed of. And it wasn't

21 expected that large quantities of depleted uranium

22 could be disposed of in a commercial low-level

23 waste site.

24 Since then, we've basically gone into

25 the idea of privitiz -- we've issued licenses for

1 privatized uranium enrichment facilities. And so
2 therefore, the waste from those would be expected
3 to go to a commercial waste site.
4 And when we did the original 1982
5 revision of Part 61 as I indicated, this type of
6 waste wasn't envisioned to the point that really it
7 wasn't even addressed in that Rule, in the final
8 Rule. And so therefore, it defaults into a Class A
9 waste.
10 Another issue that came up since then
11 is the idea of blending wastes. Where you
12 basically would take higher classes of waste and
13 combine it with larger quantities of lower class
14 waste. And dispose of it as a low level classed
15 waste.
16 So that's something else that came up
17 upon, you know, during this rule making that we
18 were looking at. The problem is that, you know,
19 these blended wastes could result in quantities of
20 waste near the top concentrations of the Class
21 level then were originally evaluated as part of the
22 original 10 CFR Part 61.
23 So, the purpose of this rule making is
24 really to develop a strategy that would allow these
25 different types of new waste and waste that occur

1 in the future that we don't know about now that
2 would have a pathway for evaluation and potential
3 disposal on low level waste sites. Next slide.
4 So, to resolve the problem -- these
5 types of problems, the NRC staff decided to create
6 an approach where the 10 CFR Part 61 regulations
7 would instead focus and use a more performance and
8 risk-based approach by requiring site specific
9 analysis. Including for waste disposed of under
10 the existing waste classification tables.
11 The site specific analysis will help to
12 ensure that the waste streams that were not
13 originally addressed in 1982, or that are disposed
14 of in conditions or concentrations outside the
15 original assumptions of the 1982 evaluations. That
16 they're being safety disposed of.
17 Implementation of the new Rule is
18 intended to reduce ambiguity and facility the
19 disposal of these previously disposed -- previously
20 unanalyzed wastes. In addition, some rule changes
21 were made to better align 10 CFR Part 61
22 regulations with updated existing health and safety
23 methodologies.
24 MEMBER SKILLMAN: Gary, before you
25 change, and would you back up to three, please?

1 You mentioned in your comments that there was
2 depleted uranium prior to this rule making
3 activity.
4 It was basically DOE and it was
5 probably defense related. Is it the vision of this
6 rule making to reach back to those waste locations
7 also?
8 MR. COMFORT: Well, I mean, if they're
9 under the Department of Energy, they have their own
10 regulatory scheme. So this Rule would not directly
11 affect those, no.
12 MEMBER SKILLMAN: So the answer is no.
13 MR. COMFORT: So the answer's no. Yes
14 sir, right.
15 MEMBER SKILLMAN: Okay. Thank you.
16 MR. COMFORT: Okay now I'm going to
17 briefly go over, you know, some of the direction
18 that we've gotten. Because all of this rolls into
19 why, you know, where the Rule came out to become on
20 it.
21 So, first of all, starting with the
22 Commission direction that we've gotten over the
23 years. Which has changed a little bit. Or, you
24 know, become updated by the Commission as you'll
25 see.

1 Subsequent -- I've got the wrong --
2 okay. So, basically we originally got the
3 direction as John indicated, out of some
4 proceedings that were ongoing with Louisiana Energy
5 Services.
6 They basically took -- that took place
7 in 2005 where the question arose as part of those
8 proceedings about the classification of DU as a
9 Class A low level waste. It kind of fell in
10 default because it wasn't directly addressed in the
11 Part 61 1982 Rule.
12 As a result of those proceedings, the
13 Commission outside of the proceeding directed the
14 staff to consider whether the potential quantities
15 of DU, depleted uranium that were generated by
16 commercial uranium enrichment facilities warranted
17 amending the Waste Classification Tables.
18 So, based on this direction, the staff
19 performed a technical analysis to evaluate the
20 impacts of near surface disposal of large
21 quantities of DU. The staff submitted the results
22 of the analysis to the Commission as part of SECY
23 08-0147, which was response to Commission Order
24 CLI-05-20, regarding depleted uranium, dated
25 October 7, 2008.

1 In response to this paper, the
2 Commission directed the staff to -- in a Staff
3 Requirements Memorandum, or an SRM, which was
4 identified as SRM SECY 08-147 to begin a rule
5 making to require site specific analysis for
6 disposal of large quantifies of DU.
7 With this direction the staff then
8 began a series of public meetings where we went out
9 and tried to get some insight of what people
10 thought were the major issues related to this.
11 And basically the other thing that the
12 Commission said, is to develop supporting guidance
13 and technical basis for this. As well as to
14 maintain the waste classification of DU.
15 Now, since that point, the Commission
16 has told us on the waste classification to revisit
17 that subject after we complete this Rule.
18 MEMBER CORRADINI: Garry, what do you
19 mean by maintain the waste classification?
20 MR. COMFORT: It's right now defaulted
21 as Class A waste. So, they said, don't go in and
22 change the waste classification.
23 MEMBER CORRADINI: And maintains means?
24 MR. COMFORT: Keep it the same right
25 now.

1 MEMBER CORRADINI: Okay. Thank you.
2 MR. COMFORT: Right. And that's what I
3 was just saying. They have actually asked us after
4 we've finished this project, to go back and re-look
5 at the Waste Classification Tables, including DU in
6 them.
7 And so we have a product due to the
8 Commission eventually on that.
9 MEMBER BLEY: Could that have any
10 substantial impact on what you've been doing for
11 all these years to get ready for this Rule?
12 MR. COMFORT: Well, we had actually
13 asked the Commission that a few years ago. I mean,
14 you know, do we have --
15 MEMBER BLEY: Do we have separated for
16 depleted uranium?
17 MR. COMFORT: Yes. Should we do a
18 complete rule making, you know, now instead of this
19 specific one. But they decided that because of the
20 issue of DU that was going on at that time, that it
21 was more eminent to go ahead and try to deal with
22 that.
23 And we feel that actually the end
24 result of the Rule itself creates a safety program
25 that despite whatever the classification is, if

1 something is going to be disposed of in these low-
2 level waste sites, they will be shown that it's
3 safe to dispose of it.
4 So, you know, in some ways the
5 classification system other then it's a legal, you
6 know, coming out of statutes, it would, you know,
7 isn't as necessary.
8 MEMBER BLEY: Okay.
9 MR. COMFORT: So, revising it may not
10 be considered as important or absolute. But it's
11 something that we have a project to have to do, is
12 to look at it.
13 Okay. Now so we underwent -- started
14 doing the rule making. And while we were doing
15 that and going out and just starting the regulatory
16 basis for the rule making, the other issue came up
17 of blended waste.
18 So, basically the Commission direct --
19 based on a then Chairman's direction, the staff
20 developed an analysis of issues associated with
21 blended wastes. And submitted that evaluation to
22 the Commission in April 2010 as part of SECY 10-
23 0043, which is blending of low level radioactive
24 waste.
25 In response to this paper, the

1 Commission directed the staff to incorporate the
2 issue of blending into the ongoing DU rule making
3 that we were doing. So, based on the updated
4 direction, we updated the regulatory basis and
5 continued working on the Rule.
6 And we went out and basically put out
7 the regulatory basis for public comment as well as
8 with some preliminary Rule language. While we were
9 finishing up the proposed Rule package, the
10 Commission instead came down with additional new
11 direction in the form of the listed SRM up there.
12 That basically told the staff to allow
13 flexibility for licensees to use recent ICRP dose
14 methodologies in their site specific performances'
15 assessment for the disposal of all radioactive
16 waste. And to establish waste acceptance criteria
17 based on a site specific technical analysis.
18 The Commission also directed the staff
19 to use a two tiered approach that establishes a
20 compliance period that covers the reasonable
21 foreseeable future. And a longer period of
22 performance that had no defined period or limits to
23 evaluate the performance of a site over the longer
24 time frames.
25 The period of performance was to be

1 developed based upon a candidate site
2 characteristics such as waste package, waste forum
3 disposal technology, cover technology and geo-
4 hydrology, and the peak dose to a designated
5 receptor.
6 Finally, the Commission wanted the Rule
7 to have compatibility requirements that would
8 ensure alignment between the States and the Federal
9 Government. So this basically readjusted where
10 we're going with the Rule that we put out, or for
11 preliminary rule writing.
12 CHAIR CHU: Gary, I'm not familiar with
13 the blended waste. Can you elaborate on that?
14 MR. COMFORT: Okay. Blended waste, you
15 know, again, if -- you have basically a Class A, B,
16 C wastes and greater then Class C.
17 Basically the idea that was being
18 envisi -- or looked at at that time is if you have
19 large -- if you have small quantities of let's say
20 a Class B waste, could you combine it and basically
21 lower the classification by combining it with large
22 quantities of Class A waste, and dispose of it as
23 Class A waste?
24 So, that's where the blending comes of
25 the two waste categories. And that's again where

1 the Commission's concern was that when we had
2 originally done the Part 61 rule making, we had
3 looked at, well, what is the average concentration
4 going to be disposed of?
5 Now we're looking at a pathway that you
6 could be much closer to the limits of the Class A
7 waste -- or to the waste categories.
8 So, we got this direction from the
9 Commission, and we redid the Rule, you know, and
10 basically finally we got a proposed Rule to the
11 Commission in 2013 for review and approval. And
12 that was identified as SECY 13-0075.
13 This is actually the latest ruling
14 which that the ACRS had been reviewing. And they
15 provided comments while that paper was up with the
16 Commission.
17 In that package, the staff had proposed
18 a new and updated technical analysis using a two-
19 tier system, as was directed by the Commission.
20 With a compliance period of ten thousand years,
21 followed by a qualitative performance period.
22 It included a performance analysis --
23 or a performance assessment with a compliance
24 period limit of 25 millirem per year. Which is
25 basically what we were using.

1 But, the current regulations didn't
2 have a time frame associated with it. And it also
3 included a new requirement for an inadvertent
4 intruder assessment with a limit of five hundred
5 millirem per year.
6 And just as aside, when I'm mentioning
7 the term an inadvertent intruder assessment, or
8 when I'm talking about intruders in general, I'm
9 not talking about somebody who's purposely going
10 onto the site to disrupt the waste. I'm talking
11 about somebody who after the site's been closed,
12 really isn't aware the site is there and starts
13 doing normal activities and the impact around that.
14 So, in response to the SECY that we
15 provided the Commission, the Commission directed
16 publication of the proposed Rule. But, they
17 identified a significant number of changes that
18 they had the staff do before we put it out as a
19 proposed Rule.
20 I'll get over -- onto those in the next
21 slide. But one of the other items that they did,
22 is they encouraged the ACRS to continue involvement
23 in the rule making. And to -- and I should have
24 shifted the slide to start. It's just skipping --
25 yes.

1 MEMBER REMPE: Actually, before you
2 leave that slide, did you want to finish the last
3 bit?
4 MR. COMFORT: Yes. This is the one.
5 Yes.
6 MEMBER REMPE: Okay.
7 MR. COMFORT: So, basically they
8 directed the staff to -- or encouraged the ACRS to
9 provide independent review and recommendations on
10 the Rule. And which is why we're here.
11 MEMBER REMPE: And I looked ahead. And
12 you're planning now to publish the Rule. But then
13 you're going to delay and publish the guidance
14 after the Rule is published?
15 MR. COMFORT: No.
16 MEMBER REMPE: Is that the plan?
17 Because I thought that was in one of your slides?
18 MR. COMFORT: No. The Rule and the
19 publi -- the Rule is going to be published, or the
20 plan is to publish it at the same time as the
21 guidance is published. Or the guidance with the
22 Rule and stuff.
23 If it's incorrectly stated in one of
24 the slides, it's a mistake.
25 MEMBER REMPE: Okay. I didn't

1 understand the words. But I just wanted to make
2 sure. So --
3 MR. COMFORT: Yes. No, the intent is
4 that both documents will be published on the same
5 day. And be, you know, be usable on those dates.
6 MEMBER REMPE: Okay. So, we just got,
7 I guess, the guidance today?
8 MR. COMFORT: Right.
9 MEMBER REMPE: Okay. I just wanted to
10 understand that.
11 MR. COMFORT: And the guidance isn't
12 publically available at this point.
13 CHAIR CHU: Is that the usual way? The
14 Rule and then the Reg Guide goes together?
15 MR. COMFORT: Yes. The Commission now
16 has basically for all Rules they've intended that
17 both when we issue proposed Rules, to have
18 proposed, you know, draft guidance for review and
19 comment. Because it helps you, of course, you
20 know, understand what the intent of the Rule is.
21 CHAIR CHU: Got you.
22 MR. COMFORT: And how we plan on, you
23 know, implementing it.
24 CHAIR CHU: Okay.
25 MR. COMFORT: And it's the same thing

1 with the final Rule. Okay. So --

2 MEMBER BLEY: And since that subject

3 was brought up, glancing at the slides, I think

4 David's going to talk about the guidance. And I

5 suspect -- well, I hope when you do that, you've

6 got your slides laid out to make it clear to us

7 what's changed in the guidance as you go through.

8 Because we will not have read it by

9 today of course. And we will, if we have time,

10 have read it by the time of the full Committee

11 meeting. So, we might have a lot more questions

12 then, then we have now.

13 But, if you can -- the better you can

14 point out what's changed, the more it will help us.

15 DR. ESH: Sure. I can try to do that.

16 And it is a short document. So, it shouldn't take

17 you long at all to --

18 MEMBER BLEY: It is? Okay. It wasn't

19 so short before.

20 DR. ESH: It's pretty long.

21 (Laughter)

22 DR. ESH: So, it will be helpful -- it

23 wasn't the 575 pages.

24 MEMBER BLEY: That was the before,

25 right? Or is that the new one? They're the same.

1 Okay.

2 DR. ESH: But, it will be helpful to

3 point out what areas changed and where the new

4 material is compared to the old material.

5 MEMBER REMPE: So, just to clarify my

6 confusion in the second presentation, we'll hear

7 from you, it says, the final guidance document has

8 been developed.

9 And it's in concurrence. And it will

10 be issued after the Commission approves the final

11 Rule publication.

12 So, your plan is to publish both the

13 draft guidance and the Rule. Then the

14 Commissioners will approve the Rule. And you'll

15 make any changes to the guidance. And then you'll

16 finalize that.

17 MR. COMFORT: Right. I mean, the

18 guidance is --

19 MEMBER REMPE: Because I just didn't

20 understand that.

21 MR. COMFORT: Yes. The guidance is

22 substantially completely. But the Commission can

23 and does occasionally make changes when they affirm

24 the final Rule that we have to incorporate.

25 And we'd want to make consistent

1 changes so we're not finalizing the guidance at
2 this point. And I'll get into that -- you know,
3 where do we go from here at the end of the -- you
4 know, after Dave's presentation and stuff.
5 But we'll get into some of that also.
6 MEMBER BROWN: But before you go on, I
7 think there's a question for Gary. We got -- one
8 of the copies you sent us was a red lined, strike
9 out version of the Rule.
10 And it had the stuff -- is that the
11 most current? Is that the --
12 MR. COMFORT: Yes. That -- what you
13 received is a red lined, strike out versus the
14 current Rule language. It incorporates --
15 MEMBER BROWN: Yes.
16 MR. COMFORT: What we sent to the
17 Commission. So that is the --
18 MEMBER BROWN: So that is -- I mean,
19 take out all the strike outs and you end up with
20 what you intend to publish, --
21 MR. COMFORT: With what the final Rule
22 --
23 MEMBER BROWN: Right?
24 MR. COMFORT: Yes.
25 MEMBER BROWN: Okay. So, that had it

1 in red. So it was pretty easy to --

2 MR. COMFORT: Right. It shows you

3 where the significant change -- or where the

4 changes were.

5 MEMBER BROWN: Okay. Yes. I wasn't

6 that. I just wanted to make sure I was looking at

7 the right thing.

8 MR. COMFORT: Yes. Because I'll be

9 going over some of the major changes. But that

10 document shows all the editorials and small things

11 that I'm not going to be going over.

12 MEMBER BROWN: Okay.

13 MR. COMFORT: I'm not going to go over

14 it word by word.

15 MEMBER BROWN: No. I'll pass those.

16 MR. COMFORT: Yes. I thought that

17 would be laborious if I tried to do that.

18 Okay. So, as I said, the Commission

19 provided us a lot of changes which is not usually

20 normal without them asking to see it back before we

21 publish the Rule. In this case they said, you

22 know, make these changes and go do it.

23 Well, for example, this basically on

24 the right side of the -- well, left side of the

25 chart, shows what was in the Rule that we sent to

1 the Commission in SECY 13-075. And this is for the
2 proposed Rule.
3 And this basically is a summary of the
4 things that were in the published Rule. And the
5 color changes show where areas that the Commission
6 changed.
7 And so you'll see they're in some
8 substantial areas of the change -- of the Rule.
9 For example, --
10 CHAIR CHU: So, the right-hand side is
11 the --
12 MR. COMFORT: Is what we actually
13 propose -- or sent out, published it.
14 CHAIR CHU: The proposed final --
15 MR. COMFORT: Yes. The published
16 proposed Rule. Not the -- yes, it's the -- not the
17 final Rule.
18 CHAIR CHU: It's not the final Rule.
19 MR. COMFORT: The final Rule, that's
20 the next stage, yes. But this is what we proposed
21 for public comment. So, this is what went out for
22 public comment.
23 CHAIR CHU: Oh. For public comment.
24 MR. COMFORT: Right. So, this -- I
25 want to get into this just because when we start

1 talking about the public comments, you need to know
2 the time frame -- or I mean, get the frame of
3 reference of what those comments were based on.
4 Because of course, we incorporated a
5 lot of changes into the final Rule based on those
6 comments. So, for example, on the analysis time
7 frames, we've gone forward with a two-tier approach
8 for time frames.
9 We've basically, as I had indicated
10 before, a ten thousand year compliance period.
11 Followed by a performance period.
12 The Commission instead directed us to
13 go through and do a three-tier approach. With
14 basically one thousand year compliance period
15 versus a ten thousand. But they added in between
16 this protective assurance period. Which was from
17 one thousand to ten thousand years.
18 And for the performance assessments, we
19 were to apply a five hundred millirem dose goal.
20 It wasn't supposed to be a limit. But it's just
21 basically do as reasonably achievable so you can
22 get to that, you know, the minimized doses to get
23 to that limit.
24 MEMBER BLEY: Did the Commission
25 specify the thousand year?

1 MR. COMFORT: They specified the
2 thousand year in their document panel. And then it
3 was followed by the performance period. Which was
4 again, a qualitative type rule.
5 For the intruder assessment it was kind
6 of -- they basically said, leave that similar to
7 the same. That you're going to have a five hundred
8 millirem limit for the first thousand years.
9 But then you have a five hundred
10 millirem dose goal for the second -- for the
11 thousand to ten thousand years. And then again, a
12 qualitative review after that in the performance
13 period.
14 The other thing that they did on the
15 intruder assessment there was for the scenarios for
16 it, because they were concerned about uncertainties
17 which the Committee also sent its concerns about.
18 They directed us to make sure that the
19 scenarios were based on activities that were
20 ongoing at the time of closure of the site. And
21 so, you know, rather then looking ten thousand
22 years out in the future and trying to guess what
23 was going on.
24 So, just base the assessments on what
25 was current -- or what was going to be happening at

1 the closure of the site.

2 They also directed us to add some

3 discussion of defense in depth analysis as well as

4 an explicit description of safety case. So, those

5 were new things. I mean, again, new concepts being

6 added into the Rule, you know, after we'd sent it

7 to the Commission.

8 And then the other major thing that

9 they did was to basically direct us to change the

10 Compatibility Category from a C to a B for the

11 major provisions of the Rule.

12 Now a Compatibility Category is when

13 the Agreement States who are actually regulating

14 all of current licensees, they have to adopt

15 regulations that are compatible with our

16 regulations. And we assign a Compatibility

17 Category with those.

18 So, for example, Compatibility Category

19 B says that you have to make the regulations

20 effectively the same. You know, use the same

21 language to the greatest extent in all that stuff.

22 Compatibility C says you have to meet

23 the effective goal of it. But you could be more

24 conservative.

25 So, for example, you know, in this kind

1 of case, you know, we're saying a thousand year
2 compabil -- or a compliance period, they'd have to
3 meet under Compatibility B, they have to have a
4 thousand year compliance period.
5 Under Compatibility C, they could have
6 a thousand years, they could have longer then that,
7 five thousand, ten thousand, whatever period they
8 wanted. But the Commission had directed us because
9 they wanted the consistency in the regulations to
10 Compatibility B.
11 So, -- go ahead.
12 MEMBER BROWN: I just want to clari --
13 make sure you keep talking about intruder,
14 inadvertent intruder. And you made a comment a
15 minute ago that an inadvertent intruder is somebody
16 who goes there after the site is closed,
17 inadvertently don't know what's going on.
18 MR. COMFORT: Right.
19 MEMBER BROWN: When a site is closed,
20 does it look like just a great green soccer field?
21 I mean, is it a green field? There's no signs, no
22 nothing?
23 I mean, in a --
24 MR. COMFORT: I'll let Dave answer
25 that.

1 DR. ESH: All right. So, when it's
2 operating of course, there's physical barriers to
3 somebody accessing the facility.
4 MEMBER BROWN: Of course.
5 DR. ESH: And then at the -- there's a
6 five-year observation and maintenance period at the
7 time of closure. That the idea is that the
8 licensee will ensure that the changes they made to
9 prepare the site for closure have not caused any
10 negative affects to the potential of the -- the
11 potential performance of the site after closure.
12 So then the institutional control
13 period starts. And the institutional control
14 period starts is still an actively maintained
15 period where access to the site maybe prohibited by
16 fences and signs and that sort of thing.
17 But the institutional control period is
18 only allowed to be credited in the regulation of up
19 to one hundred years after the point of closure.
20 So, there will be some potential limitation of
21 access to the site during the institutional control
22 period.
23 But, after the institutional control
24 period, there's no requirement to provide barriers
25 to access of the site. So, if the engineered cover

1 was designed such that it looked like a green
2 field, then yes, it would just look like a green
3 field.
4 If it was like some of the engineered
5 covers that are used for erosion protection control
6 that have the large rick-rack designs, then it
7 would look like a big mound of rocks essentially
8 sitting on the surface.
9 So, it would depend on the design and
10 the facility what it would look like at that point.
11 MEMBER BROWN: Well, if some
12 development occurred, you could come in and there
13 could be houses, there could be a mall, and --
14 DR. ESH: Right.
15 MEMBER BROWN: All that kind of stuff.
16 Okay. That's -- I just wanted to understand. So,
17 that's after the institutional period though.
18 DR. ESH: Right. Correct.
19 MEMBER BROWN: Okay. Thank you.
20 MR. COMFORT: And that's why again,
21 they were saying, you know, look at what's going on
22 at that time period, you know, when closure occurs
23 as to what the ongoing activity is. So, if you've
24 got housing near there, you know, assume it -- if
25 there isn't, if it's a big, you know, desert kind

1 of thing, we're not going to make you assume that
2 somewhere a thousand years from now that population
3 will move in there at all.
4 You may consider some sorts of
5 intrusions, but, you know, they said use realistic
6 scenarios. Or that's what the regulations are
7 requiring.
8 MEMBER SKILLMAN: Gary, let me ask
9 this. As I looked at the Compatibility Categories,
10 this is from the handbook, 5.9 part two.
11 MR. COMFORT: Right.
12 MEMBER SKILLMAN: It's certainly
13 confusing to me how you can -- not you -- how this
14 discussion can say, now it's a B and not a C when
15 it almost appears Category A is the most
16 applicable.
17 MR. COMFORT: Because of the health and
18 safety --
19 MEMBER SKILLMAN: Yes.
20 MR. COMFORT: Right.
21 MEMBER SKILLMAN: So, what is the
22 discussion that certifies?
23 MR. COMFORT: Yes. Because Category B
24 is trans-boundary issues and stuff, and how you say
25 these are trans-boundary issues. This is one of

1 those why, you know, I mean, partly why we looked
2 at these. And This is an area where we got a lot
3 of comments on and stuff.
4 And so I'll get into that. But we --
5 you know, most people agreed with you, how would --
6 does that occur? Why wouldn't it be A? Or why
7 isn't C appropriate?
8 You know, for example on the compliance
9 period evaluations, a lot of stakeholders were like
10 well, my current State, you know, requires ten
11 thousand years for the evaluation. You're
12 basically saying limit that.
13 You know, it's going to make an unsafe
14 -- a less safe review and all.
15 MEMBER SKILLMAN: Right.
16 MR. COMFORT: So, that's one of the
17 things we considered when we did the final Rule.
18 And we basically did go back and revert some of
19 these major things from B. Or we recommending to
20 the Commission that they be revered from what was
21 designated as C -- or B, back to the C category.
22 So, the Agreement States can have their
23 flexibility and, you know, maintain safety
24 appropriately and all.
25 DR. ESH: And one thing I would add to

1 that as -- the Commission did give direction for
2 compatibility B. But that's an area they
3 specifically said to seek comment on.
4 Because I think they said we're going
5 to make it B. But, let's see what our stakeholders
6 think about it, was my interpretation of their
7 direction.
8 MEMBER SKILLMAN: So, the conclusion
9 is, it will be B. And while it's not universal
10 consensus, there is acceptance of that category?
11 MR. COMFORT: Well, for publication of
12 the proposed Rule it would be. In the final Rule
13 we did change some of the major provisions back to
14 C so that they have more flexibility as to, you
15 know, they didn't have to meet it exactly. They
16 could use longer time periods. Or use some
17 alternatives.
18 MEMBER SKILLMAN: And you're going to
19 discuss this a little more?
20 MR. COMFORT: Yes. I'll be getting
21 into that. Just what about their comments --
22 MEMBER SKILLMAN: A little later.
23 Thank you.
24 MR. COMFORT: Into the final Rule that
25 we've done.

1 MEMBER SKILLMAN: Thank you.

2 MR. COMFORT: Okay. So, that really
3 brings us up to the publication of the proposed
4 Rule. I'm going too just quickly step back to
5 discuss the past ACRS interactions that we've had
6 with you.

7 Just to remind you, the Committee and
8 the new members, of what types of comments that
9 we've gotten in the past on it. I'm not going to
10 try to go over our feelings on some of them and
11 all.

12 But, as you can see by the slide, we
13 have had a number of interactions with you on Part
14 61 in the past. They started in 2009. The last
15 one as I said, was in 2013.

16 After most of them, I mean, we had two
17 in 2011. One was on the Rule. One was on the
18 guidance. We got a single letter.

19 But, after each of those we did get a
20 letter from -- or the Commission got a letter from
21 the ACRS. And we, you know, the staff responded to
22 those letters.

23 On the next slide I go over some of the
24 key issues so that you --

25 MEMBER BLEY: Not to bicker, but I'm

1 looking at what I have is our last letter was
2 issued in February 2014. And we'd had a meeting in
3 February, a full Committee meeting with you in
4 February 2014.
5 MR. WIDMAYER: I can clarify that.
6 They're identifying Subcommittee meetings that they
7 were presenters at.
8 MEMBER BLEY: Oh.
9 MR. WIDMAYER: We've had meetings where
10 they were not presenters.
11 MEMBER BLEY: Okay. But this was a full
12 Committee meeting.
13 MR. WIDMAYER: Yes. Our meeting was a
14 full Committee meeting.
15 MEMBER BLEY: We wrote a letter in
16 2013.
17 MR. WIDMAYER: Right.
18 MEMBER BLEY: We wrote another one in
19 2014.
20 MR. WIDMAYER: They were three meetings
21 that were just stakeholder involvement.
22 MEMBER BLEY: Okay. So that 2014 was
23 just stakeholders?
24 MR. WIDMAYER: Yes.
25 MEMBER BLEY: That's the ones we've

had. Okay. I remember. Sam asked for those.

MR. WIDMAYER: Right.

MEMBER BLEY: Yes. Okay. Thank you.

MR. COMFORT: Thank you for bringing that up. So, going through the letters, I mean basically a lot of them had consistent issues from, you know, each letter.

I'm going to go over some of the general issues that I identified that you listed. First of all it said that you -- that the Committee had identified the Rule should be risk informed, based on site specific, realistic performance assessments with considerations for uncertainties.

The realistic assumptions for release in fate transport of view, using a realistic likelihood of intrusion, and a range of site specific conditions. I think actually, you know, when we got that the Commission did, as you saw in one of the slides, at their direction, they were telling us, you know, use realistic scenarios.

They did tell us to address uncertainties and things. So, they clearly adopted a lot of those recommendations.

Your Committee also suggested we use time frames determined on a case by case site

1 specific basis rather then defining specific fixed
2 period performance and all. That's not something
3 that the Commission went forth with.
4 They did define the periods of
5 performance, you know, in the forms of the
6 compliance period as well as the performance period
7 with specified time frames and all. Next slide.
8 The ACRS recommended compliance with
9 the performance objectives after institutional
10 periods should be evaluated considering features,
11 events, and processes, otherwise known as FEPs.
12 Commensurate with the site specific risk.
13 The ACRS indicated their concerns with
14 the value of requiring inadvertent intruder
15 analysis because of the large uncertainties
16 associated with human intrusion scenarios. And
17 instead indicated that reliance on the durability
18 and stability of the site was sufficient.
19 And finally, the letters stated that
20 previously disposed waste should not be subject to
21 the new requirements. You know, we've adopted some
22 of these in some form, the Commission has. And
23 others they went forth with, you know, with other
24 approaches, you know, based on what the Commission
25 had published in the proposed Rule.

1 And although we appreciate all the
2 recommendations put by the, you know, the ACRS as I
3 said, you know, not all of the recommendations have
4 been adopted. And we look forward to see what, you
5 know, comments you do come out for the final Rule.
6 I think that will be important for the
7 Commission to consider in making their
8 determinations.
9 MEMBER BROWN: Can I ask to go
10 backwards?
11 MR. COMFORT: Sure.
12 MEMBER BROWN: I guess one of my -- I
13 was trying to -- I'm not sure I under -- no. Ahead
14 again.
15 MR. COMFORT: Okay.
16 MEMBER BROWN: It's the bottom one.
17 Did you -- let me read that. Should not be subject
18 --
19 MR. COMFORT: Yes. Based --
20 MEMBER BROWN: You all did not -- you
21 actually did require the sites to be -- the past,
22 previously posted, to do additional compliance. Is
23 that correct?
24 MR. COMFORT: Correct. To the extent
25 that they're -- if they're currently operating and

1 not completely terminated. So I mean, if it's a
2 site that's completely terminated and closed down,
3 we're not requiring.
4 But, if they're continuing to dispose
5 of waste, then they would have to meet the new
6 regulations and all.
7 MEMBER BROWN: For the new waste or the
8 old waste?
9 MR. COMFORT: They'd have to do the
10 performance assessment, which would have to include
11 or address the old waste. But, there would not be
12 an expected impact on it.
13 MEMBER BROWN: Okay. So, it's new
14 requirements in fact.
15 MR. COMFORT: But there are -- yes.
16 MEMBER BROWN: Basically. Okay.
17 MR. COMFORT: And do you have anything
18 to add, Dave, on that?
19 DR. ESH: And this was an area that we
20 received a fair number of comments on. And the way
21 I like to think about it is, you know, if you have
22 a disposal facility that has some waste in it
23 today, and then you have some unused capacity that
24 you're going to put some more waste in in the
25 future, the technical analysis that you do is going

1 to look at the impacts from all the wastes in terms
2 of whether you're meeting the performance objective
3 or not.
4 There's no -- all of it will contribute
5 say to a ground water plume. And there's no way to
6 separate the contribution, or should you separate
7 the contribution from the waste that was put in
8 previously to the new waste.
9 All of it contributes to a human health
10 impact. So, if you want to continue to operate,
11 you should include all the waste in your inventory
12 in your assessment. In simple terms that's the
13 description for this question.
14 CHAIR CHU: Even the old waste and the
15 new waste are the same? You still --
16 DR. ESH: The old waste and the new
17 waste maybe the same. It maybe different. It
18 maybe similar isotopes. It maybe different
19 isotopes.
20 If it was different isotopes, then it
21 would be easier to separate it. But that's
22 generally not the case is, you know, the waste
23 that's in the older -- or the isotopes that are in
24 the older waste are going to be similar to the
25 isotopes that are in the new waste.

1 So, from a health and safety
2 standpoint, if you want to continue to operate, you
3 should be meeting the performance objectives for
4 all the waste that you have accumulated to date
5 and that's the same idea that would apply even if
6 you didn't change the regulations.
7 Whenever you get the closure, you want
8 to be able to demonstrate that you're meeting the
9 performance objectives for all the waste that
10 you've taken to date. Not just oh, I'm going to
11 separate out some section of the waste that because
12 it was done under earlier requirements and then the
13 new section of waste that I'm going to treat
14 differently.
15 We didn't think that was a practical or
16 a smart policy approach to deal with operation of
17 these facilities. Now, a facility that's closed,
18 these requirements are not applying to.
19 So, West Valley or Sheffield or some of
20 the older legacy sites, these are not retroactively
21 being applied to those older sites, these
22 requirements.
23 MR. COMFORT: Okay. So, moving onto
24 the next slide. I'm going to quickly go over.
25 We stopped, you know, originally on our

1 time line at submitting the proposed Rule and it
2 being published. Now I'm going too just briefly
3 update you from that point to the current date.
4 The proposed Rule was actually
5 published in February 12, 2014. It was published
6 for a 120-day comment period. On March 20 -- or
7 actually, the SRM was provided on February 12,
8 2014. And the proposed Rule was actually published
9 on March 26, 2015 for 120 comment period.
10 Because of a number of stakeholder
11 requests, we reopened the comment period from
12 August 27 to September 21. And we received, you
13 know, another few dozen comments on it.
14 We looked at those comments and we
15 processed them as I'll discuss in a minute. And we
16 finally, you know, developed a final Rule package
17 that we submitted to the Commission on September
18 15, 2016, SECY 16-0106.
19 So now I'm going to go over basically
20 the comments that we received during the proposed
21 Rule. Some of the major areas that we received
22 comments on. So, next slide.
23 We did receive 24 hundred and one
24 comment letters. Of which about 23 hundred were
25 form letters. So, about one hundred discrete, you

1 know, comment letters.

2 We did extensive public outreach while

3 the Rule was out there. We held six workshops and

4 a webinar. And we did those workshops at, you

5 know, we recorded them and basically analyzed the

6 information coming out of them to develop any

7 additional comments that weren't in part of the

8 letters. And added them to our comment list.

9 As indicated, I have a number of the

10 groups that we did get comments from and all.

11 Overall we identified over eight hundred comments.

12 Which we then bend into groups

13 together. And then responded to as part of the

14 Statements of Consideration that's in the draft

15 Rule package.

16 Next one. Some of the example -- next

17 slide. Some of the examples of the public

18 comments, one of the big areas was this whole idea

19 of the time frames and how they're doing it.

20 The Commission as I said, had directed

21 us to put in the proposed Rule the three tiered

22 system. A lot of the comments were that it's much

23 more complicated then necessary.

24 The comments, you know, felt that it

25 was difficult to understand how to implement in

1 some ways and what we were wanting out of it.
2 Some of the stakeholders were concerned
3 about this idea of the five hundred millirem dose
4 goal. I mean, the current requirement in Part 61
5 is a 25 millirem limit, annual limit for the
6 performance assessment health for -- or for the
7 public dose exposures.
8 But, you know, that -- there's no time
9 frame associated with it. So, by putting clear
10 time frames, you know, you may not have been going
11 out that far anyway.
12 So, were we really reducing health and
13 safety? Not really. But to the perception of the
14 public, that five hundred millirem limit was
15 something that, you know, much higher then they
16 expected and all.
17 So, the response to a lot of these
18 comments, you know, the staff went back and
19 revisited it. And we came up with a new system
20 that we felt was simpler and based upon the public
21 comments overall.
22 And, you know, we'll get into it in
23 more detail. But, effectively it created back to a
24 kind of a two-tier system. But, the first tier was
25 more site specific based upon what types of waste

1 that you were going to dispose of.

2 So, effectively the compliance period

3 would be a thousand years. Or if you're disposing

4 of significant quantities of long-lived waste, then

5 it would be ten thousand years.

6 And if you didn't have ten thousand

7 year compliance period, you wouldn't even have to

8 worry about the performance period at all. So, if

9 you were just doing, you know, normal low-level

10 waste that's short lived without the significant,

11 you don't have to be -- you'll only be responsible

12 for doing these performance assessments after a

13 thousand years.

14 MEMBER BROWN: And this change is both

15 in the rule and in the guidance?

16 MR. COMFORT: This -- yes. Everything

17 that we've made in the rule will be reflected in

18 the guidance that you have, in the draft guidance

19 that we've developed.

20 And things such as, like I use the word

21 significant quantities of long-lived waste, that's

22 discussed in the guidance. And Dave will get into

23 that a little bit more.

24 Any other questions? Another area as

25 we discussed earlier was the Compatibility

1 Categories. You know, a lot of the stakeholders
2 felt that it reduced current health and safety
3 because some of the States had longer compliance
4 periods where they had the limits of 25 millirem
5 after, you know, after ten thousand years.
6 Or some States even went further to 50
7 thousand. Or peaked theirs that they evaluated or
8 required the evaluations.
9 Most of the commentors recommended C.
10 A few liked the idea of having, you know, a comment
11 basis across all the waste sites. But again, you
12 know, there are -- in different areas and how, you
13 know, in each State should be, you know we felt
14 should be allowed if they want to put a little bit
15 more restrictive or do it.
16 And also, we didn't want to disrupt the
17 current programs significantly of what they were
18 going. So in that case we, you know, in order to
19 help adapt that, we changed in the final Rule the
20 compliance period definition to a Compatibility C.
21 That's where the time frames are, are
22 the thousand year time frame, or ten thousand year
23 time frame was. So they can use longer.
24 Some of the areas remained C, such as
25 the performance period review. We had a, you know,

1 had in the proposed Rule and stays as C.

2 The other big area though that we

3 changed from B to C was in 61.58, which is the

4 waste acceptance criteria. So, we were allowing

5 more flexibility on the States of what they

6 required for that.

7 I'll go up, continue on with some of

8 the comments. Again, we were talking about a few

9 minutes ago about the grand fathering and all. We

10 got a lot of comments on that.

11 A certain number of the comments were

12 hey, 61, you know, 10 CFR 61.1.a kind of seems to

13 have a grandfather clause in there. That it says

14 effectively that, you know, States can adopt these

15 on a site by -- or a case by case basis. You know,

16 the regulations on a case by case basis.

17 Well, the intent of that was when we

18 published the original Part 61, that there wasn't a

19 frame work at that time other then Part 20 for

20 doing these rules. So, we were creating a whole

21 new frame work.

22 And so the idea was, it may be harder

23 for some of these States to adopt these

24 requirements immediately. And so we put that

25 language in there.

1 So, it's kind of an artifact. But they
2 were saying hey, it's still in there. Well,
3 clearly it wasn't intended to apply to this type.
4 So, we basically have gone through and
5 addressed the comments on grand fathering that we
6 do, as Dave said, think that it's important to
7 include sites that are currently operating under
8 this new requirement.
9 And as well to make sure there's no
10 future concern, we have removed that clause from
11 61.1.a so that, you know, people won't go back and
12 say hey, you know, the States don't have to adopt
13 that because of that language.
14 That was really as I said, an artifact
15 from the original Rule. And should have had a time
16 frame that it was based on and removed previous to
17 this.
18 Another interesting --
19 CHAIR CHU: Gary, can I ask a quick
20 question?
21 MR. COMFORT: Yes.
22 CHAIR CHU: How often do licensee,
23 operating licensees have to renew their license?
24 Every how many years? Or do they differ from State
25 to State? Or what?

1 MR. COMFORT: It's dif -- my
2 understanding is it's different from State to
3 State. But they may have more information on that.
4 Okay.
5 CHAIR CHU: Okay.
6 MR. COMFORT: Yes Because as part of
7 the regulatory analysis, I'm pretty sure that I saw
8 some States that were evaluating. Because we tried
9 to do it based upon what their actual renewal
10 cycles would be.
11 And I think it varied, you know, some
12 maybe like ten years. Some maybe 20 years on what
13 it is. But, it depends upon the State and what
14 they've required.
15 Another bit area that we had that was
16 interesting was backfit. A lot of NRC's
17 requirement, or regulations basically require us to
18 do a backfit evaluation when we're changing the
19 regulations.
20 Part 61 does not have that kind of a
21 requirement in it. I mean, we do look at, you
22 know, that we do through the regulatory analysis
23 that I just mentioned, some cost benefit analysis
24 on it. But we don't do a formal backfit.
25 The comments that we received were

1 well, basically this is going to impact, you know,
2 a Part 70 licensee doing uranium enrichment. They
3 do have a backfit provision. So why doesn't
4 backfit apply because of that?
5 And basically we went through our
6 review and determined that, you know, and normally
7 unless the Commission directs otherwise, we don't
8 do backfit for areas where, you know, there's kind
9 of the subsequential impact to somebody. So, you
10 know, this impact is directly to the regulations
11 for low-level waste disposal.
12 And it just happens that somebody
13 disposing of their maybe impacted, but we don't
14 look at that as part of, you know, being under the
15 backfit of the Part 70 provision, or having to be
16 reviewed under that. Because we're not changing
17 Part 70 on it.
18 So, as a result, we have not included
19 backfit. We feel satisfied the regulatory
20 analysis, which we did do a lot of update to trying
21 to -- we've talked to a lot of the licensees in
22 States to get better estimates of the costs.
23 And the costs have showed to be a, you
24 know, potentially a lot higher then what was in the
25 proposed Rule in the final regulatory analysis.

1 Which is publically available as part of the
2 package.
3 So those are some of the major areas of
4 where we had, you know, comments in. I mean, we've
5 got a lot of other comments that some were great
6 editorials where, you know, use consistent rule
7 language.
8 There were other comments, you know,
9 that were identifying, you know, problems that we
10 had that we clarified. You know, such as you
11 referenced one part you've changed. But you didn't
12 fix it in the other part in Part 61.
13 So, we really appreciated all the
14 comments. And as I said, we have an extensive
15 write up as a response to all the comments that we
16 did identify.
17 So now I'm going to go over to what the
18 meat of what we're really here for, is to look at
19 the draft final Rule changes that we've done.
20 Basically this chart, or table, indicates the
21 changes from the current Part 61.
22 We're going to forget about the
23 proposed rule and previous iterations that we had.
24 I'm going to go now just talk about changes that
25 are from the existing Part 61. That's what I

1 provided you, you know, the Committee with the red
2 lined, strike out version of.
3 So, first thing is that was that we're
4 requiring a site specific analysis. That's not in
5 the current Rule.
6 And then we're going into these --
7 we're specifying time frames for the technical
8 analysis. And I'll go into a little bit more
9 detail in a couple of minutes of where these
10 changes are in the Rule, and detail what they are.
11 But, for this one we're basically
12 putting the time frames as I said, for a compliance
13 period of a thousand year or ten thousand year,
14 depending upon how much long-live radionuclides are
15 being disposed of at the site.
16 MEMBER SKILLMAN: Gary, let me ask this
17 please. Is there any other points in government
18 where a one thousand year or ten thousand year
19 analysis horizon is utilized? Is there any other
20 place?
21 MR. COMFORT: You mean the combination
22 of one or the other?
23 MEMBER SKILLMAN: Of either?
24 MR. COMFORT: Oh, yes. Dave can go
25 over that.

1 MEMBER SKILLMAN: I mean we're in
2 2016. 3016 sounds like a long way away.
3 DR. ESH: Right. So, the thousand
4 years is used in NRC's decommissioning under 10 CFR
5 Part 20. We have a thousand year period to do an
6 assessment for unrestricted or restricted release
7 in decommissioning.
8 For the disposal of high level waste,
9 the analysis time frame goes out to a million
10 years. Broken into two phases up to ten thousand
11 years. And then from ten thousand years to a
12 million years.
13 So, that requires a million year
14 analysis. For the waste isolation pilot plant, I
15 believe they do ten thousand year analysis there
16 for analysis of the disposal of transuranic waste
17 at WIPP.
18 Internationally, there's a whole
19 variety of time frames that are considered. And
20 generally when you speak to the international
21 people, they're somewhat taken aback by the U.S.'s
22 position that we would look at significant
23 quantities of long-lived waste for a thousand
24 years, if that's what we were proposing.
25 They generally are much more

1 comfortable looking at longer time frames. So,
2 they either look at longer time frames, or they
3 first put a limit on the amount of long-lived
4 wasted that's suitable for near surface disposal.
5 And the IAEA pretty much does this too.
6 Although the IAEA generally gives higher level
7 guidance to how to solve a problem. They don't
8 say, you know, use this number and that number for
9 the time frame and the concentration.
10 But, their framework is pretty good.
11 So they have, I would say, a better framework in
12 terms of waste classification then we do. And so
13 do some of the other countries like France for
14 instance.
15 So, in the U.S. we mix long and short-
16 lived waste together in our waste classification
17 system. And some other programs they distinguish
18 the type of waste not just based on the
19 concentrations of the current day, you know,
20 radiation hazard from handling the material.
21 But also in terms of the longevity of
22 the waste they make distinctions. And so, for
23 instance in France, their long-lived waste once you
24 get to a certain threshold, is all destined for a
25 geologic or a deep disposal system. They don't put

1 any of that in the near surface.

2 Whereas, in the U.S., what we're taking

3 about here, partly because of our classification

4 system is, in some circumstances like with the

5 large quantities of depleted uranium, you're

6 putting significant quantities of long-lived waste

7 in the near surface.

8 So, that distinction needs to be made.

9 I went kind of off on a tangent in the

10 international space and answered your question.

11 MEMBER SKILLMAN: That was very

12 helpful. And I appreciate that.

13 DR. ESH: Right. So, but in the

14 domestic side, there are instances where the time

15 frames are developed. And I'm going to talk about

16 that in more detail whenever we get there.

17 MEMBER SKILLMAN: Thank you. That was

18 very helpful. Thank you.

19 MR. COMFORT: And so the key point about

20 the thousand or ten thousand years, currently in

21 our current regulations there aren't any time

22 frames at all. So, it does lead to some ambiguity

23 as to how long do you need to analyze that for.

24 It says you've got to protect the

25 members of the public, you know, and maintain a

1 dose of 25 millirem. Some people could say, you
2 know, hey that's out for whatever the peak dose or
3 long time. Others are, you know, hey, we're really
4 in general talking about short-lived waste. So
5 we're only going to analyze that to five hundred
6 years.
7 But, that's what we're trying to do, is
8 create a system that reduces that ambiguity by
9 providing time frames for these analysis.
10 The other thing this has that we do, is
11 we're adding a new requirement for technical
12 analysis for protection of the inadvertent
13 intruder. That's, you know, not -- there are --
14 there is a requirement to protect them.
15 But it doesn't have a dose limit
16 associated with it. As part of this new
17 requirement, you'll have a five hundred millirem
18 annual dose limit that you have associated with.
19 Now one of the changes that we've done
20 from what the Commission directed based on public
21 comment is the same ideas. Doing scenarios out
22 into the future and guessing what's going to happen
23 at the site is difficult.
24 So, even closure, if you've got a new
25 site, that could be 50, a hundred years away from

1 now. Trying to guess what's going to happen in a
2 hundred years could be significant.
3 Instead what we've change, or what
4 we're recommending in the Rule language to change
5 to is to basically say, do the analysis of what's
6 going on at the site at the time the analysis is
7 done. You know what that is. There's not a lot of
8 question about what's going on. So, it's easier to
9 analyze.
10 But, you'll have to update those
11 analyses during renewal. And then we'll have a
12 final requirement to update them at closure. So
13 again, you're getting an effective goal of the
14 analysis will be based on closure when the site
15 closes.
16 MEMBER BLEY: When does renewal come
17 up?
18 MR. COMFORT: Renewal is based upon
19 whenever, you know, whenever the requirement for
20 the Agreement State is. I mean, what period
21 they've selected at what point.
22 MEMBER BLEY: And that's different for
23 every?
24 MR. COMFORT: It's my understanding
25 it's different for each site. Or each State I

1 should say.

2 MEMBER BLEY: Well, okay.

3 MR. COMFORT: We've also added this new

4 ten thousand year performance period analyses.

5 Now, it's intended to be more of a qualitative

6 analysis. It can be based on technical analysis

7 itself.

8 But we're not putting any type of

9 specific limit, you know, that you have to meet

10 during that post time frame. It's more for the

11 regulator to be able to make a decision

12 particularly for these long-lived radionuclides.

13 You know, that there will be some form

14 of public health and safety going on in that

15 future. But it's difficult to tell what's going to

16 happen, you know, a thousand years, let alone ten

17 thousand or 50 thousand years out there.

18 MEMBER BLEY: Question. You're using a

19 thousand and ten thousand because that's what the

20 SRM said. Is that right?

21 MR. COMFORT: Well yes. The original

22 proposed Rule for the SRM. But also, I mean, it's

23 members of the staff had provided in the original

24 proposed Rule, we used ten thousand years.

25 But the Commission's divided it into

1 the one thousand and ten thousand years.

2 MEMBER BLEY: Okay.

3 MR. COMFORT: So, we're trying to be

4 more site specific by allowing, you know, instead

5 of just one flat for all waste that there are

6 differences in what types of wastes some sites may

7 want to accept.

8 MEMBER BLEY: Take me back. Because I

9 don't remember. Is there -- is anywhere the

10 rationale laid out in the Rule and the SRM or

11 somewhere else about where ten thousand years comes

12 from?

13 Why is it ten thousand years? This is

14 bothering me. I don't understand that at all.

15 DR. ESH: As opposed to seven thousand

16 or --

17 MEMBER BLEY: Anything else.

18 DR. ESH: Twenty-three thousand, or

19 something else right?

20 MEMBER BLEY: Or just a thousand. I

21 mean, here's what I remember.

22 DR. ESH: Okay.

23 MEMBER BLEY: What I remember is what

24 the Rule says is if the peak comes after a thousand

25 years, then you use a ten thousand year. And

there's one other case where, and I forget what that is -- oh, if the daughters continued to grow after a thousand years, you use ten thousand.

The one I know we're concerned about is depleted uranium. It doesn't peak at ten thousand years. It peaks way out by forever. So, ten thousand years isn't much different from a thousand years.

I don't have a clue why we come up with this second number. And why it's what it is. And I don't remember reading a justification that convinced me in any way.

DR. ESH: Well, we did a white paper on considerations for selecting the analysis time frame. And if you don't have that, we should get you that. And I'll put an action item for that.

MEMBER BLEY: This was back in '13 or something.

DR. ESH: I believe it may have been generated in about 2011 or so.

MEMBER BLEY: Okay.

DR. ESH: Somewhere in that time frame.

MEMBER BLEY: But my memory of it was, it just said because DU keeps growing, we're going to use a later time period. But ten thousand

1 doesn't get you anywhere near where the peak
2 occurs.
3 DR. ESH: Right. Well, the situation
4 with depleted uranium is a little unique in that
5 depleted uranium is essentially free of its
6 daughter products whenever it's generated. So,
7 it's a very pure material.
8 And then those daughter products build
9 in over time. And -- but the uranium can cause
10 health impacts and it's pretty significant because
11 it's such a large amount of material and it's very
12 concentrated in uranium.
13 The daughter products are the ones that
14 really can drive things. Especially say the radon.
15 So, at a thousand years, the build up of the
16 daughter products, you're only at about one one-
17 thousandth of the peak dose from the material.
18 MEMBER BLEY: Right.
19 DR. ESH: By ten thousand years you're
20 within one tenth of the peak dose of the material.
21 MEMBER BLEY: Well, more -- I don't --
22 DR. ESH: It's -- no, it's very
23 nonlinear, right. It gets good -- it depends on
24 the ratio of the isotope of U-238 and U-234. The
25 ratios -- the isotopic fractions of the various

uranium isotopes.

MEMBER BLEY: Right.

DR. ESH: But no, you're at about one tenth of the peak, the other direction. Right. Yes. So, you're not at 90 percent. You're at one-tenth.

But the view was that if we have to do something with deleted uranium, if you're only at one one-thousandth of what you might estimate the impact to be, you're really missing the target there.

I mean, if you're within one-tenth given what goes on in performance assessments and the uncertainties and all the various calculations and those sorts of things, that's fairly reasonable when you combine it with the performance period after that.

So, the performance period is still likely to involve quantitative calculations, but a qualitative interpretation of those calculations. So, you don't have a firm dose standard for those very long times. Very long being after ten thousand years.

But you still have somebody doing the calculation to see what they think is going to

1 happen. So, that we felt was an appropriate way to
2 address depleted uranium or other waste that might
3 have similar characteristics to depleted uranium.
4 So, greater then Class C waste, CTCC
5 has the potential to have a very large amount of
6 long-lived, alpha emitting radionuclides. They
7 have the same sort of performance issues associated
8 with them that the depleted uranium will have.
9 So, if you say well, I want to dispose
10 of GTC -- too many C's. There's two Cs on there.
11 In a low level waste disposal facility, that would
12 be a consideration for that waste too.
13 So, the way we structured it with this
14 kind of tiered approach is we had a lot of comments
15 that said okay, but should you really be doing ten
16 thousand years for short-lived waste, traditional
17 waste that has very low amounts of long-lived
18 radioactivity.
19 MEMBER BLEY: Right.
20 DR. ESH: And we generally would say
21 no. You know, you can analyze that for a shorter
22 period of time. If everything's decaying out of
23 your system, fine. You know, don't muck up your
24 calculations with the --
25 MEMBER BLEY: Is the guidance clear on

that?

DR. ESH: The guidance, I hope, is very clear on that.

MEMBER BLEY: Okay. Because I haven't seen that yet.

DR. ESH: Right. Right. So, you have it on your CD. And I'll point you to where that discussion is.

MEMBER BLEY: Okay.

DR. ESH: So but the idea was that in this -- what we've generated here that has elements that I think various stakeholders were looking for. But still has enough technical credibility for that challenging problem, which was the direction why we did all this to begin with.

So, if we were given that direction to deal with this difficult waste stream in our low-level waste regulations, and then we didn't come up with requirements that we think are appropriate for that sort of material, then what exactly did we do?

So that's, you know, in plain terms that's what we were attempting to achieve here.

MEMBER BLEY: That helps a lot. And I did not remember that you built up to a substantial fraction of the daughter.

1 I've probably got the white paper.
2 DR. ESH: Yes, I was just going to say
3 that --
4 MEMBER BLEY: But it would be good to
5 circulate that to everybody.
6 MR. WIDMAYER: Yes, I'll put it back
7 out. At probably two previous meetings, David's
8 provided a chart --
9 (Simultaneous speaking).
10 MEMBER BLEY: I remember that, but I
11 don't remember all the details.
12 MR. WIDMAYER: -- probably gave a
13 nickname to it, like Esh's Bullseye or something.
14 MEMBER BLEY: This was a good
15 discussion. Thank you, David.
16 MEMBER REMPE: We forget things. Could
17 you talk a little bit about uncertainty and how you
18 are -- that was one of the stakeholder comments,
19 and the commissioners have said do something about
20 it -- and how you are dealing with it in the
21 guidance document, and also a little bit about how
22 does that compare with the international
23 community's approach?
24 MR. ESH: Do you want to talk about
25 that now, or do you want to wait until I get in

1 tonight?

2 MEMBER REMPE: If it's in your

3 presentation -- it wasn't obvious from looking at

4 the slides, but if it fits better, that's fine, but

5 I'd like to see it discussed.

6 MR. ESH: Let me try to address it

7 there, and if I don't, remind me again, and we'll

8 pick it up there.

9 MEMBER REMPE: All right, thanks.

10 MR. COMFORT: Any other questions? The

11 other things that we did were basically add a new

12 requirement to update the technical analyses at

13 site closure, add a new requirement to identify

14 defense-in-depth protections and to have -- the

15 rule will also facilitate implementation and better

16 align the requirements with the current safety

17 standards by changing the performance objectives.

18 I'm going to go over, now, the

19 significant changes to the rule language, going

20 through the entire rule real quickly. Where we did

21 a lot of changes were in definitions. We've added

22 definitions for compliance period. This is where

23 we set up the 1,000 year and the 10,000 year. As I

24 indicated, this is Compatibility Category C, so an

25 agreement state could change this, be more

1 conservative on how long they want the compliance
2 period to be.
3 It would have to be no shorter than
4 these, but it could be longer. We also added a
5 definition of defense-in-depth. We believe that
6 defense-in-depth is already implicit in the current
7 Part 61, but the commission wanted us to spell it
8 out and to have licensees identify their
9 defense-in-depth protections, so we've put in a new
10 requirement, as you'll in 61.12, I'll get into in a
11 couple of minutes. Moving on --
12 MEMBER SKILLMAN: Gary, let me ask
13 this. Compliance period -- why doesn't the
14 compliance period begin on the day of the rule for
15 an active site? The way this definition is
16 written, it means the time from --
17 MR. COMFORT: Site closure.
18 MEMBER SKILLMAN: -- closure. Say one
19 of these sites is out there for the next 60 years.
20 It has the legacy inventory been underground for
21 maybe 30 years. It's receiving inventory for the
22 next three or four decades. Why doesn't the --
23 what governs from today to the day the site is
24 closed?
25 MR. COMFORT: They have an active

1 license, so the protections from that is where
2 you'd be getting the health and safety protections.
3 The idea of the compliance period is after there's
4 nobody at the site anymore, that you're trying to
5 evaluate. You have somebody actively at the site,
6 so if you see issues coming up, you know, they're
7 going to be doing monitoring and stuff like that
8 actively at the site --
9 (Simultaneous speaking).
10 MEMBER SKILLMAN: The final rule is
11 really for low-level radioactive waste disposal
12 after the site is closed?
13 MR. COMFORT: These new requirements
14 are for it. There are other requirements on what
15 they have to do while the site is operating.
16 MEMBER SKILLMAN: I certainly
17 understand that.
18 MR. ESH: 61.43, the performance
19 objective, provides for protection of the people
20 operating the facility and members of the public
21 during operations. That's where the issue you just
22 raised would come into play, and all the associated
23 requirements (Simultaneous speaking).
24 MEMBER SKILLMAN: Let me ask one more,
25 and this is really an off-the-wall question, but

I'd like to get it out of my system because I lived the life, and so did my colleague here. What about stuff that got dumped at sea? There was a lot of stuff that went overboard, and it's wherever it is. How do you think about that in the context of this rule?

MR. ESH: The sea disposal of material happened in both oceans, of course, the Atlantic and Pacific. Other countries pursued that, too. But then I believe it was maybe in the early '70s that basically, that practice was ended. There was a moratorium placed on that practice because it was not viewed as being environmentally responsible, I guess, or ethical, whatever word you want to (Simultaneous speaking).

MEMBER SKILLMAN: That's all, thank you.

MR. ESH: That was pre-Part 61. The same sort of logic that applies to the older sites were closed prior to Part 61 would apply to the sea disposal -- the material that was disposed at sea.

MEMBER SKILLMAN: Thank you.

MR. TAPPERT: Just to clarify, on the performance assessment, you're doing that during the operation of the facility? You're not

1 operating it for 60 years and then applying the
2 compliance period, right? The compliance period
3 begins after the site closure, but you're doing
4 that analysis to inform what's being accepted into
5 the facility, right?
6 MEMBER SKILLMAN: I appreciate your
7 comment because that's why I was picking away at
8 what is compliance period. I'm not suggesting that
9 something is in error. I was going for clarity.
10 What I heard the gentleman say is, "While you've
11 got your license, you're in a different set of
12 protections. Compliance period really begins when
13 you close the site and you go to your first 1,000
14 years. I believe that's what you're trying to
15 communicate.
16 MR. TAPPERT: Yes, so that's the
17 compliance period for the analysis period. My
18 understanding is that you're doing that during the
19 operation of the facility, and you're updating it
20 periodically. You don't continue to operate the
21 facility and then do the analysis at the very end.
22 Even though that's the compliance period, it
23 informs the operation of the facility.
24 MR. COMFORT: They have to provide the
25 performance assessment as part of the initial and

updated applications that they do. They'll do the evaluation, so it's not that they're going to all of a sudden dispose of a bunch of stuff, and then say, "We're not going to meet these requirements, and we now have to do something with it. Whether they should have before -- that they're permitted to dispose of material that some of these analyses --

MEMBER BLEY: This might not be a fair question, but since we're writing defense-in-depth into the rule, were you guys tracking or involved in, or at least knowledgeable of the fairly recent NUREG KM, knowledge management on defense-in-depth?

MR. COMFORT: We were aware of it, yes.

MEMBER BLEY: Are you consistent with it in any way?

MR. ESH: I guess you should tell us whether we're consistent with it. We looked at that document when the regulation was developed and these requirements were developed. I believe we're consistent with it.

MEMBER BLEY: Okay, you're aware of it and you followed it. Thank you. That's what I wanted (Simultaneous speaking).

MR. ESH: I'm going to talk about

1 defense-in-depth and --

2 MEMBER BLEY: I haven't looked

3 carefully, so maybe we'll let you know if we don't

4 agree.

5 MR. ESH: I'm going to talk about

6 defense-in-depth when we get to my part. There

7 were some challenges with implementing it for a

8 waste disposal problem compared to, say, other

9 problems, and I was planning to talk about that.

10 MEMBER BLEY: Thanks, David.

11 MR. COMFORT: We've added a definition

12 for an inadvertent intruder assessment, as

13 indicated on it. As I indicated before, one of the

14 things that it is important to note is that we

15 changed the scenario, that basically, somebody that

16 engages in normal activities and other reasonably

17 foreseeable pursuits that are realistic and

18 consistent with expected activities in and around

19 the disposal site at the time of the assessment.

20 That was, again, a change both from writing this

21 definition, but it's also from what was in the

22 proposed rule. It examines the capabilities of the

23 intruder barriers to inhibit contact with the

24 waste, and it estimates the inadvertent intruder's

25 potential annual dose considering uncertainty.

1 We added a definition for long-lived
2 radionuclide because that becomes an important role
3 as to particularly setting the compliance period as
4 indicated. I won't go over the different ideas.
5 We added definitions for performance assessment and
6 performance period, again just to fulfill the
7 requirement -- to add more definition into what the
8 rule is and when we use those terms.
9 For example, in the current 61.13, we
10 talk about technical analyses and technical
11 analysis. That technical analysis is really what
12 became the performance assessment. It's one of the
13 technical analyses that's now required in the new
14 rule, including the inadvertent intruder assessment
15 and all. Performance period, as I said, is a time
16 frame established to provide disposal after the
17 compliance period, but is not going to be -- it
18 doesn't have any technical quantitative
19 requirements or dose limits that you have to meet
20 on it in our role. Again in compatibility C, so an
21 agreement state could determine to do something
22 otherwise. We also added, again, per commission
23 direction, a safety case. Again, we think the
24 regulations already have safety case implicitly
25 involved, but the commission wanted us to more

1 explicitly state what a safety case and what makes
2 it up and have the licensee show that the site that
3 they're operating on a holistic level is safe.
4 Going to some of the new requirements,
5 one of the ones I'm pointing out, the 61.12,
6 because we got a lot of comments on it regarding
7 defense-in-depth. Originally, this was in the
8 proposed rule, in 61.13, which is a category of
9 technical analyses. The way it was written, a lot
10 of people looked at this was going to be a big new
11 elaborate analysis that licensees were going to
12 have to undertake.
13 That wasn't our intent, nor the
14 commission's intent. To make sure that's not the
15 case, we moved it to 61.12, which is technical
16 information. Now we're just basically saying they
17 have to identify defense-in-depth protections. As
18 Dave indicated, he'll get into that some more. The
19 key thing we're trying to say, it's not supposed to
20 be a brand-new big analysis. 61.13 is where
21 probably the meat of the rule really is, in the
22 technical analyses. We've broken this into a
23 number of analyses that make up all the technical
24 analyses, or a number of assessments that make it
25 up. The first one is the performance assessment,

1 which is really showing the protection of public
2 health and safety.
3 It basically relates to the performance
4 objective in 61.41 for the compliance period, now
5 that we've defined as -- I have 25 millirem on an
6 annual basis, but you have to consider the future
7 events and processes that represent the phenomena.
8 You consider the likelihood of disruptive -- what I
9 have listed here is basically a write-down of the
10 requirements of what you have to do as part of that
11 performance assessment. Continuing on the
12 technical --
13 MEMBER BLEY: Can I --
14 MR. COMFORT: Sure.
15 MEMBER BLEY: -- interrupt you for
16 something? Earlier, it'd be 61.7, you mentioned
17 this. In 61.7, it talks about if after closure,
18 the license will transfer to the state or federal
19 government, if it's US it's DOE, and you don't
20 regulate that anymore. If it's a state, our
21 regulations do continue to apply. Two questions
22 related to this. Are all of the existing
23 facilities either going to be DOE or are in states
24 that are agreement states?
25 MR. COMFORT: All of the existing sites

1 are in agreement states.

2 MEMBER BLEY: So there's no

3 (Simultaneous speaking) not in an agreement state,

4 then what would happen? It's not now, but if one

5 shows up in a state that's not an agreement state

6 in the future, the license won't transfer to the

7 state then?

8 MR. COMFORT: I'll have to turn to Chris

9 McKenney. I think he's getting up to --

10 MEMBER BLEY: Or is this a hole that

11 you don't think will ever occur?

12 MR. COMFORT: I'll ask --

13 MR. MCKENNEY: Chris McKenney, NRC.

14 That is one of the factors of defense-in-depth for

15 institutional control that's built into the rule.

16 That's one of those inclusive events of

17 defense-in-depth that's already built in, that by

18 requiring either state or federal ownership of the

19 land for long term, that reduces the probability.

20 Almost all of them are on state-owned land. One is

21 an interesting situation is state-leased land. It

22 will then revert to federal ownership later, which

23 is U.S. Ecology on the Hanford facility. At that

24 point, it will revert to the Hanford Nuclear

25 Reservation in 2063.

1 But the Barnwell facility's already
2 owned by the State of South Carolina, and the Texas
3 facility has, if I remember correctly, joint -- one
4 cell federal ownership, and one cell's state
5 ownership, but there's a combined issue there for
6 some stuff. Those are there for, again, for
7 defense-in-depth for the institution control is
8 long term.
9 MEMBER BLEY: I guess what I didn't
10 understand is should there be a future site that's
11 in a state that's not an agreement state, then the
12 way the rule's written, it still reverts to the
13 state, I guess.
14 MR. MCKENNEY: The state is an option
15 to have that there be, again, as a long-term
16 steward, to make sure that there's less possibility
17 that you don't have to worry about a commercial
18 entity owning the property and maintaining it from
19 sale to another party and having an intruder move
20 on to the site. If it's owned by the state or
21 federal ownership, it has a higher probability of
22 not being used for future development of something
23 other than (Simultaneous speaking).
24 MEMBER BLEY: That kind of makes sense
25 to me, but it doesn't quite tell me we can't -- I

1 don't think NRC can order the states to
2 (Simultaneous speaking).
3 MR. MCKENNEY: Which is why we don't
4 rely on them for more than 100 years. That was the
5 intent of why that was placed in the rule was
6 because by putting it under state or federal
7 ownership, it was likely that you could maintain it
8 as not being used for other purposes, but as just
9 an unused property, basically, for very long
10 periods of time. But if it was owned by a company,
11 then you'd have to rely on deed restrictions and
12 other things like that, as it was passed from
13 company to company, or as those corporations
14 evolved in time. So that's why that situation
15 occurs.
16 MEMBER BLEY: Okay, thanks. The second
17 question I had on that one was for the sites that
18 revert to the DOE after closure, and DOE
19 regulations apply, do we have harmonization between
20 this new rule and what DOE is doing, or are we just
21 doing our own?
22 MR. ESH: Whether the state or the
23 federal government owns the lands, our regulations
24 will apply until the license is terminated, I
25 believe. I don't know. I looked (Simultaneous

1 speaking). Even if DOE assumes ownership of the
2 land, they would be responsible for carrying out
3 the institutional control activities until the end
4 of the institutional control period.
5 MEMBER BLEY: Can I read you a sentence
6 from --
7 MR. ESH: Let's hear from Lisa
8 (Simultaneous speaking).
9 MEMBER BLEY: Let me read the sentence,
10 and then go ahead. The sentence I'm looking at is
11 Item 4. I can't track all of the things, but it's
12 under 61.7. "After finding of satisfactory
13 disposal site closure, the commission will transfer
14 the license to state or federal government that
15 owns the disposal site." Two sentences. "If the
16 U.S. Department of Energy is the federal agency
17 administering the land on the federal government,
18 the license will be terminated because the
19 commission lacks regulatory authority over the
20 Department for this activity."
21 MS. LONDON: Yes, that's what I was
22 going to say. Once the license is terminated and
23 DOE is taking ownership, their regulations will
24 apply.
25 MEMBER BLEY: My question was how does

1 this new rule harmonize or not harmonize with DOE
2 regulations?
3 MR. ESH: If this rule was finalized
4 the way it is, DOE's regulations would be less
5 restrictive, so there should be no issue with it
6 being taken over under DOE's regulations.
7 MEMBER BLEY: Kind of the point I'm
8 getting at it is --
9 MR. ESH: But the one area where I
10 would say that's not the case is DOE applies 100
11 millirem dose limit for a chronic intruder.
12 Whereas, under these regulations, we have a 500
13 millirem dose limit for -- whether it's acute or a
14 chronic intruder. They make a distinction between
15 an acute and chronic intruder.
16 MEMBER BLEY: Kind of the point I was
17 getting at is I know there are international
18 efforts to harmonize regulations. In the nuclear
19 area, there are similar things within the states.
20 We're coming up with a new rule that will apply to
21 some, but not all of these facilities. I don't
22 even know what fraction would go to DOE and what
23 fraction would go to the states. Have we tried to
24 match, so that both the DOE and NRC will be given
25 the same rules, or is it just you flip a coin which

1 site it is, and you get different rules?
2 MR. ESH: No. I wouldn't say -- of
3 course, the perception could be that, but the -- in
4 the last letter that we received from the ACRS, it
5 said don't define, say, the analysis time frames
6 and do it completely site specific. If that's the
7 case, then you are going to be using different
8 values for all different sites.
9 This idea that the NRC and DOE and EPA
10 and whomever all need to do the same thing, I don't
11 think that's the case. I think you can have
12 different regulatory requirements and make
13 everything work. Whenever I go through the
14 technical elements of the regulation, I'll talk
15 about examples where this draft final proposed
16 approach is already being made to work in the U.S.
17 for both NRC and DOE.
18 Yes, you could do some harmonization,
19 but would you then try to harmonize EPA's approach
20 to management of hazardous waste with the DOE and
21 the NRC approach to management of radioactive
22 waste? Those are diametrically opposed, compared
23 to just arguing over what the proper compliance
24 period should be. They do a 30-year evaluation
25 period using a standardized design, and then at the

1 end of 30 years, they'll re-assess and decide
2 whether they still need to maintain the proper
3 controls and restrictions in place. That's a lot
4 different approach then what's being done waste
5 disposal in the NRC commercial side and the
6 Department of Energy.
7 MEMBER BLEY: As you go through your
8 presentation, if you'd point out the places where
9 things are different between this proposed rule and
10 the DOE regulations, I'd appreciate it.
11 MR. ESH: I would argue that there is a
12 difference right there, of course, but there are a
13 lot of things that are very similar. Do they need
14 to be identical? I don't think they need to be,
15 partly because in the commercial side, the NRC's
16 philosophy is that you're going to release these
17 sites at some time in the future, and that the
18 present generation has made proper and good
19 decisions as to how to manage that material.
20 It's not going to create an impact to
21 somebody in the future, whether that is a health
22 and safety impact, or whether that's a financial
23 impact. If you want to say I'm going to provide a
24 much longer period of, say, institutional control
25 to manage the waste, then that comes with financial

1 implications. On the public side, or on the
2 commercial side, we have financial assurance
3 requirements associated with how much money you
4 need to put aside to meet your obligations. Those
5 can be significant in some cases. If you extend
6 the time that you're going to control it, you're
7 going to greatly increase the size of those
8 obligations that you may need to put aside to do
9 all the activities that you may need to do.
10 On the Department of Energy side, I
11 don't believe they, when they're self-regulating,
12 that they have those same sorts of financial
13 assurance requirements because they receive funding
14 from Congress to do all their activities and
15 Congress, year after year, maintains their funding
16 to make sure they can meet their obligations.
17 There's some differences like that that you have to
18 keep in mind whenever you're talking about -- yes,
19 at the highest level, I agree with you completely.
20 We should all be able to come to the
21 same point. But when you start getting down to the
22 implementation stage and look at some of the
23 differences, it makes sense why there could be some
24 differences between the requirements. They may be
25 presented as being difficult and extreme, but from

1 a practitioner, and the other practitioners I talk
2 to, they don't view them the same way. What you
3 may receive from some stakeholders as to how
4 significant of an issue this is, you'll receive a
5 lot different message from other stakeholders. The
6 practitioners don't view this as, generally, it's
7 as big of an issue as maybe some of the
8 policymaker-type stakeholders.
9 MEMBER BLEY: I'm going to chase this
10 just a little further. Thanks for that
11 explanation. I like that. Are those kind of
12 arguments laid out in the statements of
13 consideration or somewhere else? We don't have the
14 statements of consideration.
15 MR. WIDMAYER: Yes, it's part of the
16 red package I gave you.
17 MEMBER BLEY: It's in this package?
18 It's not called statements of consideration in that
19 package.
20 MS. LONDON: It's in the Federal
21 Register notice.
22 MR. COMFORT: The draft Federal
23 Register notice includes the statements of
24 consideration. No, it won't get into that -- it
25 won't get into this harmonization issue in there at

1 all and stuff on it. Part of it --
2 (Simultaneous speaking).
3 MEMBER BLEY: The arguments were pretty
4 interesting about commercial versus a tax-supported
5 operation, but that's not anywhere in there?
6 MR. COMFORT: Yes, we didn't get a
7 question specific to that that would have been
8 answered that way. The actual rule language that
9 you're addressing in 61.7 regarding the states and
10 all has not changed. That's in the existing
11 regulations anyways and stuff. The part that we
12 may want to look at is the statements of
13 consideration for that rule, which I guess they
14 really didn't have one. They had the environmental
15 impact statement to see if they were -- what they
16 were envisioning in the way of the turnover to a
17 state or Department of Energy and stuff on it --
18 MR. WIDMAYER: Hey, Dennis.
19 MR. COMFORT: -- but it does not
20 discuss this at all.
21 MEMBER BLEY: Thanks, Gary.
22 MR. WIDMAYER: One of the parties that
23 wants to make comments this afternoon is the
24 Department of Energy, so you'll hear from them
25 later on in the day.

1 MEMBER BLEY: I was figuring that would
2 happen.
3 MR. COMFORT: Okay, continuing on,
4 another part of the technical analysis, and a big
5 one, is the new inadvertent intruder assessment for
6 the compliance period. It requires that -- it
7 assumes the inadvertent intruder occupies a
8 disposal site and engages in normal activities and
9 other reasonable foreseeable pursuits that are
10 consistent with the activities and pursuits
11 occurring in and around at the time of the
12 development of this intruder assessment, as I
13 indicated in the definition.
14 It's updated prior to closure, and it
15 identifies barriers to inadvertent intrusion that
16 inhibit contact with the waste or limit exposure,
17 and it provides the basis for the time period over
18 which the barriers are effective. Finally, it
19 accounts for the uncertainties in variability in
20 the projected behavior of the disposal site and
21 general environment. This relates to the
22 performance assessment in 61.42, which, for the
23 compliance period, has an annual dose limit of 500
24 millirem, which is new, which is not in the current
25 rule now.

1 CHAIR CHU: Can I ask a quick question?
2 MR. COMFORT: Sure.
3 CHAIR CHU: The intrusion scenario,
4 within the compliance period, do you do one-time
5 assessment, or several, or what? It's not clear to
6 me.
7 MR. ESH: The intruder assessment
8 covers the whole compliance period. If you had
9 significant quantities of long-lived waste, then
10 the performance period, also. The evaluation would
11 look at intruder impacts --
12 CHAIR CHU: (Simultaneous speaking.)
13 MR. ESH: Yes, it'd calculate the
14 intruder impacts over the whole time period, and
15 then generally pick the peak value within the time
16 period.
17 MR. COMFORT: Dave, I think, will get
18 into more on that. The types of scenarios I think
19 that we have them look at are relatively defined on
20 it. In addition, in 61.13, Item C, D, and E, are
21 that you do it announced as a protection of
22 individuals during operations. That hasn't changed
23 from what's currently in the regulation. We have a
24 long-term stability analysis.
25 Again, that's required in the current

1 regulation. The big change is that it now has a
2 time period that you have to associate that
3 stability analysis with. Then we've added this new
4 performance period analysis, which is only required
5 if you have to do a 10,000-year compliance period
6 for the performance assessment or for the
7 inadvertent intruder assessment. It basically
8 looks at how the site would limit the potential
9 long-term radiological impacts, consistent with the
10 available data and current scientific
11 understanding. There's no dose limit associated
12 with that. It's just basically try to minimize
13 doses that you can find or seem to be a reasonably
14 achievable level in the far future. But again,
15 with all the uncertainties, that's why we decided
16 not to put a limit on that.
17 We had some other changes throughout,
18 again, editorial, but the next area where there's a
19 significant change in the performance objectives is
20 61.41. Again, this is basically added a 25
21 millirem dose limit for the protection of the
22 public. We've defined a compliance period, rather
23 than just for the assessment, in general. It
24 basically stays the 25 millirem limit. However,
25 the previous was based on methodology, older ICRP

1 methodologies.

2 We've updated the language in there so

3 that the more modern methodologies or more recent

4 methodologies can be used. It's, as I said,

5 demonstrated through the analyses for the

6 performance assessment that are specified in

7 61.13(a). For the performance period, as I said,

8 it must minimize the releases to radioactivity to

9 the general public, to the extent reasonably

10 achievable. That's basically the qualifier on it,

11 and it's demonstrated through 61.13(e), which I had

12 just shown you. 61.42 is basically the performance

13 objective for the inadvertent intrusion. This is

14 where there was no limit before. It was basically

15 evaluate it and keep it reasonable. Now we've put

16 a limit of 500 millirem to the inadvertent

17 intruder, which is demonstrated through the

18 analysis that we discussed for 61.13(b).

19 Similar to the 61.41 requirement, the

20 performance period, you have to minimize exposures

21 to inadvertent intruders to the extent reasonably

22 achievable. The final area that I'm going to go

23 over is really the draft final -- is 61.58, which

24 is the alternative requirements for waste

25 classification. In the current rule -- well, this

1 section was really replaced in its entirety.
2 The original 61.58 allowed the
3 commission to authorize provisions for the
4 classification and characteristics on a specific
5 basis if there were reasonable assurance that the
6 performance objectives of Subpart C in 10 C.F.R.
7 Part 61 could be met, so basically the 61.41,
8 61.42. In this draft final rule, we've replaced
9 requirements to better specify a process for
10 requesting and approving alternative requirements
11 for waste classification by specifying the waste
12 acceptance criteria must be provided and specify,
13 at a minimum, the allowable activities and
14 concentrations, the acceptable waste form
15 characteristics, and identifying restrictions or
16 prohibitions on the waste materials or containers
17 that might affect the facility's ability to meet
18 the performance of objectives.
19 The final rule also requires that the
20 applicant provide acceptable methods for
21 characterizing waste for the acceptance and program
22 to certify the waste. These programs are required
23 to be reviewed annually by the licensee. Really, a
24 overview of the big ideas of the changes. Dave, in
25 his presentation, will be getting into more of the

1 technical basis for it and how the changes will
2 work through guidance and all of this stuff. Are
3 there any questions I have before we potentially
4 take a break or move over to Dave?
5 CHAIR CHU: I have a question on the
6 performance period analysis. Are these
7 quantitative or qualitative?
8 MR. COMFORT: The results are evaluated
9 qualitatively. You can develop a quantitative
10 evaluation. A lot of times, it may just be running
11 out your model that you've already developed and
12 keeping things consistent.
13 (Off mic comment)
14 MR. COMFORT: Right, but we're not
15 requiring you to meet a certain limit or anything.
16 It's more to give an idea of what's the potential.
17 CHAIR CHU: Even if it peaks a lot?
18 MR. COMFORT: That's what you're trying
19 to evaluate. If you see a huge peak somewhere in
20 the future, when you run it out past -- in this
21 performance period, the regulator may say, "If
22 there's something that can be done about it, we may
23 want to do something about it."
24 CHAIR CHU: Because I was thinking of
25 what, Dave, you said earlier about depleted

1 uranium. In 10,000 years, only 10 percent decayed.
2 MR. ESH: At 10,000 years, you're only
3 at about one tenth of the peak risk is what it is
4 generally. Of course, that would depend -- that's
5 just from a radiological decay and in growth
6 perspective. When you move to a real system and,
7 say, you put that waste in a disposal facility and
8 you analyze what the impacts to the drinking water
9 are, or an inadvertent intruder, the peak may occur
10 a lot earlier than the peak radiological time. The
11 peak radiological time is something like 2.1
12 million years, but in the dose assessment, the
13 peaks may occur earlier. It would depend on your
14 specific site physics and chemistry, that sort of
15 thing.
16 CHAIR CHU: I was just wondering have
17 you done any reference case calculation way beyond
18 10,000 years to test that performance period, see
19 what happens?
20 MR. ESH: Not specifically in, say,
21 this iteration of the rulemaking, but back in 2008
22 time frame, whenever we looked at can you even put
23 depleted uranium in a near-service disposal
24 facility, we ran calculations out to much longer
25 time then. The general messages from that were

1 that you're going to be very challenged to put that
2 material in a human site, and you're going to be
3 very challenged to put that material in a shallow,
4 arid site. You need to start getting the material
5 fairly deep, in order to knock the radon impacts
6 down.
7 MR. COMFORT: Any other questions?
8 MEMBER KIRCHNER: Yes, I have a
9 question. You mentioned earlier that several of
10 the agreement states would take a longer time of
11 compliance. When they do that, is the
12 justification for that just to be conservative, or
13 does it fit in with your long-lived radionuclides
14 definition?
15 MR. ESH: I can't answer, necessarily,
16 why the agreement states may have used different
17 values. Originally, prior to starting this
18 rulemaking activity, all the existing facilities
19 were located in four agreement states. The
20 analysis time frames that they used ranged from 500
21 years to 1,000 years or peak dose, whichever is
22 longer. For that particular case, their peak was
23 at approximately 50,000 years.
24 Their compliance periods that the four
25 sites used ranged from 500 to 50,000. As we went

1 through this rulemaking process, the one agreement
2 state that had used 500, they had a proposal from
3 their licensee to dispose of larger quantities of
4 depleted uranium, so they did a revision to their
5 rulemaking to specify requirements for large
6 quantities of depleted uranium.
7 For that, then, they look at 10,000
8 years, and they do a longer term analyses. Their
9 new requirement mimics what's in our draft final
10 rule pretty well. As to why they picked those
11 different values, I think it's part of what you may
12 have heard if you were part of the subcommittee or
13 full committee at previous meetings in all this
14 last eight, nine, or ten years that we've been
15 discussing it. There's a big diversity of opinion
16 on the topic. It can be quite subjective.
17 Everybody has an opinion, and they tend to all be
18 different. The thing that I have looked at in both
19 the response to comments and in the draft final
20 approach is right now, all of these facilities are
21 in agreement states. The agreement states do the
22 regulation, and in most cases, the states have to
23 receive the facility after closure from the
24 licensees.
25 They have standards on the book that

1 they've used to license their existing facilities.
2 Who am I, sitting here in Washington, to come and
3 say, "No, you've got it all wrong. You need to do
4 it this way." They have to make the decisions
5 based on their processes and rulemaking and
6 interaction with their state stakeholders what they
7 think is appropriate to do for that facility in
8 their state.
9 Because it's not something that I think
10 you can pull a number and say absolutely, this is
11 the perfect number for it, then we should afford
12 flexibility to them to look at the problem in a
13 manner that they think is suitable for their
14 agreement states and to managing -- go ahead.
15 MEMBER KIRCHNER: I might invert my
16 question, then. Once you promulgate this final
17 rule, would any of the agreement states be less
18 conservative, not bounded by the rule?
19 MR. ESH: No, all of the agreement
20 states -- South Carolina has -- they've used an
21 analysis of up to 2,000 years in their technical
22 evaluation. They don't have a requirement -- or
23 they haven't done an intruder assessment. In the
24 existing rules going forward, if they determine
25 that they do not have significant quantities of

1 long-lived radionuclides, then they would be fine
2 because they could use 1,000, or they could keep
3 their 2,000 if they want, whatever they choose.
4 If they found that they did have
5 significant quantities of long-lived radionuclides,
6 then they would get pushed up to the 10,000.
7 Otherwise, the other three existing agreement
8 states are all at or greater than the requirements
9 that we've proposed.
10 MEMBER REMPE: You don't know whether
11 they have long-lived radionuclides? Surely, they
12 know (Simultaneous speaking).
13 MR. ESH: No, they have long-lived
14 radionuclides in their facility. As I'll outline
15 when I talk about it, half of that decision -- or
16 the part of the decision associated with the
17 inadvertent intruder, where it's much more
18 straightforward to determine what is significant.
19 For 61.41, the protection of the public through
20 releases of the facility that might occur, say,
21 into an aquifer or if you had erosion at the
22 facility or those sorts of things, release to
23 surface water, those are much more site-specific
24 calculations. What's significant for one site can
25 be a lot different than what's significant for

1 another. Without having the details of their
2 hydrogeology and all the things that might go into
3 that, it's hard for me to say, clearly, whether
4 they are in the camp of having significant or not.
5 They have some long-lived
6 radioactivity, and based on the fact that their
7 waste was pretty similar to what's generated
8 commercially, without any special waste streams, my
9 educated guess would be that they don't have
10 significant quantities of long-lived isotopes, but
11 it would depend on some of the details of the
12 problem. Based on inventory, alone, and the fact
13 that they're a humid site, it makes it much more
14 challenging for them to make that argument than it
15 does, say, for a site in Utah or a site in West
16 Texas.
17 MEMBER REMPE: Thank you.
18 CHAIR CHU: Any other questions? If
19 not, I suggest we take a break. We'll come back at
20 five until 3:00. Thank you.
21 (Whereupon, the above-entitled meeting
22 went off the record at 2:40 p.m. and went back on
23 the record at 2:56 p.m.)
24 CHAIR CHU: Let's resume the meeting
25 and have Dr. Esh give his presentation.

1 MR. ESH: Thank you, Dr. Chu. Thank
2 you for your kind introduction earlier. To me,
3 that's really a reflection of who I work with,
4 rather than my own abilities. I'm going to give
5 you an overview of the major technical elements of
6 10 C.F.R. Part 61. Before I do that, I'd like to
7 recognize some of the people that aren't here that
8 have contributed to that.
9 Of course, you've heard from Gary
10 Comfort, but also, we had Andrew Carrera in
11 rulemaking that did a significant amount of work on
12 this project, Chris Grossman, who's on the
13 telephone, and Hans Arlt, from my group in
14 performance assessment, Lisa London, who you heard
15 from earlier, from our office of general counsel,
16 Tim McCartin, senior level advisor in all things
17 waste, I would say.
18 I don't know what his particular title
19 is. We had members from agreement states on our
20 working group that provided valuable input to this
21 process. Then in the low-level waste branch, our
22 current project manager, Steve Dembek and Priya
23 Yadav, who's our excellent project manager on the
24 guidance document. All of those people had
25 significant contributions to this project. We also

1 would like to indicate that we appreciate the time
2 and effort of all the commenters and stakeholders
3 in this process. I'm particularly impressed by
4 members of the public when they give their time for
5 something like this. Everybody's time is valuable.
6 They come in the evening and listen to
7 the meetings for three hours and read some pretty
8 substantial documents. That's impressive to me
9 when we get that sort of input from members of the
10 public. We did our best to respond to all the
11 comments, which was part of the package.
12 The draft final rulemaking package has
13 been through review at, basically, all levels of
14 the NRC, except the commission, and except your
15 committee, possibly, but it went through the full
16 concurrence process on its way up there. Of
17 course, not everybody is going to be happy with the
18 final outcome, but that's generally impossible to
19 do when you have some pretty diverse and strong
20 opinions on some of the topics.
21 MEMBER BLEY: Sorry to interrupt. That
22 statement that everything's been reviewed all the
23 way up, does that include the NUREG?
24 MR. ESH: Sorry, no. The NUREG is at a
25 little bit slower pace than the rest of the

1 package. I've kind of learned, through my
2 experience, that maybe a good rule of thumb for a
3 regulator is if everybody's kind of unhappy with
4 you, then you've done a good job, so we'll see.
5 Next slide, please, Gary.
6 The outline I'm going to follow is a
7 little bit different than if you just picked up the
8 regulation and started reading through it because
9 some of these pieces kind of fit into others. This
10 is more of a top-down view of the technical
11 elements of the regulation. I'll start off with
12 the safety case, which is kind of the overarching
13 summary of the arguments for why you believe the
14 facility is safe.
15 A lot of information flows into the
16 safety case, but the two primary ones are the
17 identification of the defense-in-depth protections,
18 and then the technical analyses. They provide much
19 of the basis for the safety case. But that isn't
20 to diminish many of the other components of the
21 regulation that might, in some respects, play an
22 equally important role in the overall safety case.
23 The analysis time frames I'll discuss because it is
24 an area of interest to a lot of stakeholders. The
25 way I would describe it is it kind of provides a

1 boundary condition for the technical analyses.
2 What you decide with analysis time frames can then
3 condition or dictate what you need to consider in
4 your technical analyses. As you heard earlier,
5 part of the approach in the final rule is to try to
6 make a distinction between "normal waste" and waste
7 that may contain significant quantities or higher
8 amounts of long-lived radionuclides.
9 The technical analyses that I'll
10 discuss, I'm going to describe the performance
11 assessment, intruder assessment, and site stability
12 analyses. Then all of that information can flow
13 into the waste acceptance requirements. As Gary
14 discussed, the waste acceptance requirements or the
15 waste acceptance criteria can be based on the waste
16 classification tables in Part 61, Table 1 and Table
17 2, or they can be based on the results of the
18 technical analyses, or they can be a combination of
19 both.
20 I'll go through that approach in the
21 waste acceptance requirements because the waste
22 acceptance requirements are really how you put
23 something in place that ensures that all the
24 analysis and evaluation you did in developing the
25 licensing of the facility is going to be achieved

1 in the actual facility. We'll talk about the
2 guidance document in a kind of high-level form, but
3 any of these things I talk about or areas I don't
4 talk about, if you have questions when I'm done,
5 hopefully we have enough time. Feel free to talk
6 about any things, whether I talked about them in
7 the slides or not.
8 MS. YADAV: Dave, can I add one
9 comment?
10 MR. ESH: Yes, go ahead.
11 MS. YADAV: Hi, this is Priya Yadav.
12 I'm glad you guys can hear me and Chris Grossman.
13 We were trying to say a couple things a little
14 earlier, but we were on mute. I just wanted to
15 add, on the guidance -- because I know that it is a
16 long document -- on the CDs that you have, I also
17 added a file that's called, "Please Read Me First."
18 I thought hopefully, you might glance at it and
19 read it. Dave and I and Chris just tried to kind
20 of pick the most important areas for you to look at
21 first, since it is so voluminous.
22 We identified, "Look in this section
23 for a discussion of significant quantities. Read
24 this section carefully." It's just a quick one
25 pager, saying, "Here are the most important

1 sections that you might want to start with." Of
2 course, all 500 pages are available to you, as an
3 official use only copy. Right now, it's not
4 publicly available, just because we don't want to
5 have multiple versions of a NUREG out before the
6 rule is not changed anymore. After we get
7 definition on the rule, that it's final, then we'll
8 issue the publicly available version of the NUREG.
9 So the OUO copy you have on CD is for your use, but
10 I hope that the Please Read Me file helps you in
11 what areas to start with.
12 MR. ESH: Thank you, Priya. On Slide
13 3, the first item I'll talk about is the safety
14 case. The safety case is a collection of arguments
15 and evidence to demonstrate the safety of the land
16 disposal facility, e.g. the defense-in-depth
17 protections and the technical analyses. Our
18 representation of safety case is quite similar to
19 the international atomic energy agencies, but not
20 identical.
21 There are some differences between what
22 we're considering a safety case and how they would
23 describe a safety case. Those differences
24 primarily arise from the role of stakeholders in
25 their processes, and also the fact that in the

1 IAEA's vision, for many of their member states,
2 they will do multiple safety cases. They'll do a
3 safety case for site selection. Then they'll do a
4 safety case to determine whether they can construct
5 the facility. Then they'll do a safety case for
6 operations, a safety case for post-closure, and so
7 on and so forth. Whereas, in the NRC licensing
8 process for low-level waste, we basically do one
9 safety case for the whole thing. You could maybe
10 make an argument that we're kind of doing two
11 because once you get to the closure point, which
12 may be a considerable distance in the future, you
13 might be doing, essentially, another safety case
14 then, if your information has changed
15 significantly.
16 If your information has not changed
17 significantly, then I would make the argument
18 you've only done one safety case. It's the 10
19 C.F.R. Part 61 licensing process. But the safety
20 case is to describe all relevant safety aspects of
21 the disposal site and things like the design, the
22 managerial controls, the regulatory controls, all
23 of that feeds together to make the safety case.
24 Much of the information for the safety
25 case is already in the existing 10 C.F.R. Part 61

1 requirements, under 10 C.F.R. 61.10 through 10
2 C.F.R. 61.16. The idea is that the safety case
3 will be updated over time, as new information is
4 gained during the various phases of the facility,
5 but depending whether that update is simple or
6 significant depends on, No. 1, how much your
7 information has changed and, No. 2, how much margin
8 you may have built into your facility to begin
9 with. If you are smart about your design and maybe
10 do a good job at anticipating changes that may
11 occur over time or things that might stretch your
12 system, then your safety case is going to be a
13 pretty robust argument through time, no matter what
14 phase of the facility operation or closure, that
15 sort of thing, you may be in.
16 Next slide, please. The main point,
17 and the main view of the safety case from us, is
18 that it should be a plain language description.
19 You're kind of looking at an executive summary of
20 your licensing basis for the safety of the
21 facility. You'll describe the strategy for
22 achieving the safe disposal, the safety arguments
23 that go into that, describe your site and facility,
24 provide information about the characteristics of
25 the waste and the design and the proposed operation

1 of the facility, and then also summarize the
2 technical analyses, the strategy for institutional
3 control, and the licensee's financial
4 qualifications.
5 This description should be something
6 that is understandable by many. It may be
7 technical, but it doesn't have to be. But it
8 should, in a concise form, summarize all the key
9 features that go into making the safety argument.
10 The safety case was added, as Gary had indicated,
11 based on direction from the commission that we
12 received on the prior rule, as published. Go
13 ahead, Gary. On Slide 5 here, now we'll move into
14 defense-in-depth, which is one of the components
15 that feeds into the safety case. The definition is
16 up here at the top. I'm going to read it.
17 "The use of multiple independent and,
18 where possible, redundant layers of defense, so
19 that no single layer, no matter how robust, is
20 exclusively relied upon." One thing that we wanted
21 to do here, NRC has existing definitions of
22 defense-in-depth. We did want to deviate and come
23 up with multiple definitions of defense-in-depth.
24 We thought that's going to be confusing to people,
25 and people may say, "Why do you have a different

1 definition? Which definition should I use?"

2 We felt that it was much better to

3 have, as much as we could, a single definition

4 because defense-in-depth is really a principle, and

5 it shouldn't change depending on the application.

6 But in the case of a waste disposal facility, there

7 are some pretty substantial differences than many

8 other nuclear facilities because the waste disposal

9 facility, at least as you progress out in time,

10 their reliance on active safety systems and

11 controls diminishes, and it becomes almost totally

12 reliant on passive safety systems and controls. At

13 the bottom of this diagram, you see the various

14 arrows here. That's just increasing time from left

15 to right, but it's basically indicating the various

16 things that may come into play to make a

17 defense-in-depth argument.

18 Those include personnel controls,

19 active barriers, passive barriers. But the bottom

20 big arrow is different phases or different life

21 cycle time frames of the facility. You see that

22 the items above it, the various types of

23 defense-in-depth protections, may diminish as you

24 go out in time, especially the impact of personnel.

25 Because after the institutional control

1 period, generally, you're not going to have any
2 personnel there, and the same thing with controls
3 and active barriers because there'll be nobody
4 there to maintain an active barrier. Examples of
5 defense-in-depth protections can include things
6 like the site characteristics and the waste
7 characteristics. This feature was also added in
8 response to commission direction. As I indicated,
9 a challenge with the waste disposal is that it is
10 different from active and other nuclear facilities,
11 in that you are relying more heavily on passive
12 components and less heavily on active components.
13 So the problem came into play, especially with the
14 word redundant in the layers of defense. We had
15 this question -- this was an area of question from
16 a variety of stakeholders. They said, "What does
17 that mean for a waste disposal system, then?"
18 Say in a reactor, you have a pump and a
19 backup pump. In a waste disposal system, you have
20 a drainage layer and an engineering cap. Does that
21 mean you have a backup drainage layer and the
22 engineering cap? What we basically explained, and
23 especially in the guidance, is that we're looking
24 for redundancy at the functionality of what you're
25 trying to achieve, but not necessarily redundancy

1 of the layer or barrier itself.

2 If minimizing water flow to the waste

3 is very important to you, then you should have some

4 redundancy of trying to prevent the water flow to

5 the waste, not that you have to have redundant

6 barriers to achieve that function. You can, if

7 that's the way you choose to go about it. But the

8 other important point, then -- sorry, next slide,

9 Gary. The other important point, though, is that

10 as we discussed earlier, we aren't asking for

11 defense-in-depth analyses. We're asking for

12 identification for the defense-in-depth protections

13 commensurate with the risks. We want the licensees

14 to describe the capabilities of their

15 defense-in-depth protections and provide a

16 technical basis for those capabilities.

17 The requirement, as formulated now,

18 provides considerable flexibility for how somebody

19 demonstrates that they meet these requirements

20 associated with defense-in-depth protections. They

21 are not prohibited from doing what I would call

22 defense-in-depth analyses. If I was faced with the

23 problem, that's what I would do.

24 I would be most straightforward and

25 more quantitative and less subjective, but they

1 aren't necessarily required -- they aren't required
2 to do that. They're only required to identify the
3 protections, so it may take a more qualitative
4 form, the description of how they've achieved the
5 defense-in-depth requirements. Next slide, Gary.
6 As I indicated, operations and
7 post-closure may have some differences based on the
8 phase of the facility you're in. During
9 operations, you can have both active and passive
10 safety systems commensurate with the hazard and
11 complexity of activities. Whereas, when you move
12 to the post-closure phase, you're really looking at
13 essentially just the passive features of the
14 system. Post-closure is, of course, after the
15 closure and, really, after the institutional
16 control period. After closure of the facility,
17 only if problems were identified would you imagine
18 that there's going to be changes to the design or
19 other sorts of activity at the facility.
20 Otherwise, the institutional control
21 period is mainly a passive monitoring of the
22 facility performance and active monitoring of -- or
23 preventing access to the site. There are some
24 benefits associated with defense-in-depth that are
25 identified here. Under the post-closure one, I'd

1 say it's the second and fourth items.

2 Defense-in-depth, we believe, provides

3 the diversity of the capabilities associated with

4 defense-in-depth of the components and the

5 attributes, provides you more resilience to

6 unexpected failures or external challenges. Then

7 in addition, the use of defense-in-depth should

8 help mitigate some uncertainties or lessen the

9 impact of uncertainties. It's not going to

10 mitigate all uncertainties, but it can help you

11 mitigate some of the uncertainties. The

12 defense-in-depth is made to work with and not

13 inhibit, in any way, the demonstration of

14 compliance with the performance objectives. Those

15 two things work together to provide information

16 that supports the overall safety case. Next slide.

17 CHAIR CHU: Dave?

18 MEMBER BROWN: Go ahead, Margaret.

19 CHAIR CHU: Can I ask you to give some

20 specific examples of post-closure defense-in-depth

21 specifically (Simultaneous speaking)?

22 MR. ESH: The defense-in-depth for

23 post-closure, you're really looking at the passive

24 performance of the system. That's going to be

25 things like your engineered cover. Even though

1 it's an engineered cover, and some engineered
2 covers, based on their design, might require more
3 active efforts to maintain them, many of them can
4 have some passive performance credit to them.
5 Department of Energy, at the Hanford
6 Site, has the Hanford barrier that they've done a
7 lot of work on and tried to evaluate how much
8 passive performance you might expect from that sort
9 of engineered cover. They've even looked at things
10 like fires, kind of unlikely events that you might
11 expect and how they might stress the system. Then
12 as you move into the system, of course, if you have
13 waste forms for some types of waste, the waste form
14 is going to have passive performance in the system.
15 You might have an engineered cover that helps limit
16 infiltration or release of the waste, and the waste
17 form, itself, might help limit infiltration
18 contacting the radioactivity that's embedded in it
19 or encapsulated, depending on the design, and then
20 the release from it.
21 You could also, in some cases, have
22 waste containers that might have some performance
23 credit. That's generally more rare in the
24 commercial side of low-level waste disposal, but
25 certainly, people aren't prohibited from using an

1 engineered container and taking credit for it as a
2 barrier. That's an example with respect to
3 infiltration.
4 I would look at the arguments -- also,
5 say if I was a location that was a very arid site,
6 that arid site is a barrier to release or a
7 component to the argument to release because you've
8 selected a location where the precipitation is very
9 low, and the infiltration rate is low. That's one
10 of your active parts of selecting the facility to
11 make your safety argument that provides you some
12 confidence that you're going to be meeting the
13 criteria. That sort of thought, that's just an
14 infiltration example, but we could go through other
15 ones, transport and things like that.
16 MEMBER BROWN: Could I ask a question
17 here, also?
18 MR. ESH: Yes.
19 MEMBER BROWN: Back when you answered
20 my question relative to active site, old stuff,
21 when it has to be evaluated for compliance, in
22 accordance with the new rules, which, I guess,
23 includes defense-in-depth compliance evaluations,
24 does that mean they have to dig it back up if you
25 find you don't comply?

1 MR. ESH: Right. This is a question
2 that came up in the public comment process and has
3 come up multiple times in our eight or nine years
4 that we've been discussing it. This idea that if
5 you're not in compliance, you need to take some
6 action is always in place. NRC, we regulate a
7 facility.
8 We have requirements you're attempting
9 to meet. We then inspect and verify and monitor
10 that you are meeting the requirements. If you're
11 not meeting the requirements, then some action is
12 taken to get you into compliance and meet the
13 requirements. You could, hypothetically, identify
14 a situation where a facility has a challenge
15 meeting the compliance criteria in the future.
16 They would have to come forward and say what
17 actions they're going to take to try to mitigate
18 the impacts of that.
19 MEMBER BROWN: But you changed the
20 rules. You've changed the rules on them after --
21 the stuff could have been there for 10 or 15 years,
22 and now you've changed the rules. Now you're going
23 to say, "We've got new rules." It seems like their
24 only recourse to make compliance would be to come
25 back and dig it up, put more barriers around it,

1 etc. Is that --

2 MR. ESH: Digging it up would be the

3 last action you would take, I would believe. I

4 think at first, you would see if there were

5 barriers you could put in place to mitigate the

6 impacts. Secondly, you might even do a risk

7 analysis to look at the socioeconomic

8 considerations -- the technical plus socioeconomic

9 considerations to see whether it's justified to

10 take that action.

11 Because you have a hypothetical dose

12 impact sometime in the future. You have a real

13 impact from doing remediation or digging up

14 radioactivity. We deal with this all the time in

15 decommissioning, where there's actual material in

16 the environment that somebody has to decide whether

17 to take action for and what action to take. That's

18 not unique to this problem. The existing

19 requirements in Part 61 are silent on -- say if

20 you're coming at this from an analysis time frame

21 standpoint, they're silent on what the compliance

22 period is. The intruder protection performance

23 objective says the intruder must be protected at

24 any time in the future. Is that changing the

25 requirements on them if now, we specify a time, if

1 you go from any time to specifying a time? I would
2 say any time encompasses any time.
3 MEMBER BROWN: It sounds like mouse
4 milking to me. You answered my question. I
5 understand your point. I just wanted to make sure
6 I understood the thought process. You're kind of
7 bouncing around a little bit. There's a lot of
8 things to think about, which take time to assess
9 and all types of other things.
10 MR. ESH: I don't think that the -- we
11 don't have Charlie Brown and Lucy going on here.
12 MEMBER BROWN: That's me.
13 MR. ESH: I know you're Charlie Brown.
14 (Simultaneous speaking.)
15 MEMBER BROWN: Should I take that with
16 a grain of salt, or should I be angry?
17 MR. ESH: That's purely by accident.
18 We aren't intending to change the target on
19 somebody. There are some considerations that --
20 yes, there are new requirements put in place, but
21 the fundamental backbone to what's trying to be
22 achieved in low-level waste disposal is still there
23 in the existing Part 61, and in the proposed one.
24 The one area where it's different, and I would say
25 is the most significant area, is in the area of

1 requiring the intruder assessment.

2 When the existing Part 61 was

3 developed, the intruder was protected by the

4 regulator doing an analysis of what waste they

5 thought would go in the facilities in the future,

6 and then doing -- basically we call it a back

7 calculation to determine what concentrations would

8 result in the impact they were trying to protect

9 people to.

10 Those concentrations are what are shown

11 in Table 1 and Table 2 of the regulation. The

12 existing regulation says protect the intruder at

13 all times in the future, but the way that you do

14 that is by showing that the waste meets Table 1 and

15 Table 2. It also has other requirements associated

16 to intruder barriers and depth of the waste that

17 you must meet. That's the area where I would more

18 agree with you that you could say that the target

19 was shifted because you're now requiring an

20 analyses, but in our -- in practical application of

21 that, three of the four existing sites have already

22 done an intruder analysis. It's only one out of

23 the four that didn't do the intruder analysis. The

24 majority of them have.

25 MEMBER BROWN: Thank you.

1 MS. LONDON: This is Lisa London from
2 OGC. I just wanted to highlight a couple of points
3 that Dave made that I think it's really important
4 -- key take-away points. That is that the
5 performance objectives in Part 61 always have to be
6 complied with. That was always the case. If a
7 site had reached its closure point ten years ago,
8 it would be incumbent upon them to be able to
9 demonstrate compliance with the performance
10 objectives.
11 These rule revisions are not imposing
12 anything that says -- we're simply not requiring
13 anything to be dug up. You're not going to find
14 anything in the rule that requires that. It's
15 incumbent upon the licensee to propose how they
16 would want to approach dealing with a situation if
17 they were to determine they would not be able to
18 meet the performance objective. We're not
19 requiring anything to be dug up. Just wanted to
20 make sure -- because as Dave noted, this has come
21 up numerous times. I think it's really important
22 that we stress that we are not requiring anything
23 to be dug up. It will be incumbent upon the
24 licensee to propose how they solve a problem.
25 MEMBER BROWN: Yes, but that's kind of

1 -- you're not requiring it, but in order to be --
2 they're going to evaluate, and in order to comply,
3 they might have to dig it up. (Simultaneous
4 speaking) you're not requiring it, but it's a
5 backdoor way of they're required to be doing
6 something.
7 I'm not saying it's not right or wrong.
8 I just wanted to make sure I understood what you're
9 doing in here. I'm talking about while you're
10 active right now. He already went over the
11 post-closure part, that there's an institutional
12 period. I'm not quite sure what happens there, but
13 then the post-institutional period is another set
14 of things you deal with.
15 It was while you're still -- you've got
16 stuff you put in, site's active, now you put more
17 stuff in, has to meet the new. Now how do they
18 have to evaluate that for compliance and go back?
19 You say you're not requiring digging up, but, in
20 fact, the only way to comply may be to dig it up,
21 in which case, then you go through the rest of the
22 risk assessments, the dose assessments, etc.
23 Where's the rational person that sits down -- I
24 could use where's the adult in the room that says,
25 "No, we're stopping right here because it's just

1 not clear that the balance is not met"? It's just
2 hard. Maybe the state -- should the state be in
3 charge of that, as opposed to the NRC regulations,
4 or what? It just seems to be a little bit open.
5 MS. LONDON: I wanted to make sure
6 everyone understood that the requirement to comply
7 with the performance objectives, those were always
8 there. At closure, that's something -- the site
9 would have always had to demonstrate. If we had
10 never done these rule requirements, they may have
11 still gotten to that point where at closure, they
12 couldn't demonstrate compliance with the
13 performance objectives. Then they would have had a
14 problem.
15 MEMBER BROWN: Based on some of the
16 stuff they have to look at now, that's not
17 overwhelmingly obvious to me, but I understand your
18 point, or what you said, thank you.
19 MR. ESH: Next slide, Gary. Probably
20 one of the most challenging issues in this process
21 was the issue of the analysis time frames. This
22 figure is designed to give you an overview of the
23 variety of time frames that are in the regulation.
24 The second and third line down are really the only
25 new parts in the regulation. The top line and the

1 three below that are all existing in the
2 regulation. Each of these time frames has a basis
3 for how they've been placed in the regulation and
4 the purpose of them.
5 For instance, in the area of site
6 characteristics, this is our representation for the
7 guidance document on how to look at the site
8 characteristics because the regulation in 61.7 says
9 that you should consider site characteristics for
10 500 years or the indefinite future, I think, is the
11 language that's in the existing regulation.
12 How long is the indefinite future?
13 What we said in our guidance document is that you
14 should generally be looking at the site
15 characteristics commensurate with the type of waste
16 that you're trying to dispose. If you have -- if
17 you're in the situation that you have -- you don't
18 have significant quantities of long-lived waste,
19 then a 500-year to 1,000-year type of time frame is
20 appropriate.
21 If you're in the situation where you do
22 have significant quantities of long-lived
23 radioactivity, then you should look at your site
24 characteristics commensurate with how long you're
25 trying to evaluate the problem for. The ones that

1 I'll focus on, though, are the ones that are
2 different here. We can talk about the other ones
3 if you have questions, but the compliance period
4 and the performance period. We understand -- and
5 we looked at them carefully -- the ACRS's positions
6 on this topic, both the recent ones and the ones in
7 the very distant past.
8 This issue has been discussed even back
9 in the 1990s because the NRC was developing a
10 guidance document for 10 C.F.R. Part 61, how to do
11 the performance assessment analyses. One of the
12 issues that they tackled was the compliance period.
13 They had interactions with the ACRS, the staff, at
14 that time, in the 1990s, and the ACRS wrote various
15 letters on that topic then. We considered those,
16 too, when we developed our approach. There's a lot
17 of confusion on time frames.
18 One other thing we saw in the comments
19 from various stakeholders is that the compliance
20 period in Part 61 is 500 years. That is not
21 correct. Part 61 is silent on what the compliance
22 period is. For 61.42, it says, "Intruder must be
23 protected for any time in the future." That's the
24 existing regulation; that's what it says with
25 respect to compliance period and time frames. We

1 only added or altered, really, the compliance
2 period and the performance period. Next slide,
3 please. As we talked about earlier, all of our
4 existing facilities are in agreement states. We
5 took that into consideration as we developed the
6 approach for time frames and how we tried to solve
7 this problem. Throughout the process, we've had
8 significant interest in the topic.
9 We received significant comments, and
10 we devoted significant effort to formulation of the
11 final position. As Gary described earlier, the key
12 features of the final position is a compliance
13 period of 1,000 years or 10,000 years, depending on
14 if the site will contain significant quantities of
15 long-lived radionuclides. Then the performance
16 period only applies if you're using the compliance
17 period of 10,000 years.
18 So long-lived waste, you're looking at
19 10,000 years, plus the performance period.
20 Insignificant quantities of long-lived waste,
21 you're going to be using 1,000-year compliance
22 period. For a low-risk problem, we would be in
23 alignment with what we do in 10 C.F.R. Part 20 for
24 decommissioning, or what the Department of Energy
25 does in their analyses. The other important factor

1 here is that, as Gary discussed, the Compatibility
2 Criteria C. Agreement states can be more
3 restrictive if they choose to. That's one of the
4 consistent comments that we received in this
5 process from the agreement states. All four of the
6 existing agreement states currently use a
7 compliance period longer than 1,000 years.
8 The only unique case is for Utah, that
9 has this distinction between large quantities of
10 uranium and traditional waste, where they say use
11 10,000 years, plus look longer for the large
12 quantities of uranium because they were trying to
13 come up with criteria that they thought were
14 appropriate for depleted uranium.
15 Our rulemaking, though, was a little
16 more broad than just depleted uranium. We were
17 also tasked with looking at blended waste, and we
18 had to consider the potential for new waste streams
19 to come into play in the future. Because the
20 existing regulation, especially with the 61.42
21 requirements, are based on assumed quantities and
22 concentrations of waste.
23 If you've done an inverse calculation
24 to develop what the concentrations are that you
25 need to use to demonstrate compliance with 61.42,

1 if you change your waste, then what does that mean
2 for those concentrations that you calculated? The
3 concentrations that you may need as limits can be
4 quite a bit different if you change your waste. We
5 did not want to be in the situation, after eight or
6 nine years, of somebody coming in with a new waste
7 stream, and we would need to turn around and say,
8 "Now we need to go through this process again to
9 look at the new waste stream that may have
10 developed, that we need new criteria for. We
11 wanted something that would work, no matter what
12 the waste streams are, that somebody could do the
13 analyses and demonstrate compliance with it.
14 MEMBER REMPE: David, I'm a bit slow.
15 Tell me again what Utah does, and they did it
16 because of -- expound a bit about their reasoning
17 for doing something different there.
18 MR. ESH: They make a distinction --
19 they originally had analyzed 500 years. They used
20 500 years as a compliance period for evaluation of
21 their low-level waste facility. There's members in
22 the audience here that can correct me if I get
23 anything wrong on this.
24 Part of the reason for that was their
25 site, they believe, has ground water that's not

1 potable. It eliminates a large part of the
2 analyses that you commonly look at in a low-level
3 waste facility. I would say if you're trying to
4 site a facility, that's a great idea. If you put
5 it someplace where somebody's not likely to use the
6 water, you would want to take advantage of that.
7 But then the licensee proposed one of the entities
8 to take some of the large, significant quantities
9 of depleted uranium. They said, "Okay, that raises
10 some unique issues for us.
11 What may we need to do differently to
12 regulate that material, as opposed to this
13 traditional material that doesn't behave like
14 that?" They went through a rulemaking process and
15 developed criteria for -- I don't know the specific
16 language they used, but basically, large quantities
17 of uranium, they use a different compliance period
18 for that compared to other waste.
19 MEMBER REMPE: That period is?
20 MR. ESH: They use 10,000 years for
21 that, and then they look longer. They have
22 something similar to what we're calling our
23 performance period here. They have that in their
24 regulations.
25 MEMBER REMPE: Thank you.

1 MR. ESH: Let's see if I had anything
2 else I wanted to say on here. All our agreement
3 states have been licensed and are operating. All
4 of them have used a compliance period longer than
5 1,000 years. One of the arguments we heard from
6 some of the stakeholders is using a 10,000-year
7 compliance period is going to make these facilities
8 unlicenseable, and it's going to create a huge
9 burden for them to be licensed. All our facilities
10 already use values longer than 1,000, and they are
11 licensed and operating.
12 To me, that's factual information that
13 demonstrates that position was not entirely
14 correct. We also discussed with a variety of the
15 contractors that developed the performance
16 assessments -- because I had an opinion that if you
17 have a site that might be stressed by some unique
18 processes or events in the future that occur, say,
19 with a frequency that they're likely to occur after
20 1,000 years, but not really likely to occur within
21 1,000 years, then that would be a situation where
22 maybe you can have some additional burden in your
23 licensing.
24 Because maybe you're worried about a
25 seismic event, for instance. That's not a good one

1 for waste disposal, but it's just the one I'll use
2 for an example. Maybe you're worried about a
3 seismic event that could damage or stress your
4 facility. That could introduce burden if you're
5 doing a 10,000-year analysis, compared to 1,000,
6 because maybe it's at low enough frequency you
7 don't expect it to occur with a frequency to affect
8 your 1,000-year analysis. But in the vast
9 propensity of cases, what you have to do to develop
10 a 1,000-year analysis, a performance assessment,
11 intruder assessment, etc., a huge part of that
12 effort is the same for the 10,000-year analysis.
13 It's not a significant increase in effort to go
14 from the 1,000 year to the 10,000 year.
15 You have to develop the models. You
16 have to develop all the data for it. You have to
17 write all the reports, all that sort of stuff you
18 have to do for the 1,000-year analysis. This idea
19 that the 10,000-year analysis is significantly more
20 burdensome I don't believe is true. It wasn't true
21 from our experience, and then it also wasn't true
22 when we talked to the various contractors on the
23 private side that developed the models. They said
24 no, the additional burden for the 10,000-year
25 analysis, compared to the 1,000, is not significant

1 to them.

2 CHAIR CHU: David, I do want you to

3 comment on something. I agree with you on the

4 extra burden between 1,000 to 10,000 is not that

5 much more, but a lot of people comment on the fact

6 that because the uncertainty increases as time goes

7 on, your answer is not credible.

8 MR. ESH: Right.

9 CHAIR CHU: So would you --

10 MR. ESH: Right --

11 CHAIR CHU: -- here --

12 MR. ESH: Yes, that's -- that's another

13 argument that we heard, and -- and I think that

14 creates a -- in my opinion, a policy challenge

15 associated with the uncertainty, and where I would

16 go with that is so the argument that was put forth

17 is the uncertainty is increasing, okay, in some

18 cases it is, and in some cases it is not.

19 You know, we looked at the uncertainty

20 and different sources of uncertainty when we did

21 our white paper, and our opinion was basically that

22 the socioeconomic source of uncertainty is much

23 much larger than many of the other sources of

24 uncertainty associated with like flow and transport

25 and, you know, all the -- all the gs that go into a

1 performance assessment because, if you think about
2 how the world has changed in the last even 100
3 years, you know, and I like to use -- I like to use
4 the Las Vegas argument.
5 So the argument I would make is if you
6 could go back in time say 300 years and talk to
7 somebody living in the environs of where Las Vegas
8 is today and ask them what Las Vegas was going to
9 look like 300 years from then, they would not have
10 predicted what they got. They would have been
11 probably way off on that estimate, and that is the
12 type of uncertainty you're dealing with on the --
13 on the -- the human side of it.
14 And one way we try to manage that in
15 the regulatory process is we say, use some fairly
16 conservative receptors that are representative of
17 what people might try to do today and just
18 eliminate that source of uncertainty that does not
19 do you any good to speculate about exactly what
20 somebody is doing, but if you want to refine your
21 receptor scenario and say, well, today, we have
22 nobody living there, and we have hunters that spend
23 five hours a day there, well then in the future,
24 if, you know, they hit a gold rush of the next
25 natural resource in that environs and they -- say,

1 for instance, fracking.

2 I think fracking is a great example,

3 too, you know. 50 years ago, fracking wasn't so

4 widely done, if at all, but now, fracking is pretty

5 prevalent. So if you did an assessment 50 years

6 ago and said, you know, what's the likelihood of

7 somebody drilling in my facility, well, fracking

8 wouldn't have been part of the consideration, but

9 today, if you're in West Texas or at WIPP, or, you

10 know, some other -- even Western New York, it's a

11 consideration for all of those places.

12 So anyway, I am sorry I am rambling a

13 bit, but the uncertainty piece is an important

14 consideration, but I think the policy challenge is

15 I don't -- I am not aware of other areas in the

16 NRC, or even in risk management in general, that

17 use the argument of the uncertainty is so large,

18 therefore I should reduce my requirements, which is

19 basically the argument that is put forth, okay? So

20 if you're saying, well, the uncertainty is so large

21 with 10,000 years, therefore I should make it

22 1,000, I don't know. I think from a policy

23 standpoint, that is difficult.

24 You know, think about in everyday

25 experience what you would do. If I was going out

1 and trying to cross Rockville Pike and there was a
2 big truck parked there, I would not just start
3 walking, you know? I would try to do something to
4 mitigate my risk or mitigate my uncertainty
5 associated with the decision I was trying to make.
6 I think the same thing should apply here in the
7 waste disposal areas, that you should be doing
8 things -- if you truly think the uncertainty is
9 prohibitive, then you should not be taking that
10 action, you should be taking some other action
11 where you can understand the uncertainty and you
12 can uncertainty the risks associated with it.
13 I personally do not believe that those
14 uncertainties are prohibitive in these
15 calculations. I think they serve a very good
16 purpose. They communicate to the best of our
17 ability how we expect things to behave in the
18 future, and they are useful for making regulatory
19 decisions, which is what you are trying to do.
20 Part of the problem in waste disposal
21 is that the risk gets liberally applied throughout
22 the vernacular, but in many cases, we aren't
23 necessarily talking truly about risk. We are
24 talking about radiological dose, which might be
25 different, especially considering what you're doing

1 to get from Point A to Point B in that calculation,
2 so it's kind of a long answer to your question
3 about uncertainty, but I think fundamentally, I
4 don't agree with the idea that if the uncertainties
5 are prohibitive, you should reduce your
6 requirements. I think it means you should solve
7 the problem a different way, or you need some
8 different requirements --
9 CHAIR CHU: Thank you.
10 MR. ESH: -- not -- not that you should
11 -- not that you should lessen them.
12 MEMBER REMPE: To belabor it, I think
13 this is a good time to re-ask my question about the
14 international community because I think the same
15 situation occurs, even if they go to 50,000,
16 they've got to deal with uncertainties for that
17 period, and do they treat it the same way? They
18 basically --
19 MR. ESH: Right.
20 MEMBER REMPE: -- don't try and -- they
21 use the conditions the way it is today, and they
22 run their calculation out for 50,000 years instead
23 of 1,000, or something like that.
24 MR. ESH: Right. Internationally, they
25 will take a variety of approaches. Some of them

1 say for like -- I know some countries even for like
2 chemical waste disposal, their requirements is they
3 analyze to peak, whenever that might be. It might
4 be five million years that they analyze for, and so
5 they are talking about uncertainties that are quite
6 significant compared to what we're talking about.
7 But they -- especially in Europe, I
8 would say, the people are much more comfortable
9 with this idea of longer time frames, and partly
10 because they've been around -- they have been there
11 longer, and you'll talk to people who their family
12 may have lived in the same town for like 700 years,
13 and for us, we're kind of an infant compared to
14 that in terms of a country and our development and
15 everything, so part of that cultural idea reflects
16 -- or comes into play.
17 But then in many cases in the
18 international space, they will set a limit for what
19 they think is appropriate for near-surface
20 disposal, and it might be a -- a general limit of,
21 you know, x becquerels per kilogram of long-lived
22 alpha. Once you have set that limit, that is their
23 way of mitigating the uncertainty associated with
24 the longer time frames.
25 If you have limited how much of the

1 long-lived material can go in the near-surface,
2 then you can use a much shorter compliance period
3 because you have restricted what the risk may be at
4 a longer time by prohibiting that material from
5 going there. So that is -- you see that quite
6 commonly in a lot of the other programs, is they
7 will set some sort of waste limit that is separate
8 from the technical analyses.
9 And here, in the U.S. and in this
10 rulemaking, we're trying to strive for a much more
11 site-specific analysis-based approach, and so you
12 could set some sort of similar concentration limit,
13 say, for uranium. In fact, limits for uranium were
14 calculated in the original regulation, in the draft
15 regulation for 10 CFR Part 61. But between the
16 draft and the final, they decided that there wasn't
17 going to be much uranium that was going to be
18 disposed in a commercial low-level waste disposal
19 facility.
20 Well, that looks like that was a bad
21 assumption today, but the limits that they
22 calculated were a very small fraction of the
23 concentrations of the depleted uranium that you're
24 -- that you're dealing with, so they did generate
25 some -- they -- we, being the NRC, we generated

values for say concentration limits for uranium. That option was proposed to the Commission during the early stages of this process, and they didn't adopt that approach. They decided, no, the site-specific analysis approach was the better way to go because you can do it in a more risk-informed manner. You can reflect the actual say radiological dose impacts at the site rather than some hypothetical calculation that the regulator would do.

So that -- that option was provided to the regulator of how to -- how to -- it was provided to the Commission of how to manage uncertainties, and they adopted the approach we're talking about here.

MEMBER REMPE: I am a little confused because I thought earlier, you told me -- told us that the international community actually was amazed the U.S. is only thinking of up to 10,000 years, they went further overseas --

MR. ESH: Right.

MEMBER REMPE: -- to longer time periods.

MR. ESH: Right. The ones that do not set some sort of limit --

1 MEMBER REMPE: Go for longer time
2 periods --
3 MR. ESH: -- generally, they just
4 analyze out for much longer time frames.
5 MEMBER REMPE: And for uncertainties,
6 basically, no, they don't try and think about
7 uncertainties and differences in seismic or weather
8 changes, they take the conditions the way they are
9 today and do some uncertainties, but they run the
10 calculation longer --
11 MR. ESH: Well --
12 MEMBER REMPE: -- is that the answer?
13 MR. ESH: No, I would not generalize
14 like that, and if I gave you that impression, it is
15 incorrect.
16 They -- it can vary from program to
17 program, but generally, any of these that are doing
18 the technical analyses, they are trying to do the
19 best estimate they can of the expected performance
20 in the future, so if they believe -- many of them
21 will -- will look into climate change --
22 MEMBER REMPE: Okay.
23 MR. ESH: -- for instance. We say look
24 at natural cycling of the climate, but that
25 anthropogenic climate change, who knows where it's

1 going to end up and how exactly you should assess
2 it. That is kind of a, okay, if it does in fact
3 need to be revisited in the future, we will revisit
4 that aspect of the assessment, but by considering
5 natural cycling of the climate, you should be
6 encompassing most of the effects of the
7 anthropogenic changes in the climate because the
8 natural cycling of the climate from the planetary
9 motions and everything is so large, you know, you
10 get glaciation and that sort of thing eventually at
11 some locations.
12 But the -- the anthropogenic changes
13 will occur earlier, but right now, it does not -- I
14 would not say that they are going to cause effects
15 on the order of the planetary motion types of
16 effects from the climate cycle.
17 So anyway, internationally, though,
18 they do consider all those sorts of process --
19 features, events, and processes in their analyses,
20 but it can vary substantially from program to
21 program. So some of them are much more mature than
22 others, and some are earlier in their development
23 in terms of the complexity of their technical
24 analyses.
25 MEMBER REMPE: Okay.

1 CHAIR CHU: Dave, a lot of what you
2 describe on how to, you know, apply the FEPs and
3 all that, is it in the guidance document? Are all
4 these things --
5 MR. ESH: Right. So in the guidance
6 document in Chapter 2 is where we go through a
7 process of how to develop the scope of your
8 analyses, so what should be in it, and what should
9 be out of it, and there's kind of two approaches,
10 either top-down or bottom-up.
11 And one is based on identifying the
12 safety factors or safety functions of your system
13 and then building kind of the processes and events
14 that may affect those safety functions, so that is
15 pretty much the top-down. The bottom up is you
16 start with a database or a list of all the
17 features, events, and processes that you could
18 anticipate at any site, and then you determine the
19 subset of those that may apply to your particular
20 site, and then you go through a process of taking a
21 subset of those to develop into your models to
22 evaluate your particular site.
23 So it is -- it is pretty lengthy,
24 though, that part on the -- the FEP process, so
25 I'll warn you ahead of time. Let's see, where were

1 we here on time frames? I think we can go to the
2 next slide.
3 Also, one other thing on the time
4 frames, the -- it isn't just in the Agreement State
5 space that these 10,000 year analyses were used. I
6 think this was a question earlier, but the
7 Department of Energy has used the 10,000 year
8 analyses in a variety of decisions that have been
9 made, so in their incidental waste determinations
10 for the Saltstone Disposal Facility at the Savannah
11 River Site, for tank closure at the Savannah River
12 Site, for tank closure at Idaho, at Idaho National
13 Laboratory, and in process for tank closure at the
14 Hanford site, all of those sites have analyzed --
15 or done 10,000 year analyses for those various
16 decisions.
17 And the incidental waste problem is one
18 where it is material that had resulted from the
19 weapons program, basically, and some of the
20 material that -- the residuals that remains in the
21 system, if you went strictly by definition, it
22 would be high-level waste because in the U.S.,
23 we're not very smart with how we define our waste
24 classes, and Lisa will smack me for this, but they
25 are based on words in legal definitions instead of

1 by necessarily engineering and that sort of thing.
2 So yeah, so the problem is that some of
3 that material by definition could be considered
4 high-level waste, but then the Department of Energy
5 goes through this waste incidental processing,
6 waste determination process to determine that some
7 of it could be managed as -- with -- as low-level
8 waste, or similar to low-level waste, and for the
9 Savannah River Site and Idaho, they used the
10 criteria in 10 CFR Part 61.
11 That material is much more similar to
12 kind of the situation for some unique waste streams
13 where you have long-lived -- significant amounts of
14 long-lived radioactivity than it is most of the
15 traditional commercial low-level waste, so it makes
16 sense to use that there, and with our proposed
17 requirements, I think -- I can't guess how it would
18 fall out, but my guess is they would continue to be
19 using the 10,000 year evaluation for those
20 incidental waste determinations, but there may be
21 situations in DOE's inventory in waste where they
22 could determine if it were incidental waste that it
23 does not have significant quantities of long-lived
24 radionuclides, and then they would use 1,000 year
25 analyses.

1 So that's another data point of you had
2 asked about, you know, numbers and who uses what.
3 Maybe it was over here, I think you asked numbers
4 and who uses what, so let's see here.
5 Significant quantities, so the way this
6 approach is set up now is that you determine your
7 compliance period based on if you have significant
8 quantities of long-lived radionuclides, and how
9 does one determine though if you have them? And
10 what we're advocating is that you start simple and
11 introduce more complexity to make this decision if
12 necessary.
13 So the simplest approach is to look at
14 your inventory. The inventory is the thing you
15 know best in -- in probably this performance
16 assessment process. Even the inventory has
17 uncertainties, but you know what you want to put
18 into the system, so you can design a disposal
19 facility with say minimal long-term barriers
20 because you only want to take short-lived waste.
21 That would be smart. I would do that as an
22 engineer.
23 If I was trying to dispose of
24 long-lived waste, I would design a much different
25 facility than if I am trying to take short-lived

1 waste. So we thought, well, can't we structure
2 this analyses to kind of go in that same direction?
3 And in the -- the previous -- the most recent ACRS
4 letter that we received, they said -- or you said
5 use a site-specific approach, don't define the
6 period of performance or compliance period in the
7 regulation.
8 So the challenge we faced was, though,
9 that many stakeholders had told us to define the
10 compliance period or the performance period --
11 period analyses in the regulation. We heard that
12 early on in the process when we had workshops in
13 2009. They said yes, yes, yes, we all want a
14 number in the regulation. Of course, nobody can
15 agree with each other, but they all wanted a number
16 in there.
17 So -- so we -- you know, we listened to
18 you, and we know the existing regulation has --
19 does not have a compliance period in it, and as I
20 stated earlier, originally, that did result in a
21 pretty big variance in the values that people used.
22 The other challenge with not putting a
23 number in there, but doing it purely based on a
24 site-specific analysis, is we think there could be
25 negative incentives from a policy standpoint. So

1 if you have a very good site, then maybe your peak
2 dose is not until 100,000 years or longer. So --
3 and then say if you had an underperforming site or
4 a poor site, maybe your peak dose happens in 500
5 years. So should the poor site only need to
6 analyze 500 years while the good site needs to
7 analyze 100,000 years? That -- I mean, in my mind,
8 it probably should be the other way around, as you
9 want to have more confidence in what is going on
10 with the poor site, and you can -- you can -- can
11 rely on simpler analysis for the better site.
12 So without defining the period of
13 performance, we kind of -- and -- we thought you
14 could run into that, and the practical experience
15 from what has happened in our Agreement States
16 looks like that kind of is the fact. So like
17 Texas, that has a very robust site and, whether you
18 believe their calculations about infiltration rates
19 and that sort of thing, potentially very long
20 travel times, or even no travel times to -- to
21 groundwater, that was a site that analyzed the
22 longest.
23 And so we didn't want to have that
24 disincentive to choosing good sites because if
25 you're going to raise this argument that it is

extremely burdensome to do the long-term analyses, and it causes me all sorts of problems, well then why would you ever choose a good site that is going to force you to do this long analyses with this burden and all these problems? As an engineer, I would choose the one that I think is a lot easier, which would be the poorer-performing site.

So we -- we talked about that and tried to say, well, we think we need to put some numbers in here, but then if we're smart about it, we can do the part which you also wanted, which was to make it basically site-specific, so we started off and we said, okay, this is going to be waste-specific, but then maybe you look at inventory and you say gee, based on my inventory, I'm not sure whether I have significant quantities or not. Well then, you do site-specific screening analysis and see, okay, based on my physics and chemistry of my site, is the amount of inventory that I have likely to cause me a long-term problem or not?

So that's another way, as you step through this process, of defining whether you have significant quantities or not, is to consider the actual site-specific characteristics or do a full

1 site-specific analysis as indicated in number 3
2 here on a case-by-case basis, but the -- what I
3 would say, though, is if you're needing to get into
4 this really complicated argument for why you're
5 doing 1,000 years, you should probably just be
6 doing the 10,000 years because that means that
7 you're in such an area that you're going to ask for
8 all sorts of problems associated with if you
9 truncate the analysis, especially if the impacts
10 are much bigger after 1,000 years, kind of like
11 your example, Dr. Chu, with the depleted uranium.
12 If you're really worried about managing
13 the material, I think you'd want to know what is
14 going on throughout the whole hazard profile of the
15 material. You might make different decisions as to
16 how you design your facility and how you make your
17 arguments about protecting health and safety, but
18 you definitely want to know what is going on for
19 the waste that you're disposing of, you know,
20 irrespective of what the regulatory requirements
21 might be.
22 And so this approach with the -- kind
23 of looking at the inventory, looking at the
24 simplified dose assessment and then maybe doing
25 some more complicated we feel is going to allow

1 people to do -- to tailor the analyses based on the
2 waste that they have and to make smart decisions
3 and make sure that the analysis is appropriate for
4 the material and the site that they're analyzing.
5 It doesn't get all the way where you would
6 recommend it in your letter of don't define it at
7 all in the regulation, but as I explained, there
8 are reasons why we felt we could not do that. So
9 next slide, please, Gary.
10 Here is an example that's similar to
11 what is in the guidance, not identical, and I'm not
12 necessarily going to go through this in detail
13 here, but it's there in your slides, you can look
14 at it, and we can -- you can ask about it, we can
15 talk about it if you'd like --
16 MEMBER BROWN: What's SOF?
17 MR. ESH: SOF is the sum of fractions.
18 MEMBER BROWN: Okay.
19 MR. ESH: So yeah.
20 MEMBER BROWN: Thank you.
21 MR. ESH: So yeah, so in the -- in the
22 context of the -- of where this came from, that
23 would make sense. I see now that that is not
24 identified in the example. It's a little hard to
25 understand. But so in -- in low-level waste, when

1 you have a mixture of radionuclides, when you
2 compare each radionuclide to its concentration
3 limit to get -- you get a fractional value, and
4 then you sum all those up, and that is called the
5 sum of fractions, right, okay. All right, all
6 right.
7 You can just tell me to shut up if I am
8 --
9 MEMBER BROWN: No, no.
10 (Simultaneous speaking.)
11 MEMBER BROWN: -- Charlie Brown.
12 (Laughter.)
13 MR. ESH: The performance assessment is
14 one of the main components of the technical
15 analysis that you use in the 10 CFR Part 61. It is
16 not a new requirement, though. The existing 10 CFR
17 Part 61 has requirements for technical analyses.
18 The words are different, the analyses is
19 essentially the same.
20 So the existing analyses in Part 61 for
21 demonstration of compliance with 10 CFR 61.41 is a
22 performance assessment. This is just modernizing
23 the terminology because in 1982, they didn't call
24 it performance assessment, now we do. The
25 definition that is shown up here, though,

1 basically, you identify the features, events, and
2 processes that could affect the disposal site
3 performance, so that's getting the scope of the
4 analyses correct, and then you estimate the impacts
5 associated with those, including the uncertainties.
6 Some of the new requirements under
7 61.13 that support the performance objective are
8 new, but I will talk about those on the -- on the
9 next slide or the slide after. Those requirements
10 are we believe implicit in the existing regulation.
11 They're kind of mom and apple pie things when it
12 comes to performance assessment, so you need to
13 have support for your calculations, you need to get
14 the scope right, you should consider uncertainty
15 and variability. Those are all things that the
16 modern technical analyses should do, and so we
17 don't believe those are burdensome.
18 Even if they're not listed in the
19 regulation, if a performance assessment came in to
20 me at NRC that wasn't being done under an Agreement
21 State and it was lacking on any one of those
22 things, they would be getting lots of RAIs on it,
23 and maybe I wouldn't approve their application,
24 because those are fundamental components of the
25 performance assessment, and they aren't necessarily

1 -- well, they can involve effort, so -- but they
2 should be part of any performance assessment,
3 existing or in the future.
4 There is a requirement to update the
5 performance assessment enclosure. That is an
6 important requirement because, as Gary indicated,
7 or was indicated previously, some of these
8 facilities may operate for a substantial period of
9 time, 50, 60 years. A lot of things can change in
10 50 or 60 years: our knowledge about various
11 scientific and technical things, the -- what's
12 going on socioeconomically in the environment of
13 the disposal facility, so the requirement to update
14 the performance assessment at closure is good
15 science, and we think it is good policy because
16 when you get to the point of closing the facility
17 and the pass-off occurs from the licensee to the
18 entity that is going to be doing the institutional
19 control, they want to have confidence that the
20 facility is going to continue to meet the
21 requirements.
22 So without updating the performance
23 assessment, there -- there may be some questions
24 about that. If the licensee was smart and
25 introduced significant margin or enough margin in

1 their analyses when they did their initial
2 licensing basis, then the amount of updating that
3 they might need to do at closure could be minimal,
4 so they could make the argument that I've already
5 accounted for everything that we observed in this
6 time period while we operated.
7 The other thing in the performance
8 assessment area is that we modified the siting
9 characteristics, consistent with the disposal of
10 long-lived waste. So this one is a little bit
11 tricky if you're not familiar with Part 61. The
12 siting characteristics are in 61.50, and they have
13 -- there's requirements in there that are
14 exclusionary or need to be present for a site, and
15 they don't indicate basically the time frame that
16 you're talking about that that characteristic might
17 need to be present or need to be excluded.
18 So an example would be the facility
19 cannot be located in a 100 year flood plain, okay?
20 So what is the 100 year flood plain now? What is
21 the 100 year flood plain 1,000 years from now?
22 Those can be different answers, and the one is much
23 harder to estimate than the other. You can do a
24 pretty good job estimating the 100 year flood plain
25 today; much more challenging to estimate the 100

1 year flood plain 1,000 years from now.

2 So we looked at that and said, okay,

3 Part 61 when it was developed with the waste tables

4 and these other criteria were envisioning not

5 significant quantities of long-lived waste, but

6 they were looking at mainly short-lived activity

7 that would make sense to say, okay, you don't want

8 to put the facility in a 100 year flood plain where

9 it's flooding today because if it's flooding today,

10 you're likely to have a lot of instability

11 tomorrow.

12 So -- but the idea is that at longer

13 time periods, when the short-lived activity, which

14 you can only tolerate a small amount of that

15 getting into the environment, has decayed away, the

16 long-lived activity, then you can use a what we

17 would call risk-informed performance-based approach

18 to consider those siting characteristics, and what

19 that means is whether you can meet the 61.41 or 42

20 performance objectives.

21 So for the first 500 years, we stuck

22 with the language in Part 61 that says, for

23 instance, you can't cite a facility in a 100 year

24 flood plain. After 500 years, if you have a 100

25 year flood plain or you project that you're going

1 to have flooding in that area, then you can look at
2 it in terms of whether it impacts the performance
3 objectives or not.
4 Otherwise, say there's a requirement in
5 there like the waste can't be disposed in the zone
6 of water table fluctuation. Well, if you applied
7 that for 10,000 years, you would have to look at,
8 well, can I demonstrate that this waste is never
9 going to be in the zone of water table fluctuation
10 for the next 10,000 years? That seems to be an
11 intractable problem technically. But you can
12 probably better estimate if it does fluctuate,
13 what's the impacts that I might see from it, so the
14 modified siting characteristics, that's how we went
15 about it. Next slide, please.
16 MEMBER KIRCHNER: May I ask just a
17 question of clarification? So you have 500 years
18 for the site characteristics versus 1,000 years for
19 the compliance period, so how do you reconcile
20 those?
21 MR. ESH: Yeah, the site
22 characteristics language is existing in the
23 regulation. It says consider the site
24 characteristics for 500 years or the indefinite
25 future. I don't remember, let me get the language

1 straight for you here.

2 So, okay, here, it is "In choosing a

3 disposal site, site characteristics should be

4 considered in terms of the indefinite future and

5 evaluated for at least a 500 year time frame," so

6 at least a 500 year time frame. If you evaluated

7 the site characteristics for 500 years and you're

8 analyzing for 1,000 --

9 MEMBER KIRCHNER: Yes.

10 MR. ESH: -- you're not going to be --

11 something is not going to occur -- like with

12 confidence, you're not going to be able to say

13 something occurs in the 500 to 1,000 year time

14 frame that is significant that you couldn't also

15 argue should be part of the site characteristics

16 you consider in the 0 to 500. Now as long as

17 you're in the same ballpark of what you're

18 analyzing, I think that is what we're trying to

19 achieve.

20 Since the regulatory language is pretty

21 broad in how it could be interpreted, then we chose

22 to address that in the guidance of how to -- how to

23 consider the site --

24 MEMBER KIRCHNER: So you didn't --

25 MR. ESH: -- characteristics.

1 MEMBER KIRCHNER: -- go back and change
2 it from 500 to 1,000?
3 MR. ESH: No. I think we still
4 reference 500, but we also say -- we talk about the
5 concentrations of the waste and say based on the
6 concentrations of long-lived waste that you're
7 dealing with, here's the time frames you might want
8 to consider in terms of site characteristics.
9 MEMBER KIRCHNER: Thank you.
10 MR. ESH: Yes. So this is the figure
11 of the performance assessment process, and what
12 should be stressed is it is a learning process.
13 The outer stuff on the pentagon is collecting data,
14 developing the conceptual models, developing your
15 numerical models, combining the models, and
16 estimating the effects, while considering the site
17 characteristics of the design and the waste form.
18 That process is normally iterative in a performance
19 assessment.
20 If the site is very complex, maybe you
21 have a lot more iteration. If the site is simple,
22 maybe it is once through, and -- and you are
23 content with the results, but the performance
24 assessment technical analysis is -- is iterative.
25 The requirements that were added in

1 this rulemaking are around the outside here, just
2 to show how they fit into the overall performance
3 assessment. So as I indicated, the three on the
4 bottom there, or the one on the right and the two
5 on the bottom with 61.13, that's scope uncertainty
6 and the basis for your models. Those are kind of
7 fundamental things to performance assessment. We
8 did receive comments on it, but if you aren't doing
9 those things in your performance assessment, you're
10 -- you're probably not doing a good job with your
11 performance assessment.
12 MEMBER SKILLMAN: David, you mentioned
13 it's a continuous process. How often or how
14 frequently is that circuit enacted?
15 MR. ESH: It depends on like in this,
16 since these are in the Agreement States, it depends
17 on the particular Agreement State. So I know in
18 Texas they do an annual update to their performance
19 assessment. Texas looks at that as one way to
20 manage the facility and understand the performance
21 and uncertainty and that sort of thing.
22 So they ask for an annual update.
23 That's not a requirement in the regulations to do
24 an annual update. To be on a -- I'm sorry Gary.
25 Do we have a -- do you know, do we have a

1 requirement for an update frequency in the
2 regulation?
3 MEMBER SKILLMAN: That's why I asked
4 the question. I'm looking for it and I don't see
5 it here.
6 MR. COMFORT: Yeah, I'm not sure that
7 we do.
8 MEMBER SKILLMAN: Why wouldn't you ask
9 that?
10 MR. ESH: Well, we have a requirement
11 to update it when you get to the point of closure,
12 so ideally though, if you've done a good analysis
13 when you establish your licensing basis, there may
14 not be a need to do many updates as you operate the
15 facility. It depends apparently also on the
16 complexity of the site and the type of waste that
17 you're receiving.
18 So the update period that may be
19 appropriate for one might not be appropriate for
20 another. We'll have to look and see here. Maybe
21 we can. If Gary can look if I'm talking, if we
22 added anything for that. But that was kind of the
23 thinking behind should we put an update period in
24 or not. The one thing we wanted to achieve is that
25 when you get to that final decision point of saying

1 okay, I'm going to move to closure, you do an
2 update then.
3 So that takes into account everything
4 that may have happened during operations. A good
5 operator is probably going to update before that,
6 because they want to know ahead of time what they
7 might be looking at, you know, but that's not a
8 requirement. As long as you can demonstrate that
9 you're safe at closure. Whether you have problems
10 to address when you get to the closure point, the
11 way it's structured now I believe that would be up
12 to the licensee.
13 MEMBER SKILLMAN: But that almost flies
14 in the face of the idea that you don't know what
15 you don't know. If you're not taking a look
16 periodically, you may very well be surprised?
17 MR. ESH: I think the reality is that
18 all of them do take a look. So all of them
19 periodically update their analyses to reflect their
20 new inventory and the understanding on the site
21 based on observations they might have, and I don't
22 know. Maybe we'll hear once we get to the comment
23 period. Any of the individuals in the room can
24 elucidate what they do --
25 MEMBER SKILLMAN: What you're saying is

1 it's simply not required at this point in time.

2 MR. ESH: I don't believe so, but

3 Gary's looking. So this next slide here on

4 performance assessments, a visual representation of

5 what a PA is and what it entails. You have to

6 build all of this regardless of the compliance

7 period. That's something I was stressing earlier.

8 So if you start on the upper left-hand

9 side, you have a real site. You're going to

10 develop a conceptual model for the site. Then from

11 the conceptual model, then a performance

12 assessment. There's lots of what I would describe

13 as models within a model.

14 So you might have a model for the

15 hydrologic performance of the site. You might have

16 a model for the geochemistry of the site and a

17 waste form performance. All of those things feed

18 into the overall radiological dose assessment. So

19 if you have 1,000 year compliance period or a

20 10,000 year compliance period or some other number,

21 you have to do all of these things to develop your

22 models to evaluate your site.

23 As you go out in time, there may be

24 unique features, events or processes, especially

25 with lower frequency events that could come into

1 play. But that's part of the -- part of the Part
2 61 approach to managing the uncertainties
3 associated with low level waste disposal is the
4 siting characteristics.
5 So you're supposed to consider the
6 likelihood for seismicity and volcanism and erosion
7 and subsidence and all those ologies that can
8 stress your system and result in releases or
9 impacts. Those are to be part of your performance
10 assessment analyses, or a consideration of your
11 site characteristics and then if necessary part of
12 your performance assessment analyses.
13 So this idea that the burden is
14 significantly different depending on the compliance
15 period doesn't agree with our experience and it
16 didn't agree with many of the other practitioners
17 that we talked to. The main point that I would
18 associate with the performance assessment is that
19 the quality of the work, both in terms of the
20 analyses but then in the actual operation of the
21 site is what's going to determine whether public
22 health and safety is protected, not necessarily the
23 number that's spit out of the computer program.
24 So I mean that can't be lost on -- we
25 spent a lot of this time talking about the

1 technical analyses and debating the requirements
2 for it. But the other parts of Part 61 that are
3 used by the regulator to evaluate the actual
4 operation of the facility and to inspect against,
5 those are the primary drivers of whether the
6 facility is achieving its performance goals, not
7 necessarily what may be going on inside a computer
8 model.
9 Next slide, Please. So the inadvertent
10 intruder assessment, it has always been part of the
11 Part 61 framework. As I indicated previously, it
12 was analyzed by the NRC, by us the regulator, and
13 that analysis was not site-specific and it was not
14 risk-informed, because we had to make certain
15 assumptions about the site, such as that it's a
16 human site. You had make certain assumptions about
17 the waste that's going to go into it.
18 So the resultant waste classification
19 tables are completely tied to the assumptions that
20 the NRC put into the analyses, especially about the
21 waste. So when we were faced with the issue of
22 depleted uranium disposal, it basically represents
23 an unanalyzed safety condition.
24 So if you've disposed of depleted
25 uranium and you have not done an intruder

1 assessment, then you could potentially have a
2 safety impact associated with that, because
3 depleted uranium was not included in the waste
4 classification tables. I don't know whether that
5 was -- you could say that's NRC's fault,
6 responsibility for not making that clear, or it's
7 the implementer on the other side that didn't
8 understand that issue.
9 But the fact of the matter is that the
10 source terms that were analyzed were very well
11 described in the environmental impact draft and
12 final documentations. So if you, if I was a
13 licensee and I was looking at disposing of new
14 material, I could easily do a comparison to see
15 whether okay, does this material fit in the box
16 that, the regulatory box that was developed or not.
17 In the revised regulation, this is the
18 main change, even though a lot of debate goes on
19 about the time frames and a few other pieces, when
20 this issue came up of whether we needed to change
21 the regulation, I naively said that yes, we do. We
22 only need to add the requirement to do an intruder
23 assessment and it should only take three months.
24 So I was a little bit off.
25 (Off mic comment.)

1 MR. ESH: A little bit
2 humbling. So in the revised regulation, the
3 intruder assessment is now site-specific, which we
4 think is much more powerful and much more flexible.
5 It also creates some ancillary burden
6 or effects especially on regulators. The
7 site-specific intruder assessment allows the
8 consideration of the actual waste, the site
9 conditions and the expected receptor scenarios for
10 that site.
11 So one of the comments ACRS gave us in
12 this area previously was you don't need to do this
13 intruder assessment. You can just consider the
14 durability of the waste and the stability of the
15 site. Yes, the durability of the waste and the
16 stability of the site are important considerations,
17 but how do you know what durability or stability
18 you need if you don't consider the source of the
19 material that you've put in the facility?
20 So the intruder assessment is one way
21 to calculate how much of a particular type of salt
22 waste stream or concentrations of radionuclides
23 that your facility can take, at least from a
24 protection of the inadvertent intruder.
25 We also felt that it was much more

1 difficult to design and justify the performance of
2 a durable barrier, especially a durable barrier
3 from the perspective of intruder protection, than
4 it is to do the intruder dose assessment. The
5 intruder dose assessments are usually much more
6 simple than the performance assessments.
7 They represent on the order of, you
8 know, ten percent of the effort of a performance
9 assessment. So the intruder assessment yeah, while
10 you could argue that what's the validity or policy
11 reason for including the intruder. Part of that
12 was derived from when Part 61 was developed, was
13 around the time that like Love Canal, where you did
14 -- people did dispose of waste and then it got
15 disturbed and caused some health impacts.
16 So that was kind of the mentality at
17 the time. It ended up in part 61, and even though
18 it is a regulatory analysis, we do think it has a
19 good purpose because it is a check and balance in
20 the system. So if you combine -- if you think of
21 defense-in-depth, this is kind of defense-in-depth
22 of regulatory analysis, combining the intruder
23 analysis with the 6141 type of analysis gives you a
24 type of defense-in-depth from the regulator's
25 perspective.

1 Next slide, Please. Now one of the
2 important considerations, and this detailed charter
3 or table here that on the left-hand side you have
4 on your CD. So don't worry about trying to read
5 this right now.
6 It's the intruder, inadvertent intruder
7 receptor is a very important topic, because the
8 dose impacts associated with the inadvertent
9 intruder can be driven by the types of activities
10 that occur and especially how one may occur and how
11 much disruption is associated with them.
12 What we've done in Part 61 is we
13 followed the Commission direction of course, and
14 the language associated with the intruder is shown
15 in the draft final rule. But basically we say the
16 intruder will potentially undertake normal
17 activities such as dwelling, construction,
18 agriculture, drilling for water, or other
19 reasonable foreseeable activities consistent with
20 the activities in the vicinity of the site when the
21 assessment is development.
22 So the direction that we received from
23 the Commission prior to this was at site closure,
24 to consider the activities in the vicinity of the
25 site. Well, if a site operates for 50 or 60 years,

1 we felt that could be difficult for some and maybe
2 draw them into, for instance, a legal argument as
3 to how well they can project what the particular
4 activities are 50 or 60 years in the future as
5 compared to when now, in the present day.
6 If you have a requirement to update the
7 analysis at closure, well that's when you should
8 reflect if something different is going on at the
9 facility, than rather trying to project it today
10 what you think is going to be going on 50 or 60
11 years from now. So that's -- you can look at that
12 language as a slight deviation between the last
13 version of the proposed regulation and the draft
14 final regulation.
15 Next slide, Please. This is a figure
16 of some of those types of what we would consider
17 normal activities, normal from the standpoint of
18 people are always going to look for some place to
19 live and they need to eat and they need to drink
20 water. Those are things that people do today.
21 Now where they get their water from can
22 vary substantially. What they live in can vary
23 substantially and where they get their food from
24 can vary substantially. So but we also would say
25 that while you can and should consider the

1 site-specific characteristics, you should also
2 perceive with caution in defining your receptors,
3 because on one hand you want to argue that there's
4 enormous uncertainties that make the results
5 unusable.
6 But on the other hand, then you turn
7 around and say but I can accurately define what my
8 receptors are and what they're doing. Those two
9 things are kind of diametrically opposed. You
10 choose one or the other.
11 So and if you think you have
12 imagination with developing intruder receptor
13 scenarios, wait until you interact with your
14 stakeholders and see the intruder receptor
15 scenarios that they may propose to you.
16 So that is a slippery slope. The
17 flexibility is afforded there. The intruder is a
18 regulatory construct. It's not a risk calculation,
19 and it is used effectively on low level waste
20 disposal, both on the commercial side and DOE, both
21 entities do this intruder assessment.
22 And of course I guess looking at these
23 figures, these are obviously not just scale unless
24 we have like 12 feet tall people in the future.
25 So next slide, Please. Site-specific

1 scenarios, I just talked about that a little bit.
2 We think you should consider them, and they can be
3 used to constrain the exposure pathways for the
4 normal activities or for reasonable foreseeable
5 activities, and it's much better to base that on
6 physical information, things that might be durable
7 over time such as that the water is not potable and
8 it's going to remain not potable, rather than
9 cultural information such as well, there's no
10 housing development there today. Therefore, there
11 will never be a housing development there.
12 If the environment is such that it's
13 very unlikely to support a housing development,
14 well that's one thing. But you know I still get
15 pulled back to that Las Vegas example. I think
16 that challenges me from relying too heavily on
17 cultural information.
18 Next slide, Please. Site stability is
19 the third component of the technical analysis.
20 It's an important part of the safety strategy. The
21 original regulation said stability is a cornerstone
22 of disposal. We are not backing away from that.
23 We still believe stability is the cornerstone of
24 disposal.
25 Part of that arose from the early

1 problems that occurred in low level waste
2 facilities. There were a lot of stability issues
3 with the facilities that were developed prior to
4 Part 61. And even more recently with one of the
5 existing facilities had an event or incident
6 associated with what I would call stability issues,
7 the Beatty facility in Nevada.
8 We did revise in response to public
9 comment the stability definition, because the
10 stability definition was somewhat circular than the
11 existing regulation. Stability is structural
12 stability. So we tried to provide a better
13 definition for stability in this final version of
14 the regulation.
15 Next slide, Please. Site stability.
16 The guidance in Chapter 5 provides a lot of detail
17 on this. It's also somewhat of an iterative
18 process starting with site characterization, what
19 are your hazards, what are your disruptive
20 processes both natural and anthropogenic, doing
21 some sort of either technical analysis or technical
22 assessment combined with engineering design.
23 It's pretty much two different
24 approaches or a combination of the two that can be
25 used to demonstrate stability. For instance,

1 there's an appendix to the guidance document that
2 has examples both for the stability analyses that
3 was done for decommissioning at the West Valley
4 site, which is one of the most challenging sites
5 with respect to stability.
6 And then there's an appendix that has a
7 technical evaluation report from uranium mill
8 tailings management, where in that area usually
9 design-based approaches are used to develop erosion
10 protection. So those are based on determining that
11 PMF, probable maximum flood from the probable
12 maximum precipitation, and then from that designing
13 your erosion protection systems, the sizing of your
14 ripwrap (phonetic) and your drainage channels and
15 all those sorts of things.
16 Now there's a TER with some information
17 around it in there that we gave examples about the
18 technical approach and the modeling approach. Then
19 you combine that with the evaluation and
20 monitoring.
21 Next slide, Please. So the site
22 stability should consider the temporal and spatial
23 scales. The temporal and spatial scales associated
24 with the site stability analysis should be a
25 function of the waste. So we -- if you have

1 primarily short-lived waste, and you're primarily
2 looking at the waste at the site itself and the
3 disposal trenches and whether you can ensure the
4 stability of those.
5 When you start moving out to
6 longer-lived waste in higher concentrations, when
7 that is tied, of course it triggers when you might
8 need to do a longer-term analyses, and a
9 longer-term analyses means the scope of your
10 stability assessment and how you're bringing in the
11 geomorphological considerations becomes a larger
12 area that would be important to consider. But some
13 of that can be seen in the examples that we
14 provided in the guidance document.
15 So that's pretty much the end of the
16 technical analysis part, and now we'll transition
17 into waste acceptance criteria. The technical
18 analysis may feed the waste acceptance criteria
19 depending on the approach that's selected by the
20 licensee.
21 The licensees must review their waste
22 acceptance program at least annually, and this is
23 the primary mechanism that you ensure that the
24 waste that is sent and received and disposed is
25 going to meet the technical criteria based on the

1 analysis that you performed to license the
2 facility.
3 So the three components to the waste
4 acceptance requirements are characterization, the
5 criteria themselves and then the certification, and
6 the first thing that I'll talk about is the
7 criteria.
8 Next slide, Gary. So the waste
9 acceptance criteria are made up of the allowable
10 limits on radioactivity, the waste form
11 characteristics and container specifications and
12 then any restrictions and prohibitions. The last
13 two bullets here are really lumped together in 6156
14 in the regulation under waste characteristics. So
15 that lists the types of restrictions and
16 prohibitions and the characteristics that the waste
17 may or may not have.
18 The allowable limits on radioactivity
19 may be on a package basis, or they may also be on
20 the overall facility. The waste form
21 characteristics and container specifications
22 include things like it can't be disposed of in a
23 cardboard box. You have solidify liquids. You
24 can't dispose of explosives. You can't have waste
25 that's pyrophoric or it contains chelating agents.

1 They're all things that are important things from a
2 performance standpoint.
3 As an engineer when I look at the waste
4 characteristics and the prohibitions and
5 restrictions, I think that's a much -- one of the
6 most effective risk management components of the
7 regulation, regardless of all the technical
8 analyses and everything else. If you put
9 pyrophoric material in a facility, you're asking
10 for trouble, right.
11 So the requirement that prevents
12 pyrophoric material from going in is a very
13 important requirement to ensure the longer term
14 performance or performance of the facility after
15 closure.
16 Next slide, Please. So in this draft
17 final rule, as within the previous version, there's
18 flexibility to develop site-specific waste
19 acceptance criteria. So you can use the 6155
20 limits. You can use the results of technical
21 analyses or a combination of both to develop your
22 criteria.
23 So either way though, the licensee must
24 demonstrate that the criteria will demonstrate the
25 performance objectives will be met. So the

1 important point in this is that the licensees have
2 considerable flexibility, and generally you would
3 be considering the concentration and the inventory.
4 So even in the existing Part 61,
5 there's language that references the consideration
6 of the inventory of the material you're disposing
7 of, in addition to the waste classification tables.
8 So long-lived mobile isotopes, there was an
9 identification in the early 1980's that you might
10 need to develop inventory limits for those
11 isotopes, technetium, iodine, technetium-99,
12 iodine-129, tritium and carbon-14.
13 The reason why a licensee and you might
14 be thinking to yourself well why does the licensee
15 need to do this third bullet if they're doing the
16 other things, or especially if they're using the
17 6155 concentration one. It's because of the
18 problem I talked about earlier.
19 The 6155 concentration limits were
20 developed for a specific waste. So if your waste
21 is outside the envelope of what was considered when
22 they were developed, you basically have an
23 unanalyzed safety condition there potentially.
24 So that's why this requirement to meet
25 the performance objectives must be demonstrated,

1 even if you're using the 6155 limits.

2 As I indicated earlier, three of the

3 four existing sites on the commercial side have

4 already analyzed intruders, and in the DOE practice

5 it's part of their requirements to analyze

6 intruders.

7 So the next slide, Please. The

8 allowable limits from 6155. This is what the

9 process looks like. It looks complicated but it

10 really isn't. The part I just talked about on the

11 previous slide is really top two boxes on the

12 diagram. After that, it's everything else you're

13 doing to meet the requirements associated with the

14 waste.

15 So the determination of the limits is

16 rather straightforward, whether it's based on the

17 concentrations and the sum of fractions or you need

18 to develop some sort of inventory limits. The

19 other requirements take up most of the diagram.

20 Next slide, Please. So if you were

21 developing allowable limits from analyses, this is

22 how it might look like, something like this. Of

23 course this is the flexibility that provides you

24 the ability to look at the site-specific

25 characteristics. It's very powerful.

1 But then that power also then triggers
2 the need for a thorough review by a competent
3 regulator, because if you're basing what the
4 facility can take on the analyses, you have to
5 ensure that the proper quality and valuation was
6 done of that analyses, that the results are
7 correct.
8 This was a concern for a number of
9 stakeholders. They described it as putting the fox
10 in charge of the hen house I think, which was kind
11 of a good layman's way of describing it. I said
12 no, you're not putting the fox in charge of the hen
13 house but if you are, the regulator is the farmer.
14 So I mean you still have somebody that's supposed
15 to mitigate or evaluate and make sure that the
16 decision is going to be safe.
17 MEMBER BLEY: Dave, I have a question.
18 If we have reg guide and we have the SRP, I know
19 how that works. If we have a NUREG as the
20 guidance, does that serve both functions? Is that
21 the guidance for reviewers as well, or are you
22 going to have an SRP on this?
23 MR. ESH: Right. We have an SRP for 10
24 C.F.R. Part 61 that was developed based on the
25 existing regulation.

1 MEMBER BLEY: Right.

2 MR. ESH: And it is quite voluminous,
3 and we looked at that and we said ideally, we would
4 like to develop an SRP that would go along with the
5 new regulation.

6 But at the time, I think there was a
7 decision that supplementing existing guidance by
8 putting in discussion in areas that were new was
9 the appropriate way to go for this rulemaking
10 because it was supposed to be a limited scope
11 rulemaking, right.

12 So you know, I mean you laughed at
13 that. It was supposed to be a limited scope
14 rulemaking. So that made sense to supplement the
15 guidance rather than wholesale revising it. Now
16 my personal opinion is just like we did in
17 decommissioning, with doing a whole-scale revision
18 of the guidance there and consolidated the guidance
19 of what I think Derek participated in before his
20 life here.

21 (Off mic comment.)

22 MR. ESH: Yes. That would be a useful
23 activity to undertake in the low level waste area,
24 but it would be very resource intensive and
25 considering the climate with Project Aim and agency

1 resources, I just don't know whether they would
2 devote the resources to --
3 MEMBER BLEY: Well, let me push that a
4 little. I know somebody else wants to talk, but
5 just a minute. The old SRP can't, I can't expect
6 that it would be appropriate here. But I could
7 expect, depending on what we see in this document,
8 that it might be complete enough and clear enough
9 that it would serve the purpose as guidance for a
10 reviewer as well.
11 And on the other hand, if we don't have
12 good guidance because we don't want to spend the
13 money to get it, we might pay a hell of a price and
14 so might the licensees when the reviews come
15 around.
16 MR. ESH: Right, and I don't want to
17 give that impression because the existing SRP, I
18 think, provides a lot of guidance for the areas of
19 the regulation that were not touched in this
20 rulemaking. There are a lot of areas that aren't
21 touched in this rulemaking. I mean a lot of the
22 language changes in say 61.7. 61.7 does not
23 provide requirements.
24 It's just basically the concepts of
25 setting the stage for how everything fits together.

1 So you know, we received a lot of comments about
2 our changes to that section, but the reality is
3 that really doesn't mean anything in terms of
4 compliance with requirements in the regulation.
5 In the areas that we did change, that's
6 where we hope this guidance document comes into
7 play, to provide information in the areas that we
8 did change. So Chris, I don't know if you had a
9 comment.
10 MR. McKENNEY: Chris McKenney from the
11 -- Branch. The one that's also in front of the
12 Commission right now is a programmatic assessment
13 for the low level waste program, and one of the
14 actions -- one of the possible actions within the
15 next five years is a consolidation of all of our
16 guidance, to try to revise our older guidance and
17 bring it -- and bring the guidance that is
18 necessary into a consolidated set of guidances.
19 There's a couple of options there of
20 guidance for operators and possibly guidance for
21 generators, and of course resource requirements for
22 that. And as Dave mentioned, for this guidance
23 compared to NUREG-1200, this would only be like
24 part of Chapter 6 of NUREG-1200, because even
25 Chapter 6, which is the technical types of

1 analyses, had also accidents and everything else
2 and stuff which during operations, which this
3 doesn't even cover those sort of things.
4 This guidance still does cover a number
5 of things that the reviewers could use in that
6 analyses for -- NUREG-2175 does cover a number of
7 things, and with our reliance on our previous
8 analyses in NUREG-1573, which is the previous low
9 level waste guidance on performance assessment,
10 which we put out in 2000, which was also written
11 for both reviewers and the license community.
12 Again, was a combined sort of mixture
13 of SRP and guidance to the community, not an SRP
14 but not a -- just a pure guidance document.
15 MEMBER BLEY: Right, okay. It kind of
16 all sounds reasonable to me. One question. After
17 the rule becomes a rule, how soon do you anticipate
18 staff would begin receiving analyses that they need
19 to review in this area?
20 MR. ESH: Well, the short answer to
21 that is not any time soon because they would all be
22 received in Agreement States. So all the
23 facilities are in Agreement States. The Agreement
24 States would have a period of time after our rule
25 becomes final to make the corresponding changes in

1 their regulations and make them final, and then
2 they would have, receive the updated analyses in
3 their Agreement States, which they -- the language
4 is, I think --
5 MR. COMFORT: Five years or the next
6 renewal.
7 MR. ESH: Five years or the next
8 renewal.
9 MR. COMFORT: Whichever's earlier.
10 MR. ESH: So it would depend on when
11 their rule got final and then when the next renewal
12 was.
13 MEMBER BLEY: And the states that are
14 not, our staff would review?
15 MR. ESH: They would, and just like
16 always, we're available to help them or provide
17 input to them. We have two different versions. We
18 have one that's kind of a less detailed input to
19 their process, and then one that's a more formal or
20 more detailed input to their process, where I
21 believe they reimburse the agency for our time if
22 it's the latter one. If it's the former one, then
23 we supply that voluntarily.
24 MEMBER BLEY: Okay, and then these
25 areas, this reg guide would provide them guidance

as well as the licensees?

MR. ESH: Right.

MEMBER BLEY: Okay.

MR. ESH: So allowable limits.

MEMBER SKILLMAN: David, let me ask this please. Here are five assessments, and you mentioned a key word which is quality, and I look at the red line strikeout and I see quality identified as a concept. I'm just wondering what the vision is for the quality that is acceptable for these analyses. What is it that you use to ensure that you're getting a durable and responsible product?

MR. ESH: Right. So in the regulation, I believe we had a requirement for, associated with quality assurance of the analyses, because we felt that was important, and then in the guidance document, we've added -- and that's in the area where, one of the areas where I would say you should take a look at.

We added material associated with the quality assurance of developing models, data, all the components of the technical analyses. We put material in there referencing various quality assurance procedures and documents.

1 MEMBER SKILLMAN: Thank you.

2 MR. ESH: Next slide, please, and I'll
3 try to hustle through these so we aren't too far
4 behind. Waste characterization is the -- waste
5 characterization and waste certification are the
6 other two pieces to the waste acceptance
7 requirements. The licensees must specify
8 acceptable methods for characterizing the waste.

9 Now detection methods have improved
10 significantly, but there's still a source of
11 uncertainty associated with what exactly the
12 inventory is, especially for the long-lived mobile
13 isotopes, because they're generally hard to detect,
14 especially if in the presence of some other
15 isotopes that are -- confound their identification.

16 We have new guidance associated with
17 that, that allows the use of scaling factors and
18 also indicates that say for performance assessment,
19 in some cases a practice was that if a measurement
20 was done and the isotope was at the lower limit of
21 detection, then a value of zero was assigned in the
22 inventory for the performance assessment.

23 Well, if the lower limit of detection,
24 if it's below the lower limit of detection, you
25 know it's below that, but it doesn't necessarily

1 mean it's below zero. The challenge is that when
2 you assign a lower limit of detection, even if the
3 lower limit of detection it was causing some
4 performance issues in some analyses.
5 So that's where the consideration of
6 scaling factors and some other approaches that
7 developed the inventory may come into play and may
8 be useful. So we hope that that's a reasonable
9 approach to deal with this issue of inventory
10 uncertainty.
11 The waste characterization is to ensure
12 that knowledge of the waste characteristics is
13 commensurate with the assumptions and approaches
14 used to develop the waste acceptance criteria, and
15 sufficient to demonstrate that the waste acceptance
16 criteria are met.
17 Next slide, Gary. The characterization
18 methods may be -- I talked about this some --
19 direct or indirect, such as materials
20 accountability, characterization by source or
21 scaling factors. Data quality comes into play
22 here, quality of the technical analysis we just
23 talked about, and also the documentation of the
24 responsibilities for characterization, quality
25 assurance of procedures and records.

1 The guidance that has been developed
2 addressing data quality and documentation. So if
3 you want to rely on technical analyses to develop
4 your waste acceptance criteria, then you need to
5 ensure that those analyses are transparent and
6 traceable, and they should be publicly available
7 to your stakeholders.
8 You know, you should be able to weather
9 the storm of the criticism that you might get and
10 be able to answer the questions that the
11 stakeholders might have about your analyses.
12 What's shown here on the right of the
13 characterization methods slide, there's one way to
14 go about characterizing data using like a data
15 quality objectives process.
16 First, you develop your data quality
17 objectives, then you obtain the data, then you
18 evaluate the data and you iterate if necessary. So
19 it's plan, implement, assess, decide.
20 Next slide, please. Waste
21 certification is the third piece to the waste
22 acceptance requirements, and that's the program to
23 certify that the waste meets the acceptance
24 criteria prior to receipt at the disposal facility.
25 So this has been modeled after DOE's program. They

1 do this in their facilities because for quite some
2 time now they've used site-specific analyses to
3 develop their waste acceptance criteria at their
4 sites.
5 The waste certification process can be
6 important for the generators and the operators, and
7 if people aren't used to using that, I'm sure there
8 will be some growing pains to get that implemented.
9 Next slide, please. So now a few
10 slides about the guidance. The guidance changes
11 that we've made are generally in support -- well,
12 the guidance is in support of the regulations, and
13 we've developed guidance for the licensees and
14 Agreement State regulators to provide approaches
15 that the NRC finds acceptable to meet the
16 regulatory requirements.
17 Of course Agreement States and
18 licensees may come up with their own methods to
19 satisfy the regulatory requirements, as long as
20 they can demonstrate that the requirements are met.
21 The guidance that we developed we hope is useful to
22 licensees and the Agreement State regulators.
23 If we were evaluating an application,
24 that's the document, combined with many others,
25 that we would use. It is around 500 pages or so.

1 It's not all words though, so you'll have to be the
2 judge whether it's a good sleep aid to you or not
3 if you need that sort of thing.
4 There are many examples provided, and
5 some figures and that sort of thing. So hopefully
6 it's not just reading all dry regulatory text. We
7 do have in there suggested references, screening
8 tools and case studies, a variety of other
9 information. One important thing to note about the
10 guidance is, and I can't make this enough -- can't
11 make this point enough times is that guidance does
12 not provide requirements.
13 So requirements are provided in the
14 regulation. Guidance provides methods that you may
15 use to satisfy the regulatory requirements. So
16 we've received lots of comments, especially from
17 some stakeholders that kept saying things about the
18 requirements in the guidance, and it's just a
19 misinterpretation of what guidance is in the
20 regulatory approach.
21 We did not receive as many comments on
22 the guidance nearly so as we did on the regulation,
23 possibly due to length of the document. We really
24 tried to get comments on it. We did receive some
25 good comments from a variety of stakeholders, but

1 it was a bit of a challenge to get comments on it.
2 It will be issued at the same time as
3 the proposed rule, so sorry, as the final rule. It
4 will be issued the same time as the final rule.
5 Oh, I'm sorry. I'm misreading my bullet here. The
6 draft NUREG was issued at the same time as the
7 proposed rule. The final NUREG will be issued at
8 the same time as the final rule.
9 It was discussed in seven public
10 meetings, including a webinar that was dedicated to
11 it and we have the same public comment for it as we
12 did for the rest of the regulation. The guidance
13 such as the NUREG is easily revised or easily as
14 defined in relation to developing a regulation.
15 So it still might be a bit
16 time-consuming, but it's way easier to revise
17 guidance than it is to change a regulation. So we
18 expect that in the future, there may be the need to
19 revise or supplement the guidance document, even if
20 we don't have that need to do anything with the
21 regulation. But that of course would depend on
22 resources. Next slide, please.
23 MEMBER REMPE: Just a question, though.
24 Like if we had a discussion of this topic at our
25 full Committee meeting, right now the disks you

1 gave us are not openly available with the guidance
2 document. Do you anticipate that you'll be done
3 with your effort so it will be public by the first
4 week of November?
5 MR. ESH: I don't believe so, because
6 it has to be held to -- before it can be made
7 final, we have to see what the final changes to the
8 regulation may be. So we have to wait and align it
9 with that, and that's primarily why it's held back.
10 Now the version that you got right now,
11 if we didn't get any changes to the regulation,
12 that would be the final guidance document. We
13 don't anticipate any changes -- right now, we don't
14 have any additional changes to that document. So
15 yeah.
16 The comments that we received on the
17 guidance document were mainly in alignment with the
18 rule comments, such as in the analysis time frames.
19 There was a lot of discussion about the protective
20 assurance period, which Gary discussed in the three
21 tiers that he said it's confusing and it should be
22 eliminated.
23 There was comments about
24 defense-in-depth and the requirement for analyses.
25 So that we already covered in detail. There was

1 confusion on the various time frames, like I showed
2 you that figure, a version of it that we put in the
3 guidance document. We had questions about the site
4 closure process, so there's more new material on
5 that, including the development of say permanent
6 markers to identify the site at closure, and there
7 was some clarification on the inadvertent intruder
8 assessment scenarios in the guidance.
9 MEMBER BLEY: One question about the
10 comments. In the big package that was released,
11 there's the summary of comments and your responses.
12 Did you get many comments beyond those from
13 licensees and the state regulators?
14 MR. ESH: You mean on the guidance
15 document?
16 MEMBER BLEY: Well on both.
17 MEMBER SKILLMAN: On both.
18 MR. ESH: The comments on the rule were
19 from a whole variety of different stakeholders,
20 members of the public, licensees, Agreement State
21 regulators, other trade and industry organizations,
22 environmental groups. It was a wide smattering of
23 groups that provided comment on it. On the
24 guidance document, it was much more limited to some
25 of the licensees and Agreement State regulators.

1 MEMBER BLEY: Okay, thanks. I hadn't
2 seen a list of all those.
3 MR. ESH: Right. So all the comments
4 are publicly available that we received on the
5 rule. The responses for the guidance documents,
6 the comments on the guidance document are an
7 appendix to the guidance document. So you have
8 that on your CD.
9 So the major revisions made were of
10 course in the analysis time frame area. We
11 eliminated the protective assurance period and we
12 modified the compliance period discussion. We
13 added detailed examples of how to determine if a
14 site has significant quantities, because that
15 drives your compliance period selection for either
16 the 1,000 year value or the 10,000 year value.
17 We clarified the information on
18 defense-in-depth. A variety of figures describing
19 the state closure process, the time frames and the
20 process for developing allowable limits, and as I
21 indicated, we have the appendix for the public
22 comments. We also had an appendix on the 10 C.F.R.
23 Part 61 draft environmental impact statement DEIS
24 default scenarios.
25 So that provides some background to

1 what was analyzed for the intruders, in case people
2 wanted to analyze similar intruders in their
3 site-specific analysis. So they have the details
4 for how they would do that. So I guess either I
5 would entertain questions now or turn back to Gary.
6 He's going to do a path forward summary I think,
7 right.
8 CHAIRMAN CHU: Because we're running
9 late in the schedule, I recommend if there are any
10 more questions we hold them until the end of the
11 agenda, because we have still a couple of things.
12 People are lining up, but I want to first thank you
13 for, the two of you for your excellent and
14 comprehensive presentations, you know. If you
15 could stick around a little bit, there may be more
16 questions. Now we're going to turn to the -- go
17 ahead.
18 MEMBER BLEY: Well, another path
19 forward presentation.
20 CHAIRMAN CHU: Oh you have another one?
21 MR. COMFORT: Well, it's just a real
22 quick summary of where we're going from here. All
23 it is basically is the Commission currently has,
24 you know --
25 CHAIRMAN CHU: Oh please, go ahead, go

1 ahead. Yeah, okay.

2 MR. COMFORT: Yeah, and they're

3 reviewing it. They'll you know presumably be

4 receiving your letter and take that into account.

5 My understanding is they're also talking to some

6 other stakeholders and stuff who have been

7 interested in the rule. They'll eventually come

8 out with a decision on the rule, whether to go

9 forward with it or not.

10 Should, you know, our expectation and

11 hope is that they'll go forward with it. They may

12 have changes related to that. Once they do give us

13 direction that they do want us to move forward and

14 publish the rule, we'd make any minor changes that

15 they wanted us to do.

16 The package is then sent to the Office

17 of Management and Budget for review under the

18 Paperwork Reduction Act. Once we get their

19 approval, then we publish it in the Federal

20 Register. Under the terms of this rule, it would

21 be effective one year after the publication of the

22 rule itself.

23 Now since we don't have any licensees,

24 that really doesn't mean a lot, unless a new

25 licensee happened to come in. The Agreement

1 States who do have the licensees will have three
2 years from the date of publication to incorporate
3 compatible regulations. Presumably, they would use
4 the same implementation time period that we put in
5 our rule, which is for existing licensees.
6 They'd have up to five years or the
7 next renewal to provide an update to their
8 application on it. So likely some of these
9 Agreement States may not see an application for
10 seven or eight years under this time scale. That's
11 really where -- and I was going to answer real
12 quick the question about updating the performance
13 assessments.
14 It's not specifically stated in the
15 rule, but based on the language in the rule, they
16 would have to update it minimally at the time of
17 renewal, because they'll have to apply up to date
18 information in their application, and their
19 application has to include a technical analyses and
20 all.
21 It would also be expected that in
22 certain circumstances, such as if they were
23 changing their waste acceptance criteria, they may
24 have to go back and look at it and evaluate and
25 update it to support the waste acceptance

criteria.

MEMBER SKILLMAN: Yeah. My concern was addressed by the timeliness of the one year review of the waste acceptance criteria. That took care of my real concern. Thank you.

MR. COMFORT: That's it.

CHAIRMAN CHU: Thank you. We're going to go to the next agenda item with comments from Dr. James Clarke. I hope he's still there.

MEMBER BLEY: Jim are you on the line? Try to talk to us, see if your line's open.

MR. CLARKE: I think I'm on right now.

MEMBER BLEY: Yep, you're okay. We hear you.

MR. CLARKE: Okay. Well thank you. It's a real pleasure to participate in this meeting. Let me do a sound check. I have a tendency to fade. Can you all hear me?

MEMBER BLEY: Very good right now.

MR. CLARKE: Okay and also I --

MEMBER BLEY: And your slides are on the board.

MR. CLARKE: Okay, good. I want to extend my congratulations to David Esh on his very well-deserved honor. David, congratulations.

1 MR. ESH: Thank you.

2 MR. CLARKE: Oh, you're welcome. So
3 let me start with the first slide. I have slides
4 that provide an introduction to CRESP. It's an
5 mouthful of an acronym. I'll spell it out in a
6 minute. I also have slides summarizing the
7 comments that CRESP submitted. This organization
8 submitted comments in 2013 and 2015.

9 Since CRESP didn't provide any further
10 comments, I have a few of my own in my capacity as
11 a member of the former -- and that should be NRC,
12 ACMW now, and as a consultant to the ACRS. All of
13 this material is at a very high level necessitated
14 by the time I have, and answer any questions you
15 might have. So I'd be pleased if it would be
16 helpful to provide the ACRS with a more detailed
17 report. If you'd like that, that would be great.
18 And then I'm Jim Clarke of Vanderbilt University.

19 So the next slide, please. Just an
20 introduction to CRESP. It's the Consortium for
21 Risk Evaluation with Stakeholder Participation, and
22 it's a university, multi-university consortium led
23 by Vanderbilt, and I believe it goes back to Tom
24 Grumbley (phonetic). So I think that would be
25 somewhere in the late 90's.

1 The management board is shown there. I
2 think some of you know David Kosson. He is our
3 principal investigator. You may know Steve Krahn
4 and Shlomo Neuman. Craig Benson I know is on the
5 line with you folks, so you may recognize some of
6 those names and the universities that are
7 represented are shown there as well. Next slide,
8 please.
9 MR. COMFORT: Go ahead.
10 MR. CLARKE: Right now, I am trying to
11 change my own slides.
12 (Laughter.)
13 MR. COMFORT: I can't help you with
14 that.
15 MR. CLARKE: Here we go. A little bit
16 about the CRESP mission. I worked with an attorney
17 a long time ago on a lot of merger acquisitions for
18 corporations, and you know, she would call this
19 happy stuff. But basically what we're all about is
20 safe, effective publicly credible risk-informed
21 management of existing and future nuclear waste,
22 and you can see the rest for yourself.
23 We are independent. We do give advice
24 to the Department of Energy. They don't always
25 like it, but that's our situation.

1 Next slide, please. We operate under a
2 cooperative agreement, and basically as you know,
3 we provided comments on the 2013 and 2015 drafts.
4 Next slide. So I would say that we
5 applaud and strongly support the Nuclear Regulatory
6 Commission's risk-informed performance-based
7 approach, and I'm a true believer of that. I
8 remember the first time I came to an NRC meeting
9 and somebody said risk-informed, I said "what's
10 that." I know what risk-based is, but what's
11 risk-informed, and you know it's truly, truly a
12 good approach, a wonderful approach and we strongly
13 support it.
14 If we took issue with anything in the
15 proposed regulations, it was because we believe
16 that the NRC was departing from a risk-informed
17 performance-based approach.
18 Next slide, please. This is just a
19 very brief summary of some of our comments, but
20 several provisions in the draft rules, both in 2013
21 and 2015, and this quote comes I believe from our
22 first comment in 2013. "Commendably reflect and
23 implement a risk-informed performance-based
24 approach. Notably provisions for site-specific
25 waste acceptance criteria, site-specific

1 performance assessment and updated dosimetry in the
2 2013 comments."
3 And then the site-specific
4 assessment to exposure to an inadvertent intruder,
5 provisions for defense-in-depth and safety case
6 evaluations we thought were very positive
7 additions.
8 Next slide, please. However, we did
9 express concerns that there were parts of the
10 regulations or proposed regulations, but we didn't
11 think that the NRC was taking the risk-informed
12 performance-based approach, and in particular the
13 continued incorporation of very long time frames
14 that greatly exceed our experience and forecasting
15 abilities.
16 So this is really, really the heart of
17 my comments, these long time frames. We talked
18 about 1,000 years, 10,000 years and beyond 10,000
19 years, and that's at the heart of the comments that
20 we made, and at the ones that I will now make from
21 a personal standpoint.
22 So the next slide, please. These are
23 my comments. It appears the staff concerns that
24 are reflected in the rule stem from the appearance
25 of long-lived radionuclides, large quantities, from

activities that were unanticipated, and these are understandable and legitimate concerns.

However, they should be addressed through regulations in a way that's consistent with NRC's risk-informed performance-based approach, and it strikes me that I have used risk-informed performance-based probably more in these few minutes than I've heard.

Next slide, please. The draft regulations were revised to eliminate protective assurance period. This has been covered, from 1,000 to 10,000 years. However, the revision now states that the compliance period would be either 1,000 or 10,000 years, depending on the inventory and the concentration of long-lived radionuclides.

However, a compliance period of 10,000 years, I think, is neither risk-informed nor performance-based. This time period is outside our current body of knowledge, and it greatly exceeds our ability to forecast the future. My personal feeling is that our current ability would be better limited to a few hundred years. But I appreciate the 1,000 years has some standing, for example with the Department of Energy.

Next slide. With respect to the

1 intruder assessment, I appreciate that the staff
2 was directed to use 10,000 years. I have the same
3 concerns about the merits, and I think my
4 understanding is that the Commission said to use
5 the 10,000 years in the guidance, but I believe
6 it's on the draft regulations.
7 So whether, you know, this is in other
8 cases, should be approached on site-specific, kind
9 of site-specific basis. So in summary, I've just
10 got a few more here. In summary I appreciate that
11 the appearances in large amounts of long-lived
12 radionuclides requiring disposal in waste streams
13 that didn't exist were unanticipated when 10 C.F.R.
14 61 was first promulgated.
15 These unanticipated events appear to be
16 driving the regulations to positions that are
17 neither risk-informed in my opinion nor
18 performance-based. For example, 10,000 year
19 compliance periods and 10,000 year intruder
20 assessments.
21 Next slide. Perhaps these
22 unanticipated waste streams, which has depleted
23 uranium can be handled in other ways, and that's
24 really what I'd like to suggest, possibly through
25 guidance, but in ways that don't require

1 unrealistic compliance periods. I can't help but
2 wonder what if we took long-lived radionuclides out
3 of the main body of 10 C.F.R., perhaps they could
4 be treated as exceptions, maybe as special waste.
5 But they appear to be driving the regulations.
6 Next slide, please. So I just have a
7 few closing comments. I know we're running short
8 on time, but my experience with the NRC covers over
9 16 years, consultants to the Advisory Committee on
10 Nuclear Waste, member of the Advisory Committee on
11 Nuclear Waste and Materials and now a consultant to
12 the Advisory Committee on Reactor Safeguards.
13 I appreciate the opportunity to tell
14 you all that the people from the NRC with whom I've
15 had the pleasure to work are truly extraordinary.
16 We just heard from two of them, and indeed I hold
17 the NRC and its staff in very high regard. We just
18 apparently disagree over the merits of including
19 extremely long time periods as compliance periods
20 in enforceable regulations.
21 That was my last line, and I appreciate
22 the opportunity to provide these comments, both on
23 behalf of CRESP and me, and I'd be pleased to
24 address any questions you might have.
25 CHAIRMAN CHU: Thank you Dr. Clarke.

1 Any questions for Dr. Clarke?

2 (No response.)

3 CHAIRMAN CHU: No? Thank you Dr.

4 Clarke again for your presentation.

5 Now we're going to move to the next

6 agenda items. As I mentioned, we have received

7 two requests to speak at this afternoon's meeting.

8 As is customary, we have asked these speakers to

9 try to restrict their statements to no more than

10 five minutes.

11 The first of these statements is from

12 Doug Tonkay from the U.S. Department of Energy.

13 Doug, are you there?

14 MR. TONKAY: Yes, I'm right here.

15 CHAIRMAN CHU: Oh you're here.

16 (Laughter.)

17 MR. TONKAY: Thank you.

18 CHAIRMAN CHU: Thank you.

19 Public Comments

20 MR. TONKAY: Yeah, good afternoon. I'm

21 Doug Tonkay. I'm the Waste Disposal office

22 director with the Department of Energy's

23 Environmental Management Program, and I appreciate

24 having the five minutes to talk. DOE is

25 responsible for regulating low level waste disposal

1 facilities at sites across the country, and in
2 doing so we have technical requirements for
3 maintaining our performance objectives, as well as
4 setting site-specific waste acceptance criteria at
5 our disposal sites.
6 In addition, our directives allow
7 utilization of commercial disposal facilities,
8 which are directly impacted by this rule. So we
9 have a significant interest in the changes to 10
10 C.F.R. Part 61. I would like to thank the
11 Subcommittee for providing the opportunity to share
12 the views and, as well I'd like to thank the
13 speakers for their excellent presentations.
14 Please note DOE was not given an
15 advance copy, so we have not had time to review
16 thoroughly all of the proposed amendments and the
17 supporting rationale, and we would appreciate the
18 Committee's consideration of an opportunity to
19 provide further observations at the full Committee
20 meeting in November.
21 In July 2015, DOE provided comments on
22 the then-proposed revision. We are pleased that
23 the NRC staff considered and accepted many of the
24 comments. I want to address three areas for which
25 we remain concerned based on our initial review of

1 the Federal Register notice.

2 First, as we've been discussing

3 somewhat today, the draft final rules we understand

4 effectively proposes a default compliance period of

5 10,000 years for long-lived waste, with a

6 performance objective of .25 millisieverts annual

7 dose limit. The Commission directed and we agreed

8 that 1,000 year compliance period be used.

9 Multiple Commissioners observed that

10 using a 10,000 year compliance period in this

11 context provides false comfort based on guesswork

12 and subjective speculation.

13 We also agree with the ACRS, which

14 stated in their letter to the Commission that

15 introducing significant uncertainties for the

16 performance analysis through speculation on human

17 activities, waste and site performance, and earth

18 processes for a millennia is unlikely to improve

19 either our decision-making process or our

20 understanding of the safety decisions regarding

21 near surface low level waste disposal.

22 We note that the NRC regulations for

23 materials and sites that are comparable to the near

24 surface disposal of low level waste established

25 compliance periods of 1,000 years at most. In

1 light of these considerations, we'd prefer to see a
2 final rule with a compliance period for an annual
3 dose limit to 1,000 years, while requiring
4 qualitative consideration of analysis for longer
5 time periods, up to the point of peak dose but not
6 extending beyond the period of geologic stability.
7 Let me clarify Dr. Esh's statement that
8 DOE has used 10,000 years for waste incidental to
9 reprocessing analysis. This occurs because it is
10 in an NRC NUREG guidance document that is used by
11 the NRC technical staff that we are required to
12 complete consultation with. It is not part of the
13 DOE directive.
14 Our second concern is that the rule
15 continues to include radon in the dose-based
16 performance objectives. The inclusion of radon is
17 inconsistent with other EPA, NRC and DOE
18 regulations that address management of uranium
19 containing materials.
20 Including radon in the calculation of
21 annual dose imposes a limit for future exposures to
22 a limited number of hypothetical receptors, that is
23 significantly lower than the levels currently
24 accepted as guidelines for residential exposures
25 across the country today.

1 To establish more restrictive
2 limitations in the context of an extended
3 performance assessment that entails significant and
4 irreducible uncertainties would be particularly
5 unwarranted. Therefore, the final rule should
6 exclude radon from dose calculations and instead
7 include a performance objective with a flux
8 standard for more consistency with other national
9 requirements for disposal of waste containing
10 uranium.
11 Finally, DOE suggests that a draft of
12 the NUREG-2175 be made available for comment before
13 the rule is finalized. The draft final rule
14 indicates that a substantial amount of additional
15 information ha been moved to guidance, and
16 similarly that a large number of clarifications
17 appear in the NUREG.
18 What information is included and how
19 the regulatory provisions are interpreted can have
20 a dramatic effect on implementation, particularly
21 concerning the scope and conduct of performance
22 assessment over extremely long time periods. While
23 the staff indicated that changes could be made in
24 the future, it could be many years if not decades
25 before a revision to the guidance is available.

1 Thank you again for the opportunity to
2 present our views, and we will continue to monitor
3 progress of the rulemaking, and we appreciate the
4 opportunity to provide further observations at the
5 full Committee meeting.
6 CHAIRMAN CHU: Thank you very much Mr.
7 Tonkay for your comment. We're going to go to the
8 next comment from Roger Seitz from the Savannah
9 River National Laboratory. He must be --
10 (Off mic comments.)
11 MEMBER BLEY: We're getting the phone
12 line open now for you.
13 CHAIRMAN CHU: It's open?
14 MEMBER BLEY: Go ahead, yeah.
15 CHAIRMAN CHU: Mr. Seitz?
16 MR. SEITZ: Can you hear me?
17 CHAIRMAN CHU: Yes.
18 MR. SEITZ: Okay.
19 CHAIRMAN CHU: Yeah. Please go ahead
20 with your comments. Thank you.
21 MR. SEITZ: Okay. Thank you very much
22 for the opportunity to speak today. Again, my name
23 is Roger Seitz and I've been a performance
24 assessment practitioner for more than 30 years.
25 These comments reflect my experiences over that

1 time.

2 I'd like to note that I do appreciate

3 the efforts of the staff to address the comments,

4 and to develop the updated materials. I previously

5 had the opportunity to speak in detail as part of

6 the DOE presentation for this Subcommittee, and

7 also submitted comments.

8 So today, I'm just going to briefly

9 summarize my thoughts on a few, but not all of the

10 comments that have been provided. The first thing

11 I would want to address is the time of compliance,

12 and the change to 10,000 years for long-lived

13 waste is a concern and also the fact that

14 long-lived waste is not clearly defined in the

15 rule.

16 So it's 10,000 years for long-lived

17 waste, and then a more specific definition has been

18 moved to the guidance. Overall, I believe 1,000

19 years is a reasonable time frame to have strict

20 compliance, and that's consistent with or far

21 exceeding time frames for other U.S. rules

22 addressing near surface disposal, noting that for

23 deep geologic disposal there are longer times.

24 I agree with the positions of the IAEA

25 and the ICRP that time frames after many hundreds

1 of years involve increasingly speculative
2 assumptions and lose meaningfulness in terms of
3 strict decision-making. That said, I do believe
4 that time frames after 1,000 years need to be
5 addressed, but in an increasingly qualitative
6 manner with an intention to build confidence that
7 major consequences are not going to occur later in
8 time.
9 For example, when we -- a number 500
10 millirem has been used. 500 millirem is still less
11 than the average annual dose for someone in the
12 United States today, and it's significantly less
13 than average doses in some areas of the earth. So
14 these things should be reasonable considerations as
15 part of a qualitative assessment after 1,000 years.
16 The second item I will address is
17 radon, and this is a comment that I've made several
18 times, and I continue to be concerned that staff
19 has departed from the well-accepted practices that
20 exist in EPA, NRC and DOE rule. In the other
21 rules, radon is treated as a separate performance
22 objectives, as a flux or concentration.
23 I believe this was done because if you
24 conducted dose assessments for acceptable
25 concentrations of radon in a basement per EPA

1 guidance, those concentrations will easily result
2 in doses well in excess of 25 millirem per year.
3 So effectively staff are imposing a much more
4 restrictive requirement for potential doses that
5 may occur far in the future than are currently
6 applied for exposures routinely occurring in many
7 homes every day now.
8 The third thing I will address is
9 inadvertent intrusion, and I appreciate some of the
10 changes that helped with clarification. But I am
11 still concerned that it's being treated as a strict
12 performance objective. This is a departure from
13 international recommendations that emphasize
14 considering inadvertent intrusion in the context of
15 optimization, rather than using a dose constraint.
16 I'm also concerned about the staff
17 implication of the link between 500 millirems per
18 year as the objective and how that accounts for
19 likelihood in some respect. Note that 25 millirem
20 per year is five percent of 500.
21 So this leads me to think staff is
22 implying that they believe there is reasonably a
23 five percent chance that there will be a complete
24 loss of control at the facility, there will be a
25 complete loss of memory of the waste that is there.

1 Someone will chose to move on to the
2 footprint of the facility. They will choose to
3 drill a well through the facility rather than to
4 the side of the CAF, for example. They will
5 continue drilling in spite of cuttings that are
6 obviously not soil, grow a garden, etcetera. I
7 would argue that the likelihood of all those things
8 occurring is much less than five percent. So I
9 would recommend not referring to 500 millirem as
10 some means of addressing likelihood.
11 Finally, I would like to express
12 concern about a potential lack of transparency by
13 publishing a substantially revised guidance as
14 final without public review. The staff responses
15 to comments refer to major changes being made to
16 the guidance, and substantial information moved
17 into the guidance.
18 Without seeing the substantially
19 revised guidance, it is very difficult to
20 understand how the staff interprets this
21 substantially changed version of the rule. I was a
22 bit dismayed to see the staff's position that the
23 guidance will be issued with the rule without
24 comment, but the public can provide input and their
25 input would be considered when the guidance is

1 revised.

2 Considering that Part 61 was

3 promulgated in the early 80's, and it's just now

4 being revised more than 30 years after the original

5 rule, I'm left to wonder how long it might be

6 before such a revision would occur. Thank you very

7 much for the opportunity to speak with you.

8 CHAIRMAN CHU: Thank you very much, Mr.

9 Seitz, for your comments. I would like to know if

10 there are other public members who would like to

11 make comments?

12 MR. GREAVES: John Greaves --. I'd

13 like to make a comment if I could.

14 CHAIRMAN CHU: Yes.

15 MR. GREAVES: This is -- I'll be brief.

16 This is John Greaves. Just as background, Paul

17 Wellhouse and I provided specific comments during

18 July of last year during the opening of the comment

19 period. Paul Wellhouse was a principal author of

20 Part 61 in the early 80's. Both Paul and I were

21 NRC senior executive managers responsible for

22 implementing Part 61 requirements, and developing

23 associated guidance for over two decades.

24 After retiring a decade ago, we both

25 provided advice to a number of national and

1 international organizations on low level waste
2 disposal.
3 My view is the staff has done a good
4 job of listening to and incorporating many of the
5 recommendations provided by us and others with
6 expensive experience on implementing low level
7 waste disposal regulations.
8 One recommendation by numerous
9 stakeholders was a clean two-tiered approach has
10 not been incorporated. A blended two-tiered
11 approach has been recommended and incorporated by
12 the staff in this proposed rule. Gary Comfort
13 labeled it a kind of a two-tiered system, and it's
14 not clean. It will be difficult to implement and
15 result in unnecessary mitigation risk in my
16 opinion.
17 This moving target will be a
18 significant risk with such a subjective approach
19 that can be argued by multiple parties either way
20 in the future. A clean two-tiered approach with
21 1,000 year compliance period and a second tier from
22 1,000 RPG dose approach would be adequate to ensure
23 safety to 1,000 year compliance period and that
24 second tier analysis as the peak dose.
25 DOE stated a few minutes ago they used

1 such a two-tiered approach. This would eliminate
2 the need for a separate, new lengthy rulemaking to
3 address waste classification for waste streams
4 containing larger quantities of long-lived
5 materials.
6 In my opinion, requiring compliance
7 only in a guidance document in terms of specific
8 compliance period, whether you do 1,000 or 10,000,
9 is not an appropriate regulatory approach and
10 unnecessary if a plainly two-tiered system is
11 specified.
12 In my view the Commission needs to make
13 a clear final call on the one versus ten thousand
14 year compliance period number. It's really a
15 policy call. Thank you for the opportunity for
16 providing these two comments.
17 CHAIRMAN CHU: Thank you, John for your
18 comments. Any more online? Comment? If not, I'll
19 turn it to the floor for comments.
20 MR. ARLT: I'm with the NRC staff. I
21 just want to make a quick comment. So my name is
22 Hans Arlt. I was the author of part of Chapter 2
23 of the guidance, and I just wanted to make a
24 comment as far as like the uncertainty with regards
25 to a site with 1,000 years and 10,000 years.

1 The part that's in Chapter 2 looks at
2 that. It looks at the uncertainty of the site, and
3 it -- it has something called scenario development
4 and conceptual model development and so forth. All
5 the sites do not have the same uncertainty. There
6 are certain sites that have a lot of uncertainty.
7 If I gave you an example, say you want to build a
8 site on the big island of Hawaii.
9 I would not say that 1,000 years is
10 adequate. You probably couldn't even judge the
11 next 50 years or 100 years for a site like the big
12 island. There are just too many uncertainties as
13 far as like volcanos, earthquakes, the elevation
14 it's at. It just would be a very, very bad site to
15 build a repository.
16 Or if you're in another place, if
17 you're like on the plains in Kansas or the desert
18 in Chile and so forth, places that have not changed
19 at all, the uncertainty for those areas is very,
20 very low. Chapter 2 has a method of looking at
21 those uncertainties.
22 So I just basically wanted to say
23 there's no big magic line with the 1,000 years or
24 10,000 years. You really have to look at the site,
25 and if the site has so many uncertainties, you

1 know, that just might not be a good place to build
2 it.
3 CHAIRMAN CHU: Thank you very much.
4 Any more comments?
5 MEMBER BLEY: Something's come up since
6 before Madam Chairman, and I'd like to ask a
7 question at this time if I might?
8 CHAIRMAN CHU: Sure.
9 MEMBER BLEY: Jim Clarke put something
10 in my head here, and I went back and looked what I
11 think is the last SRM, and I'm going to say how I
12 read it, and then I'm going to ask you guys to
13 comment if you would. They say to include a
14 regulatory compliance period of 1,000 years.
15 Later they mention 10,000 years three
16 times. Once is approving a proposal to require an
17 intruder analysis built on the same assumptions.
18 The second time is to do a protective assurance
19 analysis out to 10,000 years, and the third time is
20 to provide qualitative analysis for a performance
21 period of 10,000 years or more.
22 As Dr. Esh talked earlier, the way I
23 understood your discussion of the analysis at
24 10,000 years and why seeing this build up to ten
25 percent of the daughter products, if uranium was

1 significant, is almost as a sensitivity study.
2 It's not trying to model everything that's
3 happened, but to say gee, if we build up to this
4 amount of radon or other daughter products, is the
5 site still well protected?
6 The conclusion about that could well be
7 a qualitative approach, and the rule as it's
8 currently stated, the 10,000 years is the
9 compliance period if you have long-lived waste,
10 which seems different than what the Commission
11 suggested to you.
12 So if you guys would talk about that a
13 little. It will probably come up at a full
14 Committee meeting too, but I'd be interested in how
15 you address that.
16 MR. COMFORT: Yeah. The revision, I
17 mean the Commission provided us direction and there
18 were a few areas from which the final rule changed.
19 But you've got to remember that Commission
20 direction was for the publication of the proposed
21 rule.
22 We incorporated what we believe all of
23 what they directed into the proposed rule, and then
24 part of the Administrative Procedures Act, we've
25 got to consider all the comments that we received,

1 and then we made revisions based on that to what we
2 think both is what the Commission was aiming for,
3 as well as, you know, addresses other public
4 comments and all. So that was the intent that we
5 go off to, you know. We were using the 10,000
6 years, but we're only applying it for the
7 long-lived waste.
8 MEMBER BLEY: I have a couple more
9 questions on this. The first is, and I think Gary
10 you went through this earlier, I think you talked
11 that in fact the Agreement States really urged you
12 to have something like a 10,000 year compliance
13 period for the long-lived waste.
14 Did I remember that correctly, because
15 I haven't thoroughly looked at all those comments,
16 but I've looked at them?
17 MR. ESH: They wanted to be able to
18 preserve their approaches.
19 MEMBER BLEY: Okay, and some of which
20 had that or maybe --
21 MR. COMFORT: Right. They didn't
22 specify, you know, that we should have a 10,000.
23 They wanted the flexibility by changing the
24 compatibility category.
25 MEMBER BLEY: Okay. I haven't had the

1 opportunity yet to read the final guidance.
2 Perhaps it makes clear that these things that
3 happened associated with 10,000 years are of the
4 sort I talked about, and I think that was the way I
5 interpreted the discussion you folks offered
6 earlier, that yeah, we want some analysis to be
7 guideposts for making determinations of the perhaps
8 qualitatively, perhaps quantitatively, of the
9 capability of the site.
10 And I'll have to read it and see. But
11 would you tell me that that in fact is the case?
12 MR. ESH: Right, yes. So the objective
13 of those analyses is to provide the information for
14 the regulatory decision-making about whether public
15 health and good -- public health and safety is
16 protected for the disposal action that you want to
17 take. So --
18 MEMBER BLEY: And they're not intended
19 to be models of the future?
20 MR. ESH: Well that --
21 MEMBER BLEY: --under all capabilities.
22 (Simultaneous speaking.)
23 MR. ESH: This is the problem. So
24 people will talk about this process that you're
25 doing a forecast. I wouldn't call it a forecast at

1 all. You are doing a regulatory analysis to
2 justify this regulatory decision or action that you
3 want to make, and maybe I'm splitting hairs about
4 that. But they are not forecasts. They are not
5 projections.
6 Sure, you're generating dose
7 assessments into time. But it's not the same thing
8 as like trying to say well, what's the population
9 growth over the next five years, or who's going to
10 win the election, you know? Those are true
11 forecasts and projections.
12 This is an analysis over time, but it's
13 -- we never describe or try not to ever describe
14 them as forecasts. So and the idea that for the
15 material that we were directed to address in this
16 rulemaking, the depleted uranium, that you should
17 only analyze it for 1,000 years and then cut it
18 off, I don't know why you would describe that as a
19 risk-informed approach.
20 How by not calculating what you think
21 is going to happen is that risk-informed? I
22 realize there are uncertainties associated with the
23 calculations and what's happening over time. But
24 that's the information that you should be
25 considering as a decision-maker, not missing,

1 especially when the thing that you know most in
2 these problems are the waste characteristics.
3 You know, I mean the decay and ingrowth
4 characteristics. The radiation physics is the part
5 of this that we should have the most certainty
6 about. So if we know things about the radiation
7 physics, then that should reflect into the
8 approaches that we're trying to do, which is what
9 we're doing with this tiered approach to the
10 compliance period. We're trying to bring in the
11 radiation physics into how we solve the problem.
12 MEMBER BLEY: Okay. This is starting
13 to fit together for me, and I look forward to
14 reading the guidance. I'd just mention, you know,
15 if you look at Reg Guide 1.174, when it looks at
16 things like this it has you do the best
17 calculations you can, but talks about an integrated
18 decision-making process. I think you're talking
19 the same kind of thing here.
20 MR. ESH: Right, and I think it was
21 maybe one of the ACRS meetings where I had some
22 figures or slides on performance assessments and
23 results, and you know. You can have a situation
24 where your numerical model or calculation generates
25 a number that's well below your limit, and as a

1 regulator I could still say you didn't make a
2 safety case because it's based on the quality of
3 the information and what went into the assessment
4 to get you from here to there.
5 Likewise, you could have a situation
6 where maybe you generate a result, a probabilistic
7 result and some of the results are above your limit
8 and I could say look, you've still made the
9 criteria because you had a lot of conservatisms and
10 this, that or the other thing that went into the
11 calculation.
12 So too much is hung up on generating
13 numbers and comparing numbers, instead of what
14 this is about is developing all the information to
15 build some confidence that you're making a correct
16 decision, of which the numbers are one input to
17 that.
18 Like I said earlier, you know, waste
19 characteristics in those prohibitions and
20 restrictions is probably much more important than
21 whether you've analyzed 1,000 years or 10,000 years
22 for your compliance period.
23 I mean if you look at the Beatty,
24 Nevada case, they had the site catch on fire and
25 barrels blew out of it because they apparently had

1 put metallic sodium in it and then they got a bunch
2 of water that interacted with the sodium and blew
3 the barrels out.
4 Okay. Maybe if they had followed the
5 waste characteristics more closely, they could have
6 avoided that problem. That actually is a good
7 example because the only reason why that didn't
8 turn into a significant impact is because in the
9 location where that occurred, there wasn't a lot of
10 activity remaining. If there had happened to be
11 some long-lived waste in the vicinity of where that
12 happened, there at least would have been an
13 expensive cleanup to deal with, if not health and
14 safety impacts.
15 I don't know. We appreciate all the
16 input we have from the commenters, and we realize
17 we differ from some of the commenters in the
18 approach and the opinions.
19 I would indicate that I don't believe
20 the guidance, I would call it, was revised
21 significantly. So we did make the changes to the
22 guidance that we needed to in response to the
23 changes in the regulation, and other ancillary
24 changes to the guidance.
25 But I certainly wouldn't characterize

1 it as a significant revision. The most significant
2 thing is we dropped Chapter 6, which was the
3 protective assurance period analyses because we
4 took that out of the rule. So if you're talking
5 big changes, that's the biggest change. A lot of
6 the other material remained the same in the draft
7 that was provided for comment.
8 So and many of the other comments that
9 you heard at the end here, they're similar to the
10 comments that were provided in writing and that
11 we've generated responses to.
12 So if you're curious what our responses
13 would be to those questions, I know we're running
14 late tonight. Look at those between now and the
15 final committee meeting and we'll be happy to come
16 back to them when we get to that point.
17 MEMBER REMPE: If we have discussion of
18 this at our November meeting, and this document
19 still has not been released, will we have a closed
20 meeting?
21 MR. WIDMAYER: Do you want an answer?
22 We have been able to close certain portions of full
23 Committee meetings. We have to check with OGC and
24 find out if --
25 MEMBER REMPE: Well that's my question,

1 is we can't discuss it openly. If we have
2 questions about what's in here, it's not been
3 released to the public and I think you've said the
4 reason it's not been released is the Commissioners
5 want to see it because it might affect some of the
6 rule language, and that's why it's not been
7 released. Is that a correct paraphrase of your --
8 MR. COMFORT: No. The Commission
9 doesn't actually look at it specifically. It's
10 more because we won't want to have a bunch of
11 variations going around, that there could be some
12 document -- you know, people saying oh, you
13 released this back in September or whatever. This
14 is what I'm using. Oh, what do you mean you
15 changed it, you know. It's just version tracking
16 control --
17 MEMBER REMPE: But something in the
18 2125 could impact what's in the rule that might be
19 published; is that true?
20 MR. COMFORT: No. The Commission could
21 though change and direct -- change direction of
22 what we want to do in some ways that we'd have to
23 update --
24 (Simultaneous speaking.)
25 MEMBER REMPE: In the 2125 guidance --

1 MR. COMFORT: Right. Well, in our rule
2 and then we'd have to update --
3 MEMBER REMPE: In the rule.
4 MR. COMFORT: Right.
5 (Simultaneous speaking.)
6 MR. COMFORT: Yeah.
7 MEMBER REMPE: Okay. That's what I
8 thought you said.
9 MR. COMFORT: Right, yeah. If the
10 Commission changes something in the rule, then we
11 would update 2125?
12 MEMBER REMPE: And they might do that?
13 MR. COMFORT: Yeah, and if they don't
14 make any changes, then what you see as the guidance
15 would be going forward. And the Commission could
16 always make the decision, I mean if they get public
17 interest to say go release it anyways, you know.
18 We're not going to worry about the version control
19 issues. That's up to the Commission direction. We
20 follow Commission direction.
21 MR. ESH: Yeah. Let's look at that.
22 Let's take that back and get back to the Committee
23 about -- so we haven't issued, released the
24 guidance because, just as Gary's said, the rule is
25 just the staff's proposal to the Commission. If

1 the Commission changes the rule, we'll have to make
2 conforming changes to the guidance.
3 But I need to talk to our general
4 counsel and our rulemaking staff. But to me, it
5 seems like the draft guidance is consistent with
6 the draft final rule, which is with the Commission.
7 So I'm not sure what the pre-decisional argument
8 would be at that point. But let us explore that
9 and get back to you.
10 MEMBER BLEY: This is something we have
11 to know about very, very, very quickly. I mean
12 like tomorrow quickly. We have -- we're down to
13 two weeks and a day or something like that, and we
14 have to get our FRN out. If we should have to
15 close part of the meeting, we have to include that.
16 I suspect if OGC gets involved and we pursue this a
17 little, closing a FACA meeting for pre-decisional
18 material could get pretty dicey.
19 MR. WIDMAYER: Yeah. That doesn't
20 usually happen.
21 MEMBER BLEY: Doesn't usually work.
22 MR. WIDMAYER: What we've done in the
23 past with a similar situation is staff generated a
24 version of the guidance document that had draft as
25 a watermark on every page, and indicated what it

1 was as far as timing goes, and then it was clear
2 that it wasn't going to necessarily be a final
3 guidance document. The issue was whether or not
4 the Commissioners had a chance to look at it, even
5 in its draft form.
6 MEMBER REMPE: The guidance document.
7 Not just the rule but the guidance document.
8 MR. WIDMAYER: Right and they, as the
9 staff indicated, they don't typically look at the
10 guidance. So it should be okay with the Commission
11 for us to have the open meeting.
12 MEMBER BLEY: I hope you guys can
13 really pursue this right away tomorrow and get back
14 to us like before noon. If this thing has draft
15 across every page, that's also a problem because I
16 have -- some of us have trouble reading that type
17 of -- me in particular.
18 MEMBER STETKAR: It's also difficult
19 for the ACRS. If the ACRS had comments on -- well,
20 I guess we could have comments on something that's
21 not.
22 MEMBER BLEY: It's possible. It would
23 be good to see that called final and let us look at
24 it, even if it's not published yet.
25 MR. WIDMAYER: Well, it won't be final.

1 MR. COMFORT: Right.

2 MR. ESH: Right.

3 MR. WIDMAYER: Because we're not going

4 to finalize the guidance until the Commission

5 approves the rule.

6 MR. ESH: Right.

7 MR. WIDMAYER: But what we can explore

8 is can we make that draft conforming, consistent

9 with what was offered to the Commission, if we can

10 make that public, and that's what I want to explore

11 with OGC and the rulemaking staff.

12 MR. COMFORT: Well we're -- it's

13 really the issue is I mean it hasn't gone through

14 all our formal management concurrence and OGC

15 concurrence yet, that there may be tiny little

16 tweaks of a word here and there, but the concepts

17 are all there, that you're going to see that

18 nothing technical is going to change.

19 Whether we can discuss it in

20 generalities I mean in a public meeting, because it

21 supports the rule, I mean you're just really

22 talking about the rule and how you're going to

23 implement it and how, you know, one phase. The

24 only thing is other members of the public wouldn't

25 have seen it if we don't release it. And while we

1 can't discuss it --

2 MEMBER BLEY: You bring up something I

3 was going to hold until you go around the table,

4 but I'm going to say it now.

5 CHAIRMAN CHU: Okay.

6 MEMBER BLEY: As Chairman of the ACRS.

7 I want to -- I know you want a letter that supports

8 the rule and the guidance. We got the guidance

9 today and we still have this other thing going on.

10 In the past year, there was a case very similar to

11 this. We wrote a letter endorsing the rule but

12 told the Commission we could not yet endorse the

13 guidance for different reasons.

14 But we did that. That's a possibility

15 no matter what happens because we've had such short

16 time to look at this. The other possibility is we

17 have -- we read through it and we have a good

18 enough full committee meeting that we feel we can

19 include it in the letter. I was going to bring

20 this up later but I'll bring it up now for you,

21 Madam Chairman.

22 We were scheduled for a two hour full

23 Committee meeting. Since we've not had a

24 Subcommittee meeting on the guidance with us having

25 had a chance to review the guidance, it seems to me

1 you might want to have a longer full Committee
2 meeting. What I was thinking was we could make
3 this the third one on the first day of the meeting,
4 and schedule it for four hours.
5 If it doesn't take that long that's
6 great, and if it does because we've got to dig into
7 this, and as we go through the guidance, it's also
8 possible we might have real disagreements with it.
9 We don't know yet. I mean the way David walked us
10 through it, it sounds pretty good. But that's not
11 the same as reading it and thinking about it.
12 CHAIRMAN CHU: Dennis, you're saying in
13 the full Committee, we spend a lot of time going
14 through the guidance document. Is that what you're
15 saying?
16 MEMBER BLEY: If the staff wants us to
17 include review of the guidance document in our
18 letter, I don't see how you avoid that, since we
19 haven't -- we will not have read it until then.
20 CHAIRMAN CHU: Are we going to have
21 time to write the letter, you know, 24 hours later?
22 MEMBER BLEY: Well, that's up to you.
23 That's up to you.
24 MEMBER REMPE: But the Commission has
25 told ACRS not just to review the rule, but also to

1 review the guidance, right?

2 MR. WIDMAYER: Yes. They encouraged

3 you to --

4 MEMBER BLEY: That's almost irrelevant

5 at this point. We will review it. Whether we

6 review it to support a letter in November is what

7 I'm talking about. We didn't get it a month before

8 then, and it's going to be pretty hard to fit it

9 all in.

10 (Simultaneous speaking.)

11 MEMBER STETKAR: I like the analogy

12 that you brought up in that other case, where we

13 just told them we're going to review the guidance

14 later, and we haven't done that yet in that

15 particular case.

16 MEMBER BLEY: I thought we did.

17 MEMBER STETKAR: Well, we wrote a

18 letter on it. There's still open issues.

19 MEMBER BLEY: Oh yeah, open issues.

20 MEMBER STETKAR: There's still open

21 issues. They're coming back to us some time.

22 CHAIRMAN CHU: But my question is --

23 MEMBER BLEY: What do you do?

24 CHAIRMAN CHU: Why write a letter in

25 November? Can we --

1 MEMBER BLEY: Because the staff has
2 asked us to. That's --
3 CHAIRMAN CHU: That's my question, is
4 does it make more sense if we review the guidance
5 documents between now and November some time, and
6 then the full Committee actually comes in December
7 and we write a letter in December that's
8 comprehensive and we reviewed everything. We got
9 all the information, you know, rather than I have
10 12 hours to make a decision. That's just an option
11 that I want people to think about.
12 MR. COMFORT: Can I just make the point
13 that I mean it's really not totally up to us. This
14 document is before the Commission. I mean they can
15 make a vote any time they want and, you know, the
16 earlier that you provide input for that so that
17 they can kind of assimilate that. If they're
18 willing to wait longer, that's up to the
19 Commission. But I just want to --
20 MR. WIDMAYER: Our timing right now is
21 sensitive to the timing of the Commission. This
22 paper is with them right now. The SECY paper is
23 with them to make a decision whether to have the
24 staff move forward and publish this as a final
25 rule. The more this committee delays, the less

likely they are to have your letter in time to help with their decision.

CHAIRMAN CHU: But if we rush, we're not going to have the information in the letter.

MEMBER BLEY: Well, we can certainly write a letter on the rule.

CHAIRMAN CHU: Right, right. Is that --

MEMBER BLEY: And we can, you know, if I were you I would prepare the beginning of a letter on the rule, and have the Subcommittee help you with that. As we review the guidance, we can decide whether we'll be able to say anything positive or not about it.

MEMBER STETKAR: Why don't we -- the purpose of the Subcommittee is to bring things to the full Committee.

MEMBER BLEY: The full Committee.

MEMBER STETKAR: So why don't we go around the Subcommittee and see if we'd like to recommend to the full Committee that we postpone a review of the guidance?

MEMBER BLEY: I think at this point, you could go around the table for everything, get comments on everything.

1 (Simultaneous speaking.)

2 CHAIRMAN CHU: Yeah.

3 Subcommittee Wrap-Up and Discussion

4 MEMBER REMPE: I want to start off by

5 thanking the staff, and I do believe that you've

6 answered a lot of questions and that you've spent a

7 lot of time trying to deal with this issue.

8 However, I am stuck on Commissioner

9 guidance that said we need to look at the rule and

10 the guidance. I'm stuck on the fact that the

11 guidance was just given to us today. We didn't

12 have a chance to go through it and implementation

13 of the rule, which is in the guidance, could affect

14 my thoughts about the rule.

15 Hence, despite the fact -- I mean I

16 would be happy to send the Commissioners a

17 valentine or mailgram saying we didn't get this in

18 time. We'll talk to you next December. Why don't

19 you wait until we get a chance to talk, to have a

20 thorough evaluation?

21 So I'm with what Margaret is suggesting

22 that -- I mean we can send them a note or we can

23 call them and contact them. But I don't think we

24 should be providing comments on the rule when we've

25 not had a chance to discuss the guidance. Thank

1 you.

2 CHAIRMAN CHU: Thank you. Charlie?

3 MEMBER BROWN: Yeah. I don't have any

4 other comments, other than one on this, is that I

5 -- am I interfering? Pardon?

6 MALE PARTICIPANT: You're okay.

7 MEMBER BROWN: Okay. I have a little

8 bit of difficulty understanding how you can issue

9 guidance without ever having the public and the

10 people who have utilize it even see it. That just

11 seems to go against my sense of whatever sense I

12 should have.

13 I mean I don't know why you just don't

14 publish it and just don't put the drafts on the

15 thing but put pre-decisional up at the top on every

16 page, and let the public see it, and then they can

17 see what's going on. Because right now, that's

18 just my opinion, okay.

19 MR. ESH: Can I add though that the

20 guidance was made publicly available, and it had

21 the same public comment period as the rule? That's

22 the -- I mean the way the process works is that was

23 the proposed rule and the proposed guidance. So we

24 received all the comments, make changes, and then

25 we issue a final document, the final rule and the

1 final guidance.

2 MEMBER BROWN: That's the same that

3 they made comments on?

4 MR. ESH: That's the final draft of the

5 final guidance document.

6 MEMBER BROWN: But is it the same? Is

7 it --

8 MR. ESH: It is not the same, but how

9 do you ever get out of the public comment loop if

10 you always submit something for public comment

11 then? So if you submit that document, you're going

12 to get new comments. Then what do you do, change

13 the document and then you have to submit it again?

14 MEMBER BLEY: I'm sorry. This isn't --

15 this isn't a time for discussion with the staff.

16 But the process we always see is one where the

17 staff publishes guidance, gets comments and

18 prepares the final that includes responses to all

19 the comments.

20 That's just the way, and then they

21 don't go out again unless there's massive changes

22 that really upset things. In any of their guidance

23 documents that I've been aware of since I've been

24 here.

25 CHAIRMAN CHU: Jose.

1 MEMBER MARCH-LEUBA: Yes. Maybe you
2 have noticed I'm not an expert of this field, so I
3 have been mostly quiet. But I have listened to
4 David and I have agreed with essentially every one
5 of your arguments. I really appreciate what you
6 said. But I sense a lot of pushback on a couple of
7 topics. The 10,000 years and the radon.
8 So if you could prepare one slide or
9 two on that for the full Committee for my
10 education. What is the implication of doing the
11 10,000 year analysis? Why is people opposed to it,
12 and what would be the rationale of taking radon as
13 a different isotope than any of the others?
14 Is it because we don't have good models
15 for it? So if you could educate me on that one in
16 a couple of weeks, I would appreciate it.
17 MR. ESH: Certainly.
18 CHAIRMAN CHU: John.
19 MEMBER STETKAR: Nothing, thank you.
20 (Off mic comment.)
21 MEMBER BLEY: Not even going to help on
22 the decision about the letter?
23 MEMBER STETKAR: Well, I thought --
24 (Off mic comment.)
25 MEMBER STETKAR: I thought we were

1 going to just go around and ask. Nobody else --
2 MEMBER BLEY: Charlie did.
3 MEMBER STETKAR: Okay. Well my
4 recommendation would be that we bring the rule to
5 the full Committee, and that we recommend that we
6 did not hear anything on the guidance. If nothing
7 else, the full Committee, as best as I can tell,
8 isn't here and they haven't received the guidance
9 and it's now about two weeks before the full
10 Committee meeting, which is well under our 30 days
11 time for transmitting material to the full
12 Committee and expecting --
13 I've been told, I haven't loaded the
14 CD, that it's several hundred pages?
15 MALE PARTICIPANT: 500 pages.
16 MEMBER STETKAR: 500 pages? There's no
17 way that you can expect, you know, our other
18 committee members to try to do any type of
19 meaningful review of that material in two weeks,
20 given everything else we have to do. So that would
21 be my recommendation.
22 CHAIRMAN CHU: Dennis.
23 MEMBER BLEY: Yeah. First, I see no
24 reason why we don't draft a letter on the rule. I
25 think we not only should but we have to, to serve

1 the Commission in the way they've asked us to, and
2 we've had the rule for a fair time now and we've
3 had a very good discussion today on it.
4 I'm not as -- I mean there have been
5 times in the past where we have fit in things at
6 this late a date, but nothing with this much
7 material in it. If we're going to -- I don't mean
8 to ramble on here -- if we're not going to try to
9 include the guidance in the letter and we're not
10 going to use a couple of hours in the full
11 Committee to have a briefing on the guidance,
12 we'll need another Subcommittee as soon as we can
13 to look at the guidance, some time late November or
14 early December if possible.
15 But we'll have to look at what's
16 feasible. Our Subcommittee agenda is pretty full
17 right now. We have to look at that. We don't have
18 the full Committee here to make a choice, but as a
19 subcommittee I'd lean toward trying it.
20 But I haven't read it yet, so I won't
21 know for a week whether that's even remotely
22 feasible and whether the briefing we got today
23 covers it at anywhere near the level we would have
24 wanted to dig into it. That's the best I can do.
25 CHAIRMAN CHU: Well, I have voiced my

1 preference is to review everything, okay, the rule
2 and the reg guide -- and the guidance document if
3 possible. But my question is if we only write a
4 letter on the rule, does that mean we have to write
5 another one?
6 MEMBER BLEY: Yes.
7 CHAIRMAN CHU: So it will be another
8 one.
9 MEMBER BLEY: Yeah, and if we write a
10 letter on both, two or three things have to happen.
11 We have to make a longer full Committee meeting,
12 which I will do. We have room to put it in as a
13 four hour meeting. The staff has to clarify the
14 status of this document to support the review by
15 tomorrow some time.
16 But I misunderstood you earlier. I
17 thought you didn't want to include this guidance in
18 the letter.
19 CHAIRMAN CHU: Well if we didn't review
20 it, then we can't include it. That's my point.
21 MEMBER BLEY: Yeah, and our time to
22 review it is two weeks plus the full Committee
23 meeting.
24 CHAIRMAN CHU: I'm going to ask David a
25 question. I used to do performance assessments.

1 So I think a lot of things are in the details, how
2 do you implement it, and then I believe most of
3 that is in the guidance document, right? So my
4 point is if we don't read it, are we going to miss
5 something important for the rule? That's what I'm
6 afraid, okay, is say -- because they're kind of
7 linked, you know.
8 The guidance tells you what
9 the rule really asking the licensee to do, and then
10 what kind of bothers me a little bit is say we
11 approve the rule, but we haven't looked at the
12 implementation. Is that okay not to look at it and
13 then approve the rule?
14 MR. ESH: Well, the rule has to stand
15 on its own merits and the technical content that's
16 in there, along with the statement of
17 considerations that goes along with it. So while
18 the guidance does provide information associated
19 with implementation, my opinion is you could look
20 at the rule --
21 CHAIRMAN CHU: Independently?
22 MR. ESH: Independently of the
23 guidance. You could also just take my opinion and
24 write that the guidance is very good.
25 (Laughter.)

1 MR. WIDMAYER: That was summarily
2 rejected.
3 MEMBER STETKAR: In the past, we've
4 also taken -- well I have anyway, because it's a
5 subcommittee meeting, the position that the rule
6 ought to be very clear on what should be done. The
7 guidance tells you how to accomplish it, and the
8 rule ought not to be held hostage to the how to
9 accomplish it part of it.
10 In that sense, as we did in this other
11 kind of ongoing example right now, it should be
12 possible for the ACRS to reach conclusions
13 regarding the rule language, without being held
14 hostage to the implementation guidance. I mean if
15 the rule language is that dependent on the
16 implementation guidance, it seems there's a
17 problem.
18 MEMBER BLEY: I'm going to clarify my
19 recommendation. I'm going to recommend that in
20 fact at the next meeting we have a four hour
21 session and we have at least two hours devoted to
22 the guidance. Whether or not at that time we can
23 decide we're ready to write or not on the guidance,
24 we'll decide then.
25 We have the previous guidance. We've

1 had it for a long time. We reviewed it two years
2 ago and personally I don't know how much has
3 changed. It sounds like a lot of it's pretty
4 similar, which would make our reviewing easier,
5 except for some of us haven't been here for that
6 other meeting.
7 MR. ESH: Crea's (phonetic) "please
8 read me" file, that will be useful, because that
9 focuses you on the delta from the previous version
10 to this version.
11 CHAIRMAN CHU: I'm going to sort of
12 change the subject a little bit and make a comment
13 about 10,000 years. Personally, it doesn't bother
14 me. Maybe it's because I just don't know how to
15 perform this assessment.
16 But I look at the value is you are
17 forcing the licensees to go through this quite
18 rigorous or comprehensive process, to look at all
19 the things that could possibly happen at your site
20 and your environment, and then up until a time you
21 feel that you have a little bit of control, because
22 of the radioactivity, okay.
23 And so to me, I think it's similar to
24 what you say. It's not the answer itself, but it
25 is the process you go through so you know your site

1 well, okay. You know your engineer barriers, you
2 know the long-term geological change that might
3 occur. All these things that otherwise a licensee
4 wouldn't look at it rigorously. To me that's the
5 value.
6 So and then like you said, it's 1,000
7 year or 10,000 year, the cranking of the computer
8 is nothing, okay. You just keep cranking for
9 another 9,000 years. But it's looking at all the
10 things and you have to justify what you present to
11 the NRC, the evaluator of why you pick what you
12 pick. That's the value I feel. So 10,000 years
13 doesn't bother me. Just my personal opinion.
14 MEMBER SKILLMAN: I want thank David
15 and Gary for a very thorough presentation. This
16 represents a huge amount of work. Thank you. I
17 also want to respect the four individuals that made
18 comments. So thank you. I have nothing further to
19 add. I'm aligned with Joy and with John. I
20 believe we could write a letter, we could write a
21 letter on the rule.
22 Until we see the guidance, I think we
23 should be careful. A four hour meeting would allow
24 us to creep up on that. But I think we should be
25 very cautious before we commit to writing anything

1 regarding the NUREG. But I do believe we can look
2 at the rule from the perspective of overarching
3 guidance, as opposed to how to. Thank you.
4 CHAIRMAN CHU: Walt?
5 MEMBER KIRCHNER: Thank you. Thank the
6 staff for their very good presentations. I think
7 I'm in Dick's camp and several others. I think we
8 could -- the rule should stand on its own, and
9 therefore I think we could be in a position with
10 the next full Committee meeting to write a letter
11 on the rule.
12 I sure would like to look at the
13 guidance of why and maybe reserve comment until
14 everyone has more opportunity to review it
15 thoroughly. There were a couple of areas that
16 hopefully maybe we could ask the staff to address.
17 We heard comments on radon-related
18 dose, and also I thought I understood the rationale
19 for the 500 millirem per year dose for the
20 intruder, but if that could be addressed again in
21 the full Committee, I would appreciate hearing that
22 again.
23 It seems to me to be an important
24 addition to the rule, and I'm not sure I
25 thoroughly, being new to this area, ingested the

1 rationale behind that. Thank you.

2 MEMBER BLEY: One clarification. I

3 think Derek's going to circulate the old white

4 paper to the full Committee, yeah.

5 CHAIRMAN CHU: Any other comments?

6 (No response.)

7 CHAIRMAN CHU: Thank you very much. I

8 thought the presentations were excellent.

9 MEMBER BLEY: Meeting adjourned.

10 (Whereupon, the above-entitled matter

11 went off the record at 5:59 p.m.)

DOE Remarks Regarding NRC Staff Revisions to Draft Final 10 CFR Part 61 (October 18, 2016) -- Revised as given

Good afternoon, I am Douglas Tonkay, the Waste Disposal Office Director with the Department of Energy's Office of Environmental Management. DOE is responsible for regulating low-level waste disposal facilities at sites across the country. In doing so we have technical requirements for maintaining our performance objectives as well as setting site-specific waste acceptance criteria at our disposal sites. In addition, our directives allows utilization of commercial disposal facilities, which are directly impacted by this rule. So, we have significant interest in any changes to 10 CFR Part 61.

I would like to thank the Subcommittee for providing the opportunity to share DOE views on the NRC staff's draft final rule. Please note that, DOE was not given an advance copy, so we have not had time to review thoroughly all of the proposed amendments and their supporting rationale. We would appreciate the opportunity to provide further observations at the full Committee meeting in November.

In July 2015, DOE provided comments on the then proposed revision. We are pleased that the NRC staff considered and accepted many of our comments. I want to address three areas for which we remain concerned based on our initial review of the Federal Register notice.

First, the draft final rule, as we understand it, <u>effectively</u> proposes a default compliance period of 10,000 years for long-lived waste with a performance objective of 0.25 mSv annual dose limit. The Commission directed, and we agree, that a 1,000-year compliance period be used. Multiple Commissioners observed that using a 10,000-year compliance period in this context "provides false comfort . . . [based] on guesswork and subjective speculation". We also agree with the ACRS, which stated in a letter to the Commission that, "Introducing significant uncertainties to the performance analysis through speculation on human activities, waste and site performance, and earth processes for millennia is unlikely to improve either our decision making process or our understanding of the safety decisions regarding near surface [low-level waste] disposal." We note that NRC regulations for materials and sites that are comparable to near-surface disposal of low-level waste establish compliance periods of 1,000 years at most. In light of these considerations, we prefer to see a final rule with a compliance period for an annual dose limit to 1,000 years, while requiring qualitative consideration of analyses for longer time periods, up to the point of peak dose but not extending beyond the period of geologic stability. Let me clarify Dr. Esh's statement that DOE has used 10,000 years for Waste Incidental to Reprocessing analysis.

This occurred because it is in NRC NUREG guidance used by NRC technical staff and we are required to complete consultation with them. It is not a DOE directive.

Our second concern is that the rule continues to include radon in the dose-based performance objectives. This inclusion of radon is inconsistent with other EPA, NRC, and DOE regulations that address management of uranium-containing materials. Including radon in the calculation of annual dose imposes a limit for future exposures to a limited number of hypothetical receptors that is significantly lower than the levels currently accepted as guidelines for residential exposures across the country today. To establish more restrictive limitations in the context of an extended performance assessment that entails significant and irreducible uncertainties would be particularly unwarranted. Therefore, the final rule should exclude radon from dose calculations and instead include a performance objective with a flux standard for more consistency with other national requirements for disposal of wastes containing uranium.

Finally, DOE suggests that a draft of NUREG-2175 be made available for comment before the rule is finalized. The draft final rule indicates that a substantial amount of additional information has been moved to guidance, and similarly, that a large number of “clarifications” appear in the NUREG. What information is included and how the regulatory provisions are interpreted can have a dramatic effect on implementation, particularly concerning the scope and conduct of performance assessment over extremely long time periods. While the staff indicated that changes could be made in the future, it could be many years, if not decades, before a revision to the guidance is available.

Thank you again for the opportunity to present our views. DOE will continue to monitor progress of the rulemaking and would appreciate the opportunity to provide further observations at the full Committee meeting.

Dr Chu, thank you for the opportunity to make comments. I will be brief. I, [John Greeves] and Paul Lohaus provided specific comments during the public comment period 7/24/2015.

Paul L. was a principal author Part 61 in the early 80's. Both Paul and I were NRC SES managers responsible for implementing Part 61 requirements and developing the associated guidance for over two decades. After retiring a decade ago we both provided advice to a number of national and international organizations on LLW disposal activities.

The staff has done a good job of listening to and incorporating many of the recommendations provided by us and others with extensive experience with implementing LLW disposal regulations.

One recommendation by numerous stakeholders for a clean two-tiered approach has not been incorporated.

A blended two-tiered analysis has been recommend and incorporated by the staff.

A "kind of a two tier system" [as labeled by Gary Comfort earlier today] is not clean; it will be difficult to implement and will result in unnecessary litigation risk. This moving target will be a significant risk with such a subjective approach that can be argued by multiple parties either way.

A clean two-tiered (i.e.; 1,000y compliance period; a tier-2 1,000y-to-peak dose) approach would be adequate to ensure safety through a 1,000 year compliance period, and second tier analysis out to peak dose. DOE uses such an approach two-tiered approach.

This would eliminate the need for a separate new lengthy rulemaking to address waste classification for waste streams containing large quantities of long lived material.

I would add, in my opinion, requiring compliance, pointing at a "guidance document" to determine a specific compliance period (either 1,000 vs. 10,000) is not an appropriate regulatory approach, and unnecessary, if a clean 2-tier system is specified.

The Commission needs to make a clear final call, on this 1 vs. 10k y compliance period number. It is a policy call.

Thank you for the opportunity to provide these few comments.

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

10 CFR Part 61
"Low-level Radioactive Waste Disposal"
Final Rule

Gary Comfort
Senior Project Manager
United States Nuclear Regulatory Commission

Presented to the ACRS Radiation Protection and Nuclear Materials Subcommittee

October 18, 2016

Discussion Topics

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Purpose and History
  - Overview
  - Commission Direction
  - Past ACRS Interactions
- Proposed Rule Comments
- Draft Final Rule
- Technical Elements
- Path Forward

Purpose of Rule

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Problem: Ensuring safe disposal of new waste streams not analyzed as part of original 10 CFR Part 61 regulation

- Depleted uranium (DU)
- Blended wastes
- Future waste streams

Purpose of Rule

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Objectives

- Specify site-specific analyses requirements
- Reduce ambiguity and facilitate implementation
- Better align with existing health and safety standards

Commission Direction

U.S.NRC
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- Order CLI-05-20
  - Staff directed to consider disposal of DU
- SRM-SECY-08-0147
  - Directed rulemaking to require site-specific analysis for disposal of large quantities of DU and associated technical criteria
  - Develop supporting guidance
  - Maintain the waste classification of depleted uranium

Commission Direction

U.S.NRC
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- SRM-SECY-10-0043
  - Incorporate blending into rulemaking
- SRM-COMWDM-11-0002/COMGEA-11-0002
  - Allow licensee flexibility to use ICRP dose methodology
  - Use two-tired approach with compliance period covering reasonably foreseeable future and longer period of performance
  - Allow flexibility to establish waste acceptance criteria based on site-specific technical analyses
  - Establish compatibility to ensure alignment between States and Federal government

Commission Direction

U.S.NRC
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- Staff provided proposed rule to Commission in SECY-13-0075
  - Latest rule language ACRS reviewed
- SRM-SECY-13-0075
  - Directed numerous significant changes
  - Directed publication after changes made
  - ACRS encouraged to provide independent review and recommendations on the technical basis and the accompanying draft guidance

Commission Direction

U.S.NRC
United States Nuclear Regulatory Commission
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Comparison of Draft Rule in SECY-13-0075 and Published Draft Rule

SECY -13 -0075	Publication
Analysis Time Frames (2 – tier)	Analysis Timeframes (3 – tier)
Performance Assessment	Performance Assessment
Intruder Assessment	Intruder Assessment
	Explicit Description of Safety Case
	Defense In Depth (DID) Analysis
	Site Stability Analysis
Waste Acceptance Criteria	Waste Acceptance Criteria
Updated ICRP Dosimetry Modeling	Updated ICRP Dosimetry Modeling
Compatibility Category C	Compatibility Category B

= Minor change resulting from SRM Direction

= Major change resulting from SRM Direction

ACRS Interactions

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Meeting Dates

Subcommittee	Full Committee
December 16, 2009	March 4, 2010
June 23, 2011	July 13, 2011
August 17, 2011	September 8, 2011
April 9, 2013	July 10, 2013

ACRS Letter Reports – Key Issues

U.S.NRC
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- Risk-informed based on site-specific, realistic performance assessments with consideration for uncertainties
  - Realistic assumptions for release and fate and transport of DU
  - Realistic likelihood of intrusion
  - Range of site-specific conditions
- Use timeframes determined on a case-by-case site-specific basis rather than defining specific fixed period of performance

ACRS Letter Reports – Key Issues

U.S.NRC
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- Compliance with performance objectives after institutional control period should be evaluated considering FEPs for a given site for a period commensurate with the site-specific risk
- Protection of inadvertent intruder
  - Large uncertainties associated with human intrusion scenarios will not help decision making
  - Durability and stability should be sufficient
- Previously disposed wastes should not be subject to additional compliance evaluations

Rule status

- Proposed rule
  - SRM-SECY-013-0075 issued February 12, 2014
  - Published for comment on March 26, 2015 (80 FR 16081)
  - 120 day comment; reopened August 27 – September 21, 2015

- Draft final rule
  - Submitted to Commission September 15, 2016

Public Comments on Proposed Rule

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Received 2,401 comment letters (2,300 form)
  - Extensive public outreach
  - Six workshops and webinar
- Represented:
  - Individuals
  - Public interest groups
  - Native American Tribal Governments
  - Industry groups
  - Licensees
  - State and federal agencies
- Over 800 comments binned and responded to

Examples of Public Comments

U.S.NRC
United States Nuclear Regulatory Commission
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- 3-Tier System
  - More complicated than necessary
  - 500 mrem dose goal reduces public health and safety
  - RESPONSE: Changed to new, simplified approach
- Compatibility Category
  - Reduced current health and safety provided by some States
  - Most commenters recommended "C"
  - RESPONSE: Changed compliance period definition and 61.58 to "C"

Examples of Public Comments (Cont)

U.S.NRC
United States Nuclear Regulatory Commission
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- Grandfathering
  - 61.1(a) should allow existing sites to grandfather
  - Already disposed of wastes should not need to be addressed
  - RESPONSE: Staff concluded that grandfathering not appropriate and removed confusing language in 61.1(a)
- Backfit
  - Backfit analysis should be done because of impact on other licensees
  - RESPONSE: No backfit in Part 61; NRC doesn't address passed along costs

Draft Final Rule Major Changes

U.S.NRC
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The rule

- Requires a site specific analysis
- Provides a 1,000 or 10,000 year compliance period for protection of the general public
- Adds a new technical analysis for the protection of inadvertent intruders
- Adds a new post-10,000-year performance period analysis
- Adds a new requirement to update the technical analyses at site closure
- Adds a new requirement to identify DID protections
- Facilitates implementation and better aligns the requirements with current safety standards

Draft Final Rule Language – Definitions (61.2)

U.S.NRC
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- *Compliance period*
  - Site closure to 1,000 years if no significant quantities of long-lived radionuclides.
  - Site closure to 10,000 years otherwise
- *Defense-in-depth*
  - Use of multiple independent and, where possible, redundant layers of defense such that no single layer, no matter how robust, is exclusively relied upon
  - Includes, but is not limited to, the use of siting, waste forms and radionuclide content, engineered features, and natural geologic features of the disposal site to enhance the resiliency of the land disposal facility

Draft Final Rule Language – Definitions (61.2)

U.S.NRC
United States Nuclear Regulatory Commission
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- *Inadvertent intruder assessment* is an analysis that:
  - Assumes inadvertent intruder occupies site and engages in normal activities and other reasonably foreseeable pursuits that are realistic and consistent with expected activities in and around the disposal site at the time of the assessment
  - Examines capabilities of intruder barriers to inhibit contact with the waste or limit exposure to radiation from the disposal unit
  - Estimates inadvertent intruder's potential annual dose considering uncertainties.

Draft Final Rule Language – Definitions (61.2)

U.S.NRC
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- *Long-lived radionuclide* means radionuclides:
  - Where more than 10 percent of the initial activity of the radionuclide remains after 1,000 years
  - Where the peak activity from progeny occurs after 1,000 years; or
  - Where more than 10 percent of the peak activity of the radionuclide (including progeny) within 1,000 years remains after 1,000 years

Draft Final Rule Language – Definitions (61.2)

U.S.NRC
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- *Performance assessment*
  - analysis to demonstrate compliance with the performance objectives
  - identifies the features, events, and processes that could affect the disposal site performance
  - estimates the potential dose as a result of releases caused by all significant features, events, and processes including the uncertainties
- *Performance period*
  - timeframe established to evaluate the performance of the disposal site after the compliance period

Draft Final Rule Language – Definitions (61.2)

U.S.NRC
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Protecting People and the Environment

- *Safety case*
  - Collection of information that demonstrates the assessment of the safety of a land disposal facility
  - Includes technical analyses, DID, and supporting evidence and reasoning
  - Also includes description of the safety relevant aspects of the disposal site, the design of the facility, and the managerial control measures and regulatory controls.

Draft Final Rule Language –

U.S.NRC
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- 61.12 Specific Technical Information
  - New DID requirement added as 61.12(o)
  - Requires identification of DID protections, including a description of the capability of each DID protection relied upon to maintain safety and a basis for the capability of each DID protection
  - Not an analysis

Draft Final Rule Language –

U.S.NRC
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- 61.13 Technical Analyses
  - Requires performance assessment for compliance period that:
    - Considers features, events, and processes that represent a range of phenomena with both beneficial and adverse effects on performance
    - Considers the likelihood of disruptive or other unlikely features, events, or processes
    - Provides a technical basis for models used
    - Evaluates contaminant transport pathways and processes in environmental media (e.g., air, soil, groundwater, surface water)
    - Accounts for uncertainties and variability in the projected behavior of the disposal site and general environment and in the demographics and behaviors of human receptors
    - Identifies and differentiates between the roles performed by the natural disposal site characteristics and design features in limiting releases of radioactivity to the general population

Draft Final Rule Language –

U.S.NRC
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- 61.13 Technical Analyses (cont)
  - Requires inadvertent intruder assessment for compliance period that
    - Assumes inadvertent intruder occupies the disposal site and engages in normal activities and other reasonably foreseeable pursuits that are consistent with the activities and pursuits occurring in and around the site at the time of development of the inadvertent intruder assessment.
    - Is updated prior to closure to reflect any significant changes to the activities and pursuits occurring in and around the site.
    - Identifies barriers to inadvertent intrusion that inhibit contact with the waste or limit exposure and provides a basis for the time period over which barriers are effective.
    - Accounts for uncertainties and variability in the projected behavior of the disposal site and general environment.

Draft Final Rule Language –

U.S.NRC
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- 61.13 Technical Analyses (cont)
  - Analyses of the protection of individuals during operations
    - Includes assessments of expected exposures due to routine operations and likely accidents
    - Must provide reasonable assurance that exposures will be controlled to meet the requirements of 10 CFR Part 20
  - Long-term stability analysis
    - Evaluates need for ongoing active maintenance after site closure
    - Based on analysis of active natural processes, infiltration, and surface drainage of the disposal site.
    - Provides reasonable assurance that long-term stability of the disposal site can be ensured for the compliance period and that there will not be a need for ongoing active maintenance
  - Performance period analysis
    - Only required if 10,000-year compliance period used
    - Assess how disposal site limits the potential long-term radiological impacts during the performance period, consistent with available data and current scientific understanding.
    - Must identify and describe features of the design and site characteristics relied on

Draft Final Rule Language –

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- 61.41 Protection of the general population from releases of radioactivity
  - Compliance period
    - Limits annual dose to 0.25 milliSieverts (25 millirems) to any member of the public
    - Demonstrated through analyses that meet the requirements specified in § 61.13(a).
  - Performance period
    - Must minimize releases of radioactivity to the general environment to the extent reasonably achievable
    - Demonstrated through analyses that meet the requirements specified in § 61.13(e).

Draft Final Rule Language –

U.S.NRC
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- 61.42 Protection of individuals from inadvertent intrusion.
  - Compliance period
    - Limits annual dose to 5 milliSieverts (500 millirems) to any inadvertent intruder
    - Demonstrated through analyses that meet the requirements specified in § 61.13(b).
  - Performance period
    - Must minimize exposures to any inadvertent intruder to the extent reasonably achievable
    - Demonstrated through analyses that meet the requirements specified in § 61.13(e).

Draft Final Rule Language –

- 61.58 Alternative requirements for waste classification and characteristics.
  - Specifies waste acceptance criteria
  - Requires waste certification
  - Requires annual review of content and implementation of the waste acceptance criteria, waste characterization methods, and certification program

QUESTIONS?

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

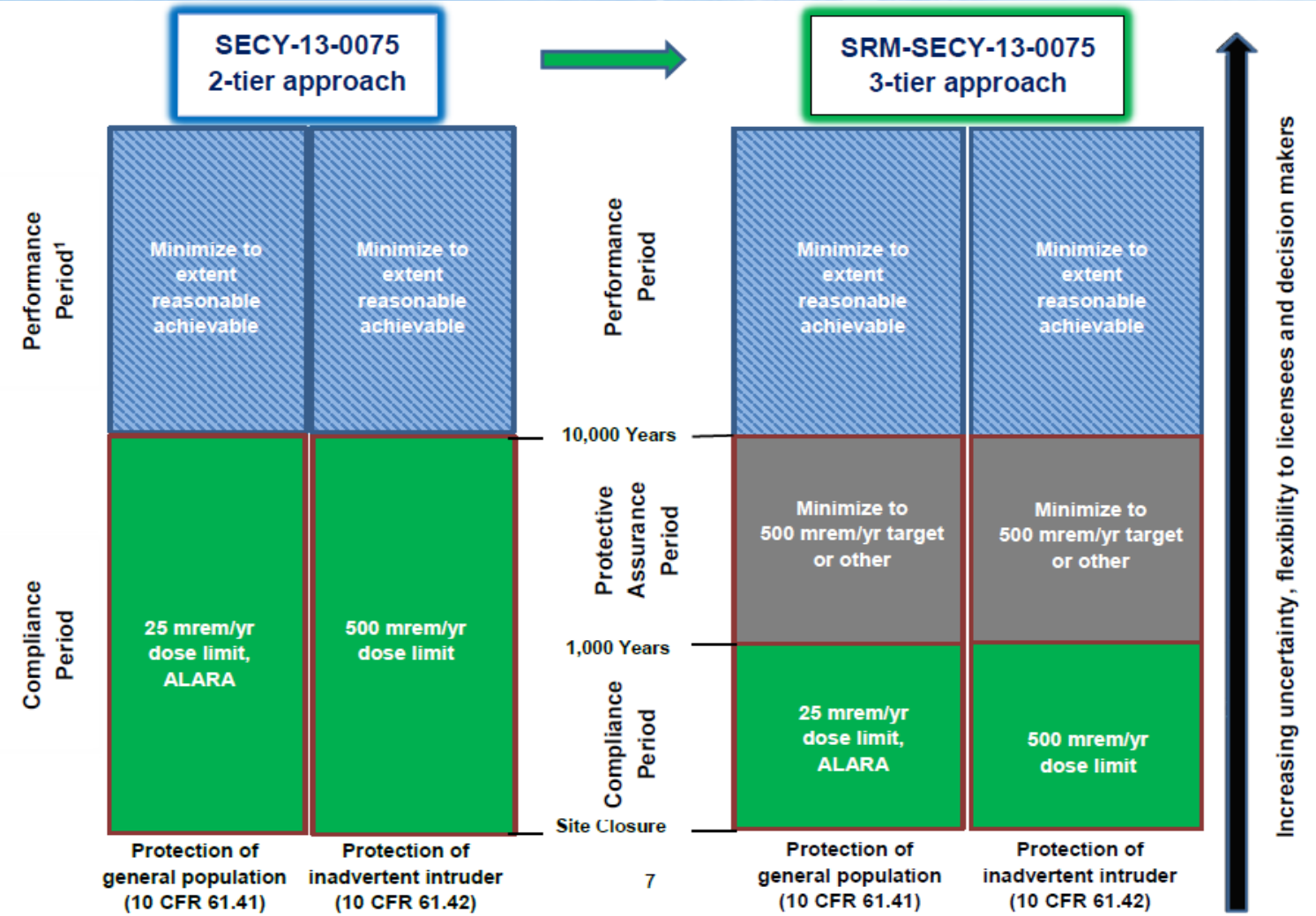
?????

Path Forward

- Commission review
- If approved for publication
  - Incorporate Commission directed changes
  - Send to OMB for review (~90 days)
  - Send to *Federal Register* for publication
- Effective date: 1 year from publication
- License updates due next renewal or within 5 years of effective date
- Agreement States have 3 years from publication to implement compatible regulations

BACKUP SLIDE

Timeframe changes



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Protecting People and the Environment

Overview of Major Technical Elements of 10 CFR Part 61

David Esh, PhD
Senior Risk Analyst
United States Nuclear Regulatory Commission

Presented to the ACRS Radiation Protection and Nuclear Materials Subcommittee, October 18, 2016

Outline

- Safety Case
- Defense-in-Depth
- Analysis Timeframes (Significant Quantities)
- Technical Analyses
  - Performance Assessment
  - Intruder Assessment
  - Site Stability
- Waste Acceptance Requirements
- Guidance (NUREG-2175)

Safety Case

U.S.NRC
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- A collection of arguments and evidence to demonstrate the safety of a land disposal facility (e.g. defense-in-depth protections and technical analyses).
- Describes all safety relevant aspects of the disposal site, the design of the facility, and the managerial control measures and regulatory controls to inform the decision whether to grant a license.
- Includes the same type of information that the original 10 CFR part 61 required to be submitted as part of a license application (i.e., 10 CFR 61.10 – 10 CFR 61.16).
- The safety case will be updated over time as new information is gained during the various phases of the facility's development and operation.

Safety Case

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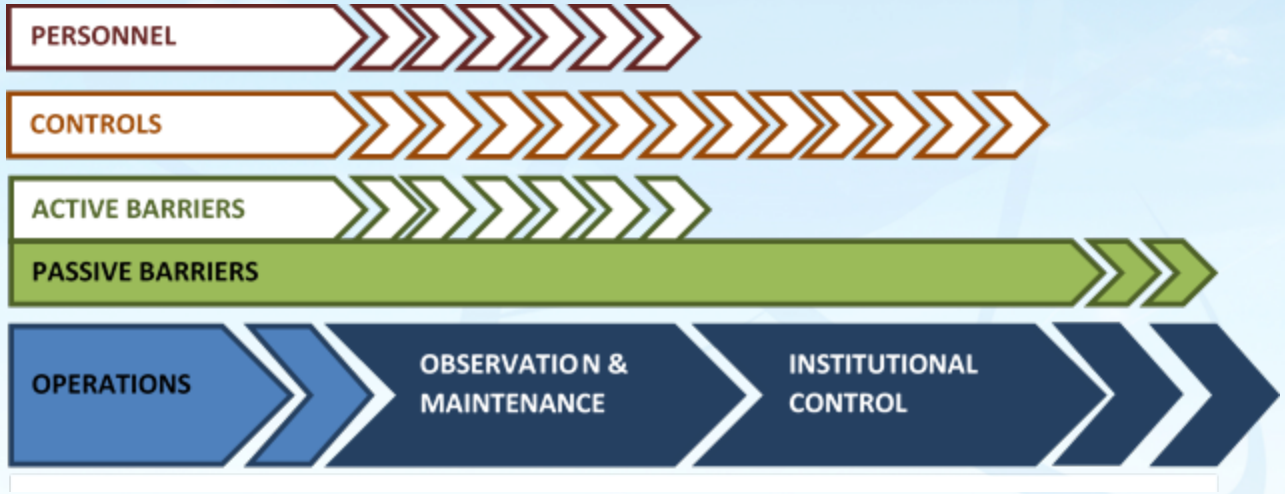
- Plain language description of:
  - Strategy for achieving safe disposal
  - Safety arguments that highlight the main evidence that quantify and support the claim that the land disposal facility will be safe
  - The disposal site and facility
  - Information about the nature of the waste and the design and proposed operation of the facility
  - The technical analyses that demonstrate performance objectives
  - Strategy for institutional control of the disposal site
  - Licensee's financial qualifications

Defense-in-Depth

- The use of multiple, independent, and, where possible, redundant layers of defense so that no single layer, no matter how robust, is exclusively relied upon.



IMPLICIT

EXPLICIT

Note: Lifecycle timeframes not to scale

Defense-in-Depth Requirements

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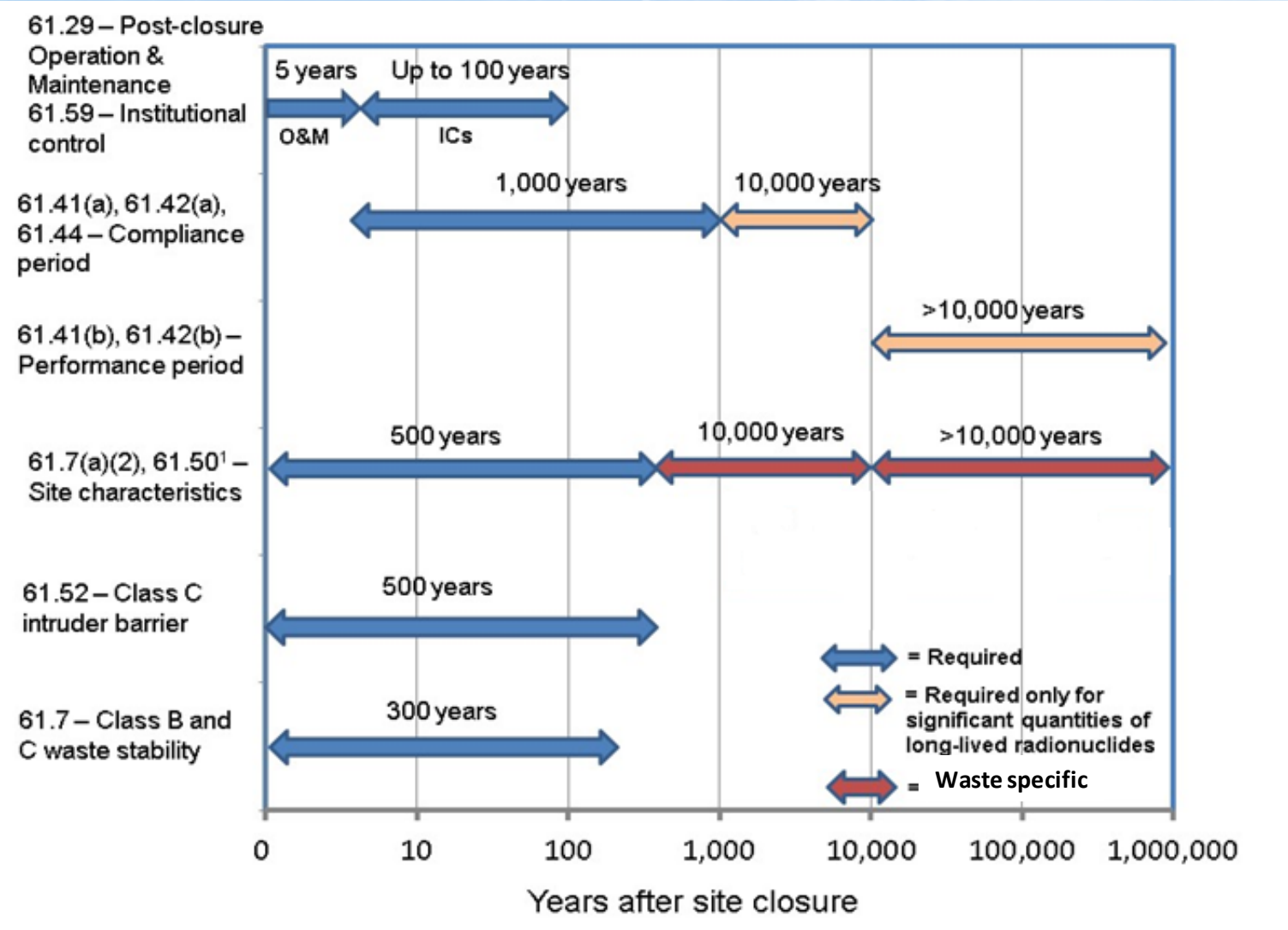
- Identify defense-in-depth protections commensurate with risks.
- Describe capabilities of defense-in-depth protections.
- Provide a technical basis for capabilities of defense-in-depth protections.

Defense-in-Depth for LLW Disposal

- Operations
  - Provide for active and passive safety systems commensurate with the hazard and complexity of the activities.

- Post-Closure
  - Disposal site is essentially a passive system, relying on both natural site characteristics and engineered features.
  - Diversity of capabilities of the components and attributes of the disposal site increases the site's resilience to unanticipated failures or external challenges.
  - Each layer of defense must make a definite contribution to the isolation of the waste.
  - Capabilities of site characteristics and engineered features over long timeframes are subject to interpretation and many uncertainties. These uncertainties can be quantified generally and are addressed by requiring the use of multiple layers of defense.

Timeframes


61.29 – Post-closure Operation & Maintenance
61.59 – Institutional control
5 years
Up to 100 years
O&M
ICs
61.41(a), 61.42(a), 61.44 – Compliance period
1,000 years
10,000 years
61.41(b), 61.42(b) – Performance period
>10,000 years
61.7(a)(2), 61.50[1] – Site characteristics
500 years
10,000 years
>10,000 years
61.52 – Class C intruder barrier
500 years
61.7 – Class B and C waste stability
300 years
= Required
= Required only for significant quantities of long-lived radionuclides
= Waste specific
0
10
100
1,000
10,000
100,000
1,000,000
Years after site closure

Timeframes

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- Throughout the process, significant interest in the analyses timeframes.
- Significant comments received reflecting diverse opinions.
- Staff devoted significant effort to the formulation of the final position.
- Key features:
  - Compliance period is 1,000 years or 10,000 years depending on if the site will contain significant quantities of long-lived radionuclides.
  - Performance period only applies if the compliance period is 10,000 years.
  - Compatibility criteria is C (Agreement State may be more restrictive).

Significant Quantities

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How does one determine if they have significant quantities?

- Start simple and if necessary introduce more complexity

1. Perform screening based on inventory
2. Perform screening based on simplified dose assessment
3. Site-specific analysis (case-by-case)

Significant Quantities - Example

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Example A licensee wishes to dispose of waste at a disposal site that does not have a potable groundwater pathway or any credible mechanisms for release other than from disturbance by inadvertent intruders. The total volume of disposal cells for existing waste is 400,000 m^3. The inventory of waste located in the facility is comprised of: 50,000 m^3 of C-14 containing waste at 0.2 Ci/m^3, 200,000 m^3 of waste containing C-14 at 0.1 Ci/m^3 and I-129 at 0.002 Ci/m^3, and 50,000 m^3 of Tc-99 containing waste at 0.01 Ci/m^3. The uncontaminated fill and material used to construct the cells represents 100,000 m^3.

Conclusion: The licensee uses the Class A waste concentrations to calculate the volume-averaged SOF per the following equation. This equation is used to calculate the SOF for *n* waste streams containing *m* isotopes. *V* is the volume, *C* is the concentration on a volumetric basis, and *CA* is the Class A waste limit for the particular isotope.

$$SOF = \frac{1}{V_T}\sum_{i=1}^{n}\left(V_i \sum_{j=1}^{m}\frac{C_{i,j}}{CA_{i,j}}\right)$$

$$SOF = \frac{1}{400{,}000\ m^3} * \left(50{,}000\ m^3\left(\frac{0.2}{0.8}\right) + 200{,}000\ m^3\left(\frac{0.1}{0.8} + \frac{0.002}{0.008}\right) + 50{,}000\ m^3\left(\frac{0.01}{0.3}\right)\right) = 0.223$$

Because the SOF is less than 1, a 1,000-year compliance period can be used and performance period analyses are not required.

Performance Assessment

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Performance assessment is an analysis used to demonstrate compliance with 10 CFR 61.41(a) and (b) that identifies the features, events, and processes that could affect the disposal site performance; and estimates the potential dose as a result of releases caused by all significant features, events, and processes including the uncertainties.

Performance Assessment

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- Performance assessment is not a new topic – renaming of technical analyses
- New requirements in 61.13:
  - Scope (features, events, and processes)
  - Uncertainty and variability
  - Model support
- Requirement to update the performance assessment at closure
- Modified siting characteristics consistent with disposal of long-lived waste

IMPLICIT

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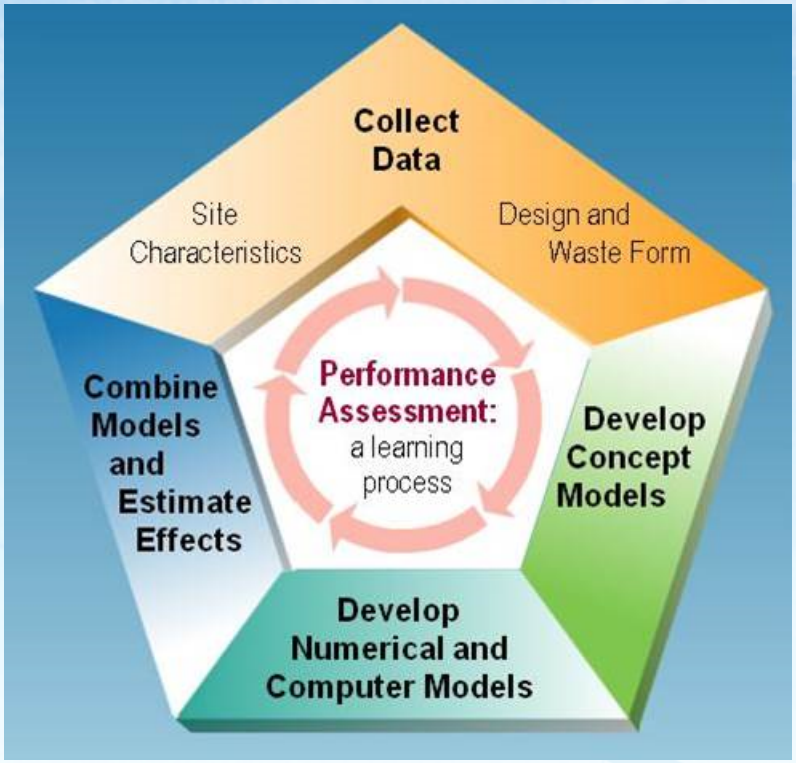
EXPLICIT

Performance Assessment

61.28: Update PA at closure

61.50: Informed by timeframes

61.58: PA results may be used to develop WAC



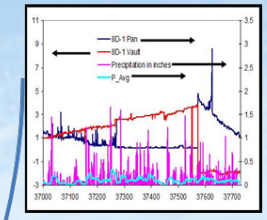
61.13: PA results considered in DID and safety case

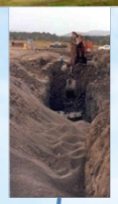
61.13: Features, events, and processes

61.13: Model support

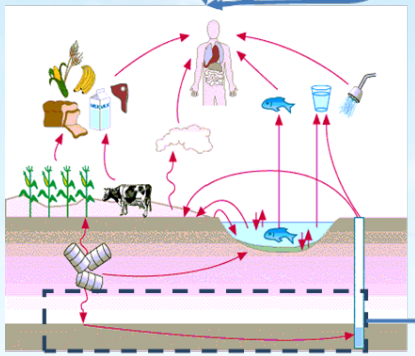
61.13: Uncertainty and variability

Performance Assessment



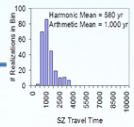


Site characterization data and other information



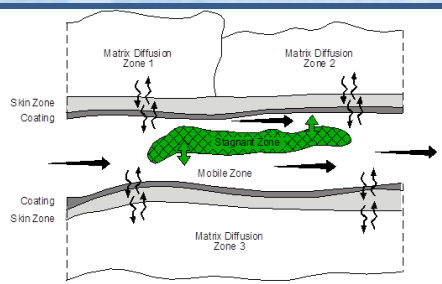
Performance assessment conceptual model development

Hydrologic conceptual model development (see next figure)

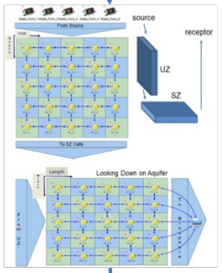


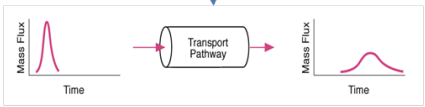
Estimated system performance

Abstracted hydrologic model



Hydrologic conceptual model

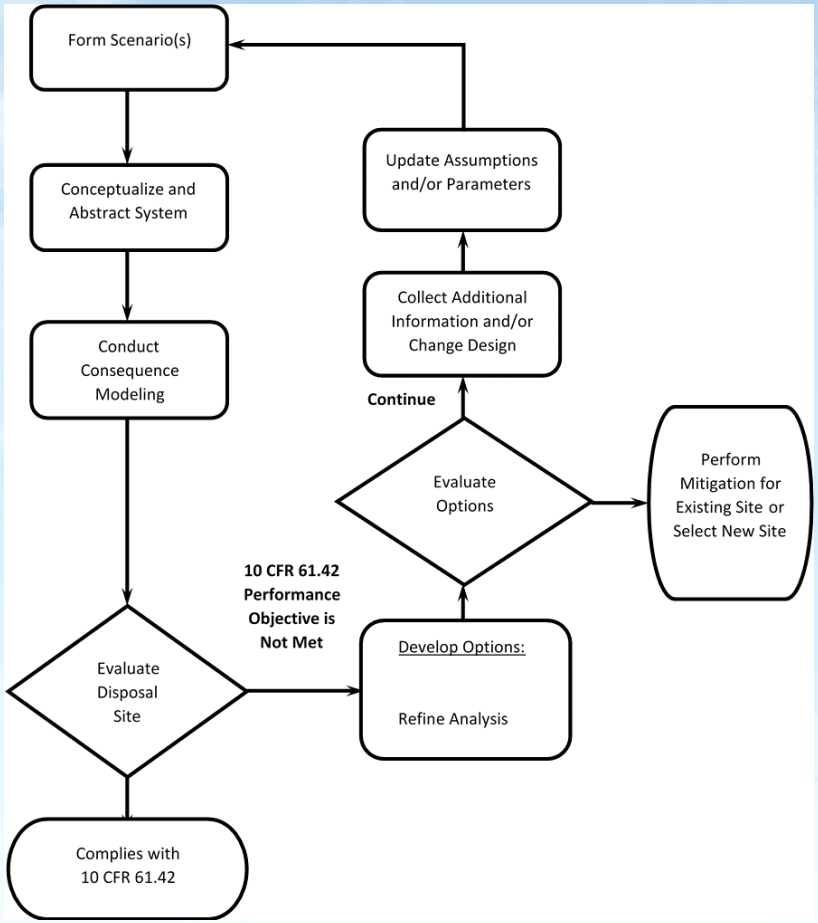




Numerical model development

$$m'_{is} = -m_{is}\lambda_s + \sum_{p=1}^{NP} m_p \lambda_p f_{ps} R_{sp} (A_s/A_p) + \sum_{c=1}^{NC} f_{cs} + S_{is}$$

Inadvertent Intrusion Assessment



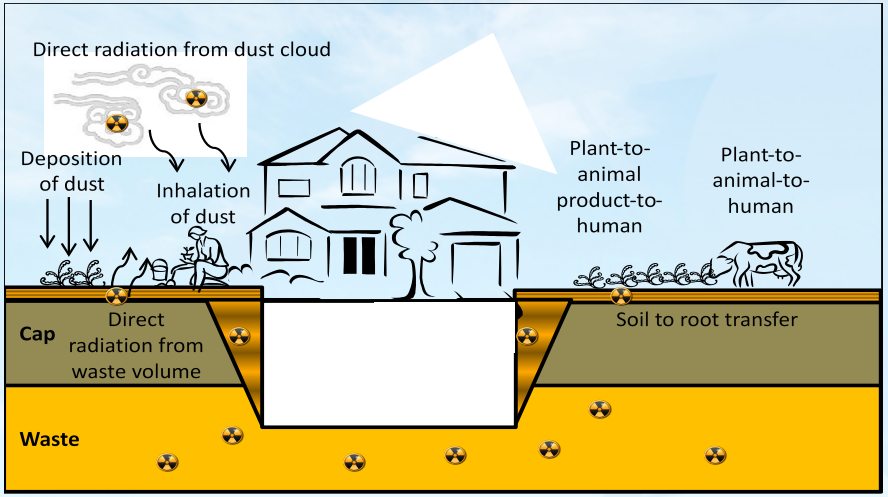
- Similar to performance assessment, except:
  - Receptor scenarios
  - Onsite exposures
  - 500 mrem/yr limit
  - Precluded during institutional control period (i.e., 100 yrs)

Inadvertent Intruder Receptor

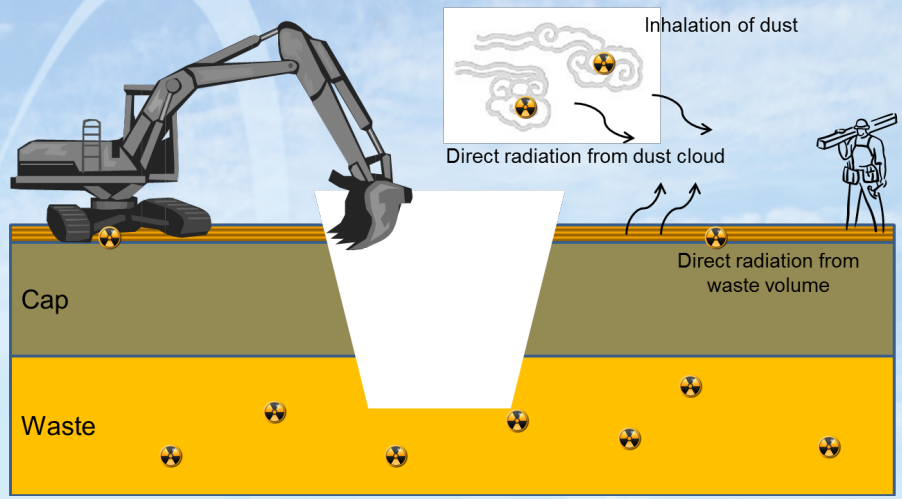
Types of Scenarios		Evaluation Purpose	Description
Plausible	Generic	All can be used to demonstrate compliance with the inadvertent intruder performance objective. Licensees should use the plausible scenario from which the inadvertent intruder would reasonably be expected to receive the greatest exposure to radiation from the waste to demonstrate compliance.	The scenarios used to inform the waste classification criteria at 10 CFR 61.55 that are consistent with normal activities including agriculture, dwelling construction, drilling for water.
	Site-Specific		A scenario developed, using site information, either from scratch or by modifying a generic scenario that is consistent with activities in and around the disposal site at the time the assessment is developed.
	Reasonably Foreseeable		Reasonably foreseeable scenarios are based on (i) normal activities and (ii) other pursuits that are consistent with activities in and around the disposal site at the time the assessment is developed. Normal activities include agriculture, dwelling construction, resource exploration or drilling for water. The NRC staff continues to believe the generic receptor scenarios associated with normal activities are plausible assuming the loss of institutional controls and the loss or significant degradation of the capabilities of intruder barriers. The NRC staff also continues to view the generic receptor scenarios as reasonably bounding over long timeframes, given the uncertainty in estimating future human activities over long time periods. However, licensees can also rely on site-specific scenarios that are consistent with activities in and around the site at the time the assessment is developed.
	Less likely, but plausible	Not analyzed for compliance, but may be used to risk-inform the decision.	Intruder activities that are plausible, assuming the loss of institutional controls, based on the capabilities of intruder barriers, site characteristics, and historical uses, but are **not** reasonably foreseeable considering normal activities or other pursuits that are different than activities in and around the site at the time of closure. These scenarios are usually site-specific.
Implausible		No analysis required.	Assuming the loss of institutional controls, intruder activities that could not occur because of persistent physical limitations of the site.

- Normal Activities
  - Dwelling Construction
  - Agriculture
  - Drilling for Water
- Reasonably Foreseeable Activities
  - Consistent with activities in vicinity of site when assessment developed

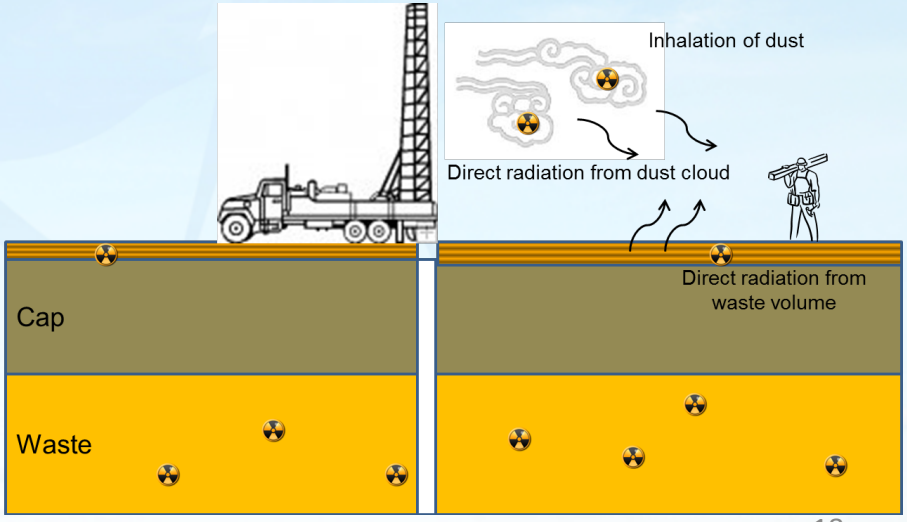
Normal Activities



Agriculture



Dwelling Construction



Drilling for Water

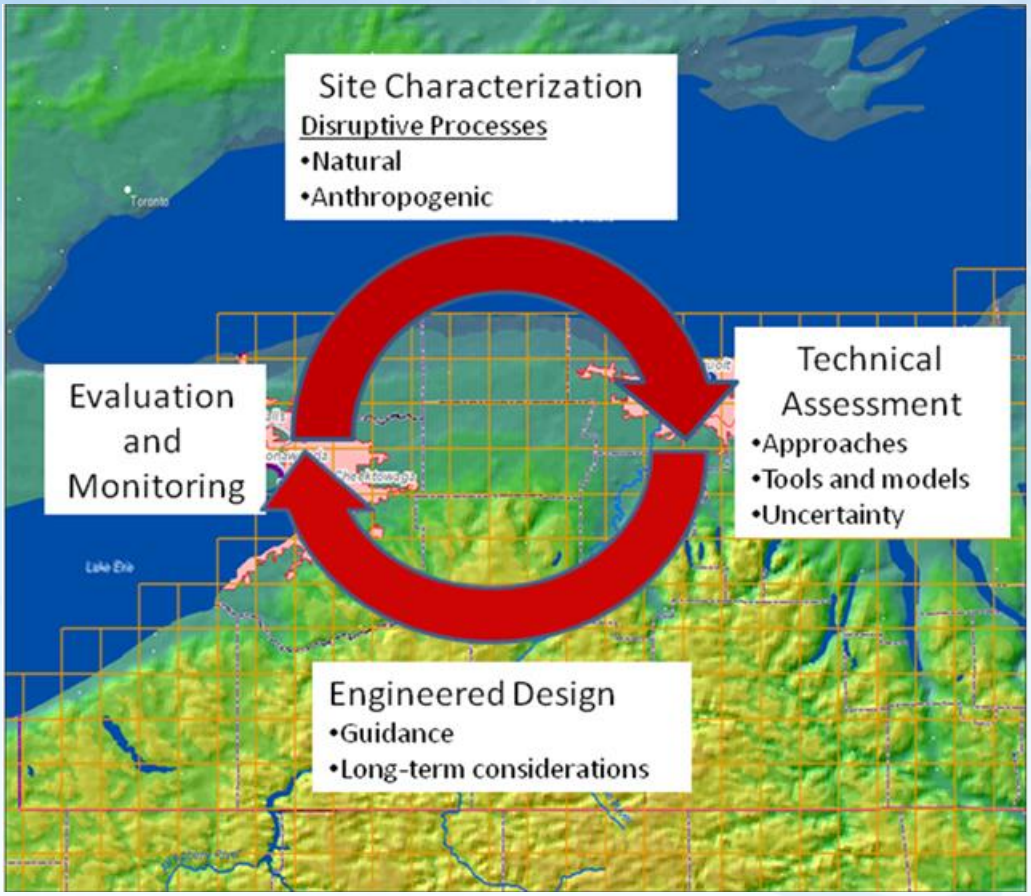
Site-specific Scenarios

- Constrain exposure pathways for normal or reasonably foreseeable activities based on:
  - Physical information
    - Waste characteristics and disposal practices
    - Disposal site characteristics
  - Cultural information (e.g. land use)

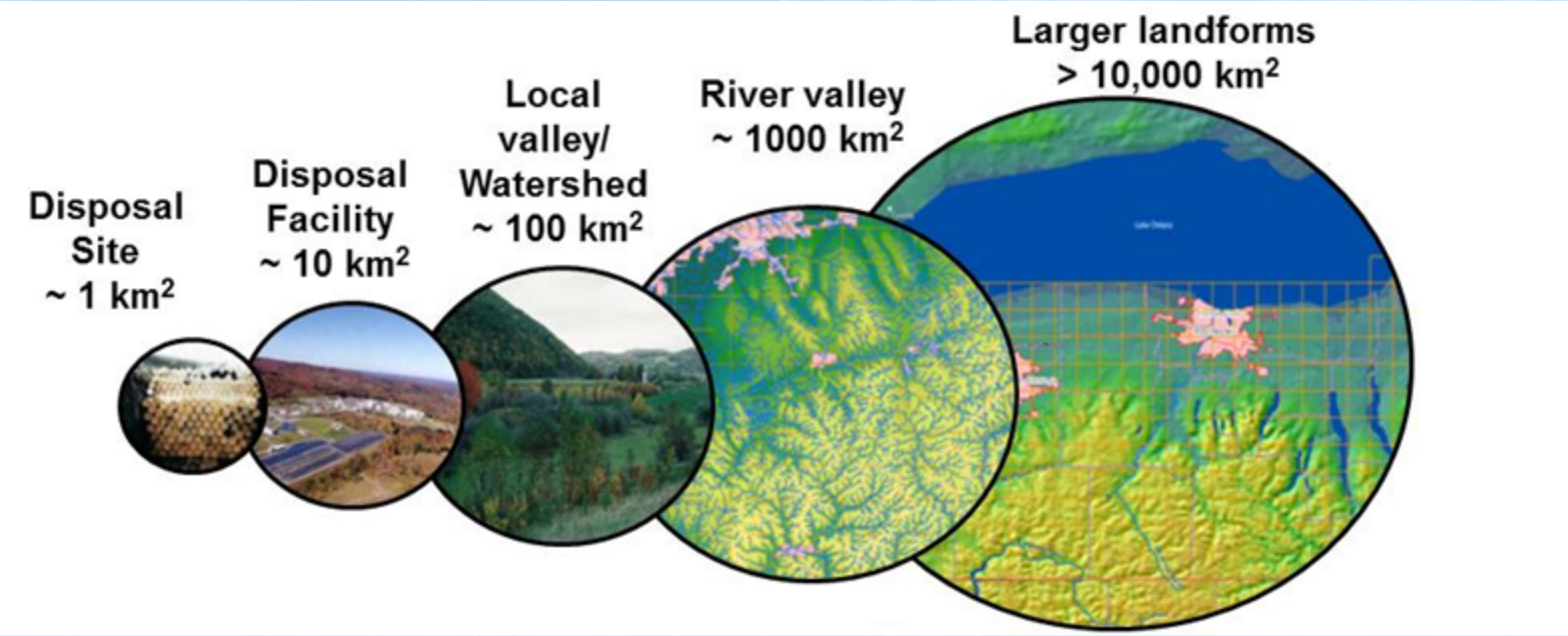
Site Stability

- Consideration of site stability is an important part of the safety strategy.
- Site stability is required for the compliance period but may be performance-based.
- Guidance describes design-based and model-based approaches.

Site Stability



Site Stability

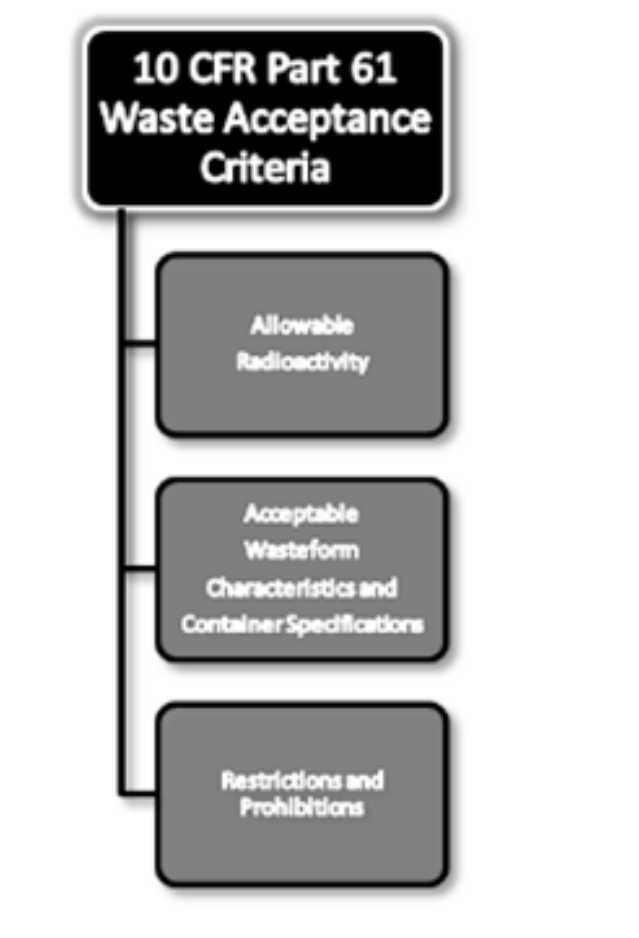


Temporal, Spatial scales = f(Waste)

Waste Acceptance Requirements

- Licensees must review their waste acceptance program at least annually
- Ensures that the program continues to be adequate and is being implemented in a way that continues to protect public health and safety

Waste Acceptance Criteria

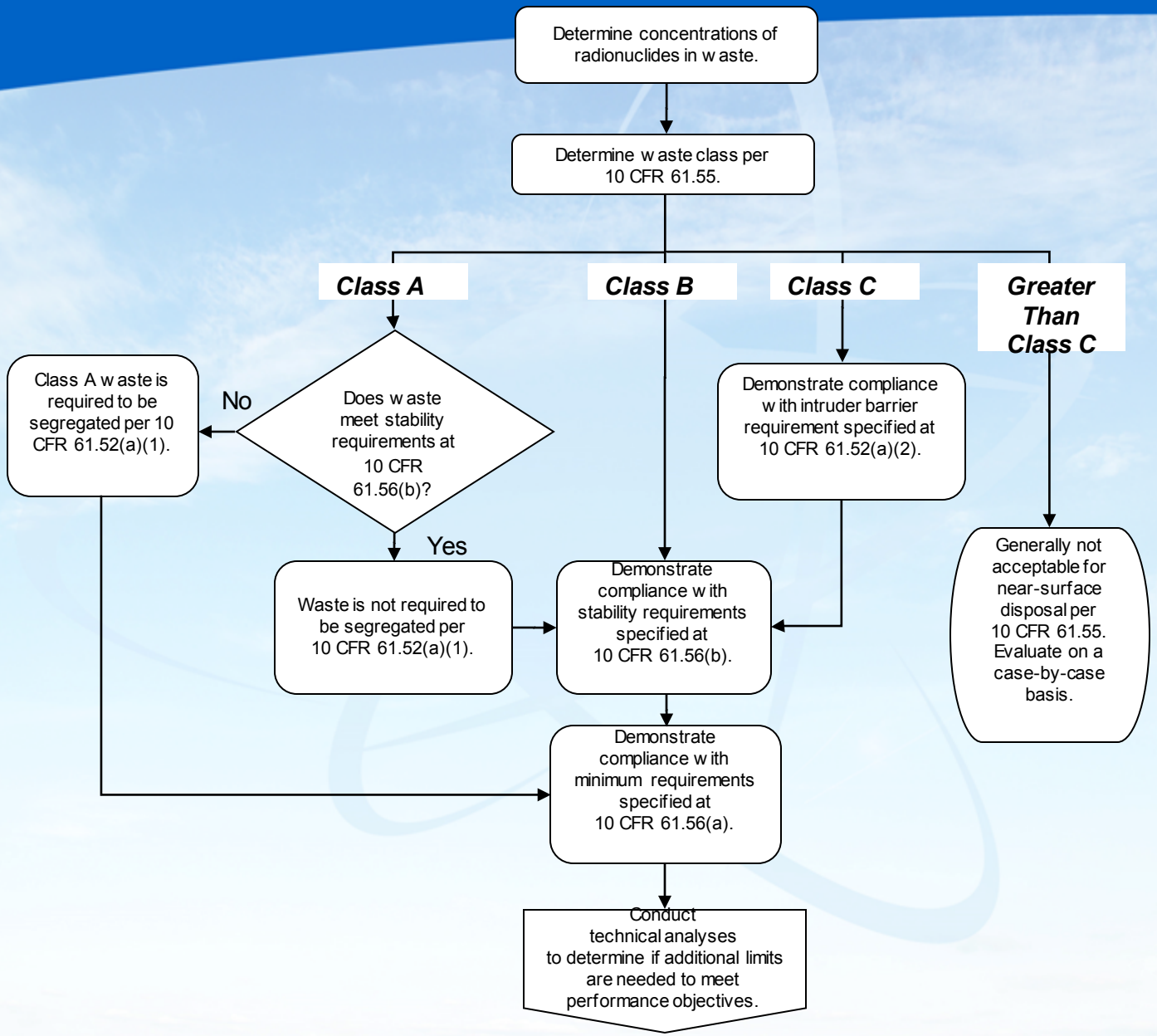


- Allowable Limits on Radioactivity
- Wasteform Characteristics and Container Specifications
- Restrictions and Prohibitions

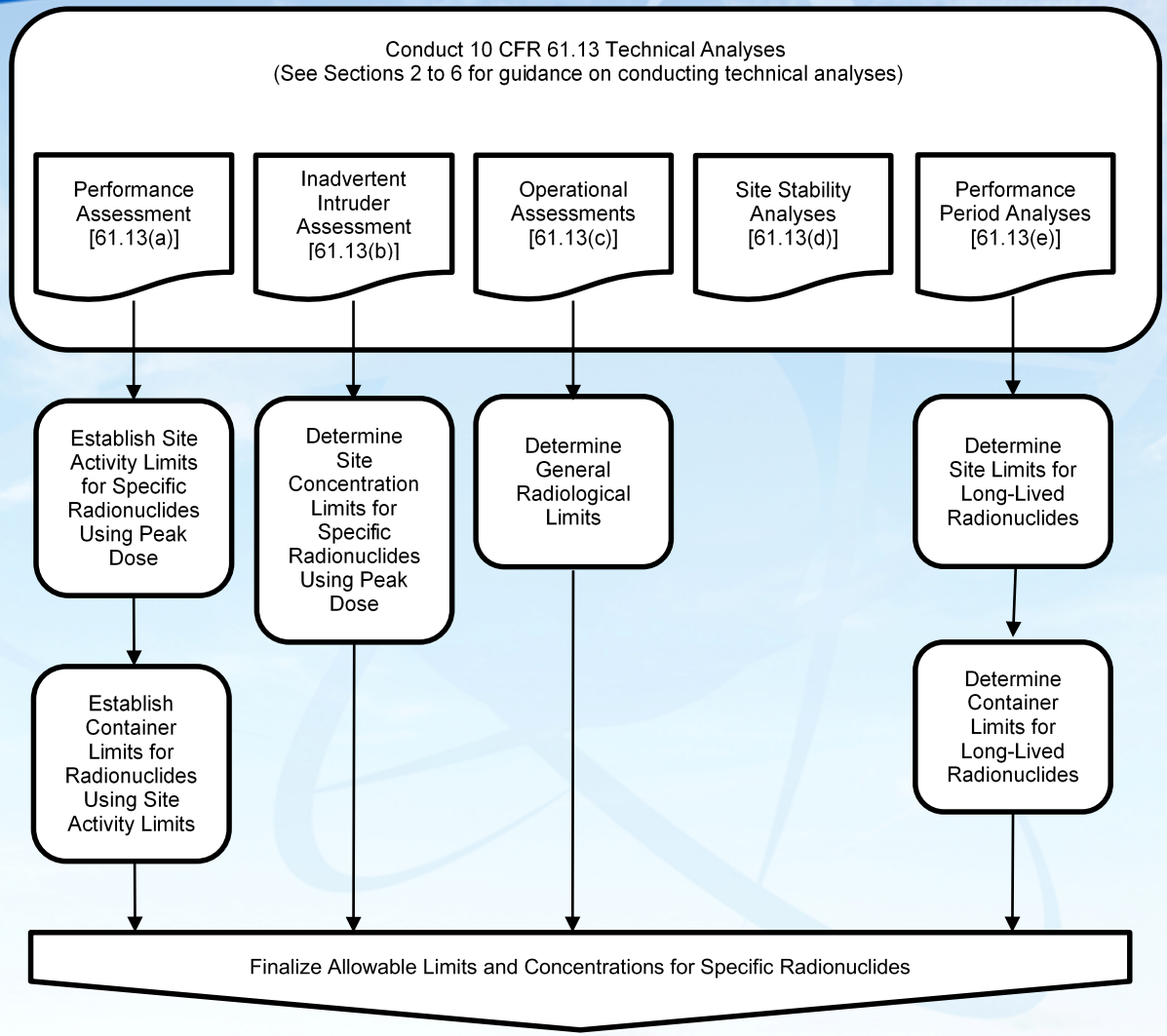
Waste Acceptance

- Flexibility to develop site-specific waste acceptance criteria.
- Use 61.55 limits, results of technical analyses, or combination of both to develop criteria.
- Either way, licensees must demonstrate that criteria will demonstrate that performance objectives will be met.

Allowable Limits from §61.55



Allowable Limits from Analyses



Waste Characterization

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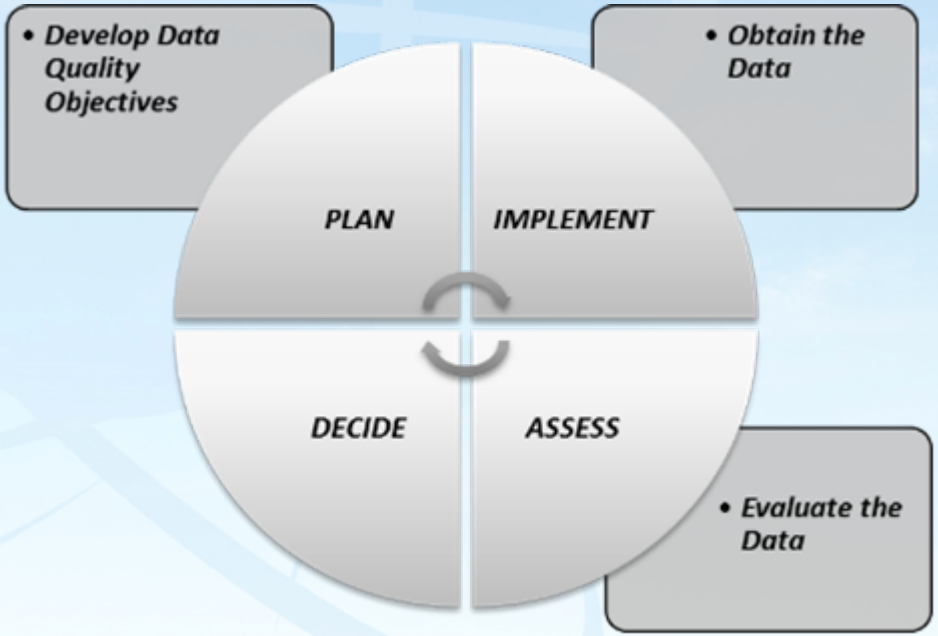
- Licensees must specify acceptable methods for characterizing waste
  - Acceptable methods to characterize waste
  - Criteria for determining an acceptable level of uncertainty in the characterization data
  - Documentation required to ensure sufficient detail is available to demonstrate that the waste acceptance criteria are met
- Ensure that knowledge of the waste's characteristics is:
  - Commensurate with the assumptions and approaches used to develop the waste acceptance criteria
  - Sufficient to demonstrate that the waste acceptance criteria are met

Characterization Methods

- Direct or indirect (materials accountability, characterization by source, scaling factors) methods
- Data quality
- Documentation
  - Responsibilities
  - QA
  - Procedures
  - Records



Waste Certification

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- Program to certify that waste meets the acceptance criteria prior to receipt at a disposal facility
  - Designate the authority to certify and receive waste for disposal at the disposal facility
  - Provide procedures for certifying that waste meets the waste acceptance criteria
  - Specify documentation required for waste characterization, shipping and certification
  - Identify records, reports, tests, and inspections that are necessary to maintain and provide criteria for auditing
  - Provide approaches for managing certified waste to maintain its certification status

NUREG-2175

- NUREG-2175 (Guidance for Conducting Technical Analyses for 10 CFR Part 61) provides:
  - Flowcharts, NRC staff recommendations, and examples for how licensees can develop high-quality technical analyses
  - Guidelines for what licensees or applicants should include and what regulators should review for each type of analysis
  - Suggested references, screening tools, and case studies

NUREG-2175

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Draft NUREG-2175 (Guidance for Conducting Technical Analyses for 10 CFR Part 61)
  - Issued at same time as Proposed Rule (March 26, 2015)
  - Discussed in seven public meetings including in a dedicated webinar (May 2015)
  - Same extended public comment period as proposed rule
  - Received seven sets of comment letters
    - Individuals, public interest groups, industry, licensees, and federal agencies
- Final guidance document has been developed (in concurrence)
  - Will be issued after Commission approves Final Rule publication

Major Comments Received

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Analyses timeframes
  - Protective Assurance Period and three-tiers is confusing and should be eliminated
- Defense-in-Depth
  - Requirement for a separate “analysis” should be clarified
- Confusion on various timeframes discussed
- Questions on site closure process
- Clarification on inadvertent intruder assessment scenarios

Major Revisions Made

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Analyses timeframe
  - Eliminated protective assurance period
  - Modified compliance period discussion
  - Added detail and examples on how to determine if a site has significant quantities of LLW
- Defense-in-Depth
  - Clarified the requirement to identify defense-in-depth protections and describe their capabilities
- Added figures describing site closure process, timeframes for evaluation, process for developing allowable limits
- Appendix with responses to public comments received
- Added appendix on 10 CFR Part 61 DEIS default scenarios

CRESP Comments on Proposed Rule 10CFR61

Presentation to the NRC ACRS RP & NM Subcommittee

The CRESP Management Board
Craig Benson[8], Joanna Burger[2], James Clarke[1], Michael Greenberg[2], Kathryn Higley[3],
Kimberly Jones[4], David Kosson[1], Steve Krahn[1], Shlomo Neuman[7], Ron Rousseau[9], Richard Stewart[5]

[1]Vanderbilt University, [2]Rutgers, The State University of New Jersey, [3]Oregon State University, [4]Howard University, [5]New York University, [6]Robert Wood Johnson Medical School, [7]University of Arizona, [8]University of Wisconsin- Madison, [9]Georgia Institute of Technology

CRESP

Consortium For Risk Evaluation with Stakeholder Participation

October 18, 2016

CRESP Mission

Support safe, effective, publicly-credible, risk-informed management of existing and future nuclear waste from government and civilian sources through independent strategic analysis, review, applied research and education.

www.CRESP.org

- CRESP operates under a Department of Energy cooperative agreement awarded to Vanderbilt University. The multi-university consortium is working to advance cost-effective, risk-informed cleanup of the nation's nuclear weapons production facility sites and cost effective, risk-informed management of potential future nuclear sites and wastes.

- Members of the CRESP Management Board commented on the 2013 and 2015 drafts for 10CFR61 **LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE**

www.CRESP.org

- We **applaud** and **strongly support** the Nuclear Regulatory Commission's *Risk-Informed, Performance-Based Approach.*

- If we took issue with certain aspects of the proposed regulations, it was because we believed that the approach was **departing** from a *Risk-Informed, Performance-Based Approach*.

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- Several provisions in the draft proposed rules of 2013 and 2015 “commendably reflect and implement a risk-informed, performance-based approach”.
- Notably they include provisions for site specific waste acceptance criteria, site specific performance assessment, and the use of updated dosimetry. (2013 comments).
- Furthermore, we noted that site specific assessments of exposure to an inadvertent intruder, and provisions for defense-in-depth and safety case evaluations were positive additions, consistent with risk-informed, performance-based regulation (2015 comments)

However, we expressed concerns that there were parts of the proposed regulations where the NRC was still not taking a risk-informed performance-based approach, in particular, the continued incorporation of very long time frames that greatly exceed our experience and forecasting abilities.

Comments from Jim Clarke Consultant to the ACRS

- It appears that the staff concerns reflected in the Proposed Rule stem from the appearance of quantities of long-lived radionuclides from activities that were unanticipated when10CFR61 was first promulgated.
- These are understandable and legitimate concerns.
- However, they should be addressed through the regulations in a way that is consistent with NRC's risk-informed, performance-based approach.

Comments from Jim Clarke, Consultant to the ACRS

- The draft regulations were revised to eliminate the "protective assurance period" from 1000 to 10,000 years, however, the revision now states that the **compliance period** would be either 1000 or 10,000 years depending on the inventory and concentration of long-lived radionuclides intended for disposal.

- However, a compliance period of 10,000 years is neither risk-informed nor performance-based. This time period is outside our current body of knowledge and greatly exceeds our ability to forecast the future.

- My personal feeling is that our current ability to forecast future events would be better limited to a few hundred years, but I appreciate that 1000 years has some standing e.g., with the Department of Energy.

Comments from Jim Clarke Consultant to the ACRS

- With respect to the intruder assessment, I appreciate that the staff was directed, by the Commission, to use a 10,000 year period, but have the same concerns about the merits of putting unrealistically long time frames in regulations.

- Rather the intruder assessment, as the draft regulations support, should be approached on a site-specific and waste-specific basis.

Comments from Jim Clarke Consultant to the ACRS

- In summary, I appreciate that the appearances of larger amounts of long-lived radionuclides requiring disposal and waste streams that did not exist at the time, were unanticipated, when 10CFR61 was first promulgated almost 35 years ago.

- However, these unanticipated events appear to be driving the proposed regulations to positions that are neither risk-informed nor performance-based viz. the imposition of a 10,000 year compliance period in certain cases and a 10,000 year intruder assessment.

Comments from Jim Clarke Consultant to the ACRS

- Perhaps these unanticipated waste streams, such as DU, can be handled in other ways, possibly through guidance, that do not require the imposition of an unrealistic compliance period, rather that letting their occurrence drive the regulations.

Comments from Jim Clarke Consultant to the ACRS

In closing my experience with the NRC covers over 16 years:

- Consultant to the Nuclear Regulatory Commission, Advisory Committee on Nuclear Waste. 2000-2004
- Member, Nuclear Regulatory Commission Advisory Committee on Nuclear Waste and Materials 2005 -2008
- Consultant to the Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, 2008 to present

The people from the NRC with whom I have had the pleasure to work are extraordinary.

Indeed, I hold the NRC and its staff in very high regard.

We just apparently disagree over the merits of including extremely long time periods as “compliance periods” in enforceable regulations.

Comments from Jim Clarke Consultant to the ACRS

- I appreciate the opportunity to provide these comments on behalf of CRESP and me and would be pleased to address any questions you might have.

Questions?