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Depleted Uranium

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 WORKSHOP 2 ON UNIQUE WASTE STREAMS --

5 DEPLETED URANIUM

6 + + +

7 WEDNESDAY, SEPTEMBER 23, 2009

8 + + +

9 SALT LAKE CITY, UTAH

10 + + +

11
12 The workshop was held at Salt Lake City
13 Marriott University Park, 480 Wakara Way, Salt Lake
14 City, Utah, at 8:30 a.m., Chip Cameron, facilitator,
15 presiding.

16 WORKSHOP PARTICIPANTS PRESENT:

17 CHIP CAMERON, Facilitator

18 MARTY LETOURNEAU

19 GREG KOMP

20 SUSAN JABLONSKI

21 DANE FINERFROCK

22 DREW THATCHER

23 CHRISTOPHER THOMAS

24 VANESSA PIERCE

25 BEATRICE BRAILSFORD

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1 WORKSHOP PARTICIPANTS PRESENT (Continued):

2 STEVE COWNE

3 THOMAS E. MAGETTE

4 DAN SHRUM

5 SCOTT KIRK

6 DAVID C. KOCHER

7 PETER C. BURNS

8 STEVE NELSON

9 STEPHEN WEBB

10 CHRISTEPHER MCKENNEY

11 DAVID ESH

12 CHRISTOPHER GROSSMAN

13 PATRICE M. BUBAR

14 TISON AMEDEN CAMPBELL

15 LARRY W. CAMPER

16 DIRK DUNNING

17 KELLI A. MARKHAM

18 DUNCAN WHITE

19 ANDREW CARRERA

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TABLE OF CONTENTS

		<u>PAGE</u>
1		
2		
3	Opening Remarks, Chip Cameron	4
4	Introductions	8
5	Outline of Agenda	23
6	NRC Welcome and Overview, Larry Camper	25
7	NRC Rulemaking Process, Andrew Carrera	56
8	Site Specific Performance Assessment, David Esh ...	73
9	NRC Depleted Uranium Technical Analysis	
10	Overview, David Esh	88
11	Key Issues for Depleted Uranium Disposal, David	
12	Esh	128
13	<u>Issue 1: Significant Quantities of Depleted</u>	
14	<u>Uranium</u>	
15	1.1, Definition of "Significant	
16	"Quantities"	142
17	Regulations versus Guidance Overview, Tison	
18	Campbell	184
19	1.2, Time Period of Performance for Site	
20	Specific Analysis	198
21	1.3, Exposure Scenarios for Site Specific	
22	Analysis	238
23	1.4, Source Term Issues for a Site Specific	
24	Analysis, Christopher Grossman	278
25	Concluding Remarks, Chip Cameron	301

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P R O C E E D I N G S

(8:38 a.m.)

1
2
3
4 MR. CAMERON: My name is Chip Cameron, and
5 I work for the Executive Director for Operations at
6 the Nuclear Regulatory Commission, the NRC, and it's
7 my pleasure to serve as your facilitator over the next
8 two days.

9 This workshop is focused on the NRC
10 rulemaking to establish site specific criteria for the
11 disposal of deleted uranium and other unique waste
12 streams, and before we get into the substance of the
13 meeting, I'd just like to go over a few points of
14 meeting process so that you know what to expect over
15 the next two days.

16 First of all, I'd just like to talk about
17 the format for the meeting. We're on a so-called
18 round table format today as opposed to the town hall
19 meeting, and the objective of a round table format is
20 to promote a discussion, a dialogue, if you would, on
21 the issues of concern, and at the table you'll see
22 that we have representatives of affected and concerned
23 interests. We also have several experts at the table
24 with us, and the NRC not only wants to hear each of
25 your individual perspectives on these issues, but also

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1 what your reaction is to the views of others around
2 the table.

3 In other words, we want to try to have a
4 discussion, and it's a modest attempt to try to
5 develop a richer, a little bit different form of data
6 for the NRC as they kick off this rulemaking on the
7 site specific criteria.

8 And of course, the Federal Register notice
9 on this particular effort in these meetings, you'll
10 note that there is a public comment period also,
11 written comments on these issues, and I believe that
12 the deadline for comments is October 30th of this
13 year.

14 In terms of the audience, the focus is
15 going to be at the table, but we thank all of you for
16 being here, and periodically I'm going to go out to
17 the audience to see if you have any comments or
18 questions on the topics that have been discussed, and
19 tomorrow afternoon, at the end of tomorrow's round
20 table, we're going to have an open mic session for
21 anybody who wants to make a comment. We know that
22 there's a lot of interest and concern about these
23 particular issues here. So we thought we'd build that
24 into the agenda.

25 The ground rules for the discussion are

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1 very simple, and they're just aimed at helping us all
2 to have a constructive and efficient discussion.
3 First of all, you'll see these name tents, what we
4 call name tents, in front of you. If you want to
5 talk, comment, whatever, if you could just turn this
6 name tent up on end and I'll know. I know Dane
7 doesn't want to have his up. He doesn't want to do
8 any talking, but if you do that, it will help us keep
9 the discussion organized, and you won't have to worry
10 about trying to jump into the conversation. I'll keep
11 track of who has their name tents up.

12 And we will be trying to follow discussion
13 threads. I may not take the tents in the order that
14 they came up, but I won't lose track of you.

15 And I would ask that only one person speak
16 at a time, most importantly, so that we can give our
17 full attention to whomever has the floor, so to speak,
18 at the moment, but also so that we can get a clean
19 transcript. We have our stenographer, Mike
20 Williamson, here, and he's taking a transcript, and
21 that transcript will be available to all of you. It's
22 the public's and NRC's record of what transpired here
23 at the meeting.

24 And as usual, try to not use a lot of air
25 time. Try to be brief, as practicable. I don't think

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1 we're going to have any problem in terms of time, but
2 I would just add that, and try to be constructive. If
3 you have a particular criticism of something, perhaps
4 try to offer something to remedy that.

5 I'm going to be using the famous parking
6 lot to capture issues that may come up in a discussion
7 of a particular topic that aren't really relevant to
8 that topic, may not even be on the agenda at all, but
9 we'll keep track of those, and we'll either come back
10 to discuss those at the appropriate part of the
11 agenda, or else we'll just build time in to do that.

12 My role in all of this is just to help you
13 keep focused and organized, to insure that the
14 information that you share around the table, including
15 information from the NRC staff, to make sure that
16 that's clear; that assumptions are checked, and to
17 make sure that everybody around the table gets a
18 chance to speak if they want to.

19 I'm going to try not to get in your way,
20 but I may ask clarifying questions. I may try to
21 connect the dots so to speak on points that people
22 have made.

23 And I want to do introductions around the
24 table now and then do an agenda check with you. And I
25 guess what I would ask you to do is not only tell us

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1 who you are, but a couple sentences, if you want, on
2 what your expectations for either this meeting or this
3 NRC rulemaking process are.

4 And the NRC is very grateful for all of
5 you coming to this because this is going to be a great
6 help to the NRC in fashioning this particular
7 rulemaking.

8 I have to apologize for the mics in the
9 sense that they don't stretch a whole lot. They do
10 have a pretty good pickup, but we're going to get
11 longer cables at lunchtime. In the meantime, I will
12 just supplement you with this cordless mic. When I
13 come out to the audience, I'll bring this mic out to
14 whoever wants to talk.

15 And I think what we're going to do is
16 let's start with Greg and with introductions. Greg.

17 MR. KOMP: Good morning. Greg Komp. I'm
18 the Director of Radiation Safety for the Army. I'm
19 here representing DoD, and we're here just to make
20 sure there's a clear understanding of the type of
21 waste streams that DoD generates in terms of DU.

22 MR. CAMERON: And I guess can everybody in
23 the back hear us? Okay. I just want to make sure,
24 but let's speak up as much as we can.

25 MR. KIRK: Hi. I'm Scott Kirk, and I'm

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1 here today. I'm replacing Bill Dornsife. Bill
2 couldn't be here today. So he asked for me to fill
3 in, and I work out of our corporate office. I'm the
4 Director of Licensing and Corporate Compliance, and
5 I'm the Corporate Radiation Safety Officer.

6 We did receive a Part 61 like license from
7 the TCEQ a few weeks ago, and what I'm here to do is
8 to listen to what other people's concerns are because
9 I think we have a real unique need.

10 MR. CAMERON: Great. Thanks, Scott, and
11 Scott is a Waste Control Specialists. He didn't add
12 that.

13 Marty, do you want to give us a try on the
14 microphone? You have to press the button. A red
15 light will come on.

16 MR. LETOURNEAU: Ah, there we go.

17 MR. CAMERON: You have to leave go of the
18 button. I'm sorry I didn't add that. You have to not
19 only press it --

20 MR. LETOURNEAU: I followed the
21 directions.

22 MR. CAMERON: -- but you have to leave go.
23 Okay.

24 MR. LETOURNEAU: Hi. I'm Marty
25 Letourneau. I'm with the U.S. Department of Energy.

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1 I work in the Environmental Management Program, and
2 specifically within the Office of Compliance. I'm one
3 of our radioactive waste management subject matter
4 experts, and I am here to represent the Department of
5 Energy and participate and answer questions as much as
6 I can.

7 MR. MAGETTE: I'm Tom Magette. I'm Senior
8 Vice President for Nuclear Regulatory Strategy with
9 Energy Solutions. My expectations today are much like
10 they were in Maryland, but I think we had a very
11 productive discussion there and discussed some of the
12 key issues in terms of what should be in the rule
13 versus what should be in guidance, which I think is
14 one of the most important matters that we have to
15 address, and that's something I'd like to see us
16 revisit again today.

17 MR. CAMERON: Thank you, Tom, and that is
18 an over arching issue here, and I thank Tom for
19 mentioning it.

20 Besides views on the issues, do you think
21 on that particular issue that it should be in the
22 rule, captured in the text of the rule, or should it
23 be in the guidance that accompanies the rule?

24 Go ahead.

25 MR. SHRUM: Dan Shrum also with Energy

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1 Solutions. I am in charge of the licensing
2 specifically at our Clive facility, and I'm here to
3 listen and to participate and to better understand
4 what the criteria will be to do updated performance
5 assessment for our facility and also to hear some of
6 the concerns that will be expressed today.

7 MR. THATCHER: Drew Thatcher with the
8 Washington Department of Health. I'm a health
9 physicist. I, in conjunct with Art Rood, the two of
10 us performed the pathway analysis for the waste
11 facility in the State of Washington.

12 I'm here actually -- Tom's comment was
13 very appropriate. I agree with that, and I also want
14 to make sure that I have specific concerns that I'd
15 like to see addressed in the next two days. So if no
16 one brings them up, I will.

17 MR. CAMERON: Great. Thanks, Drew.

18 MR. COWNE: My name is Steve Cowne. I am
19 the Director of Quality and Regulatory Affairs for
20 Louisiana Energy Services. For those who don't know,
21 LES, or Louisiana Energy Services, is building a gas
22 centrifuge enrichment plant in New Mexico. We will
23 take uranium hexafluoride and natural assays and
24 enrich it up for nuclear fuel for nuclear power
25 plants. One of our byproducts obviously from that is

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1 depleted uranium hexafluoride.

2 I'm here today to represent LES to try to
3 understand the need for rulemaking and to be a voice
4 of the enrichment industry.

5 MR. CAMERON: Okay. Thank you. Thank
6 you, Steve.

7 And let's go to Steve Nelson.

8 MR. STEVE NELSON: I'm with Steve Nelson -
9 - I am Steve Nelson. I'm with myself. I'm on the
10 faculty at Brigham Young University. I want to make
11 clear, however, that I do not speak for the
12 institution nor its sponsor.

13 I am a refugee from the Yucca Mountain
14 project. I have spent ten years as a member, chair,
15 and vice chair of the Utah Radiation Control Board. I
16 am a geologist and specifically isotope geochemist. I
17 have conducted research in the Bonneville Basin, and my
18 expectation is to convince everyone here that the
19 notion of disposing of depleted uranium in a shallow
20 engineered landfill is absurd on its face.

21 MR. CAMERON: Okay. Thank you, Steve, and
22 I know there's huge refugee camps for Yucca Mountain.

23 Vanessa.

24 MS. PIERCE: My name is Vanessa Pierce.
25 I'm the Executive Director of the Healthy Environment

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1 Alliance of Utah, or HEAL Utah. We work to engage the
2 citizens in the process of protecting public health
3 from nuclear and toxic waste.

4 And I guess my expectation for today is
5 that we provide some input about the performance
6 assessment and expectations for that so that we can
7 insure that the longevity of the waste stream will be
8 matched by the performance of the repository that's
9 going to be designed to hold the waste, and that it
10 will be protective of public health.

11 MR. CAMERON: Great, and Beatrice, let's
12 see how that picks you up.

13 MS. BRAILSFORD: My name is Beatrice
14 Brailsford. I'm with the Snake River Alliance, which
15 is Idaho's grassroots nuclear watchdog and advocate
16 for clean energy.

17 I'm here because, as probably most of you
18 know, AREVA is proposing to build a uranium enrichment
19 plant in Idaho. We're obviously very concerned about
20 the effects of that plant. One of the key effects
21 will be its waste stream, and just as we're concerned
22 about what happens to people in Idaho from the
23 enrichment process itself, we're concerned about what
24 happens to people who live near potential disposal
25 sites.

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1 What we are very concerned about is I know
2 many of you here know that the waste disposal at Idaho
3 National Laboratory was conducted in a fairly ad hoc
4 fashion, and frankly, particularly after seeing the
5 waste, the Radiation Control Board meeting yesterday,
6 we are concerned that waste disposal will continue to
7 be conducted in a fairly ad hoc fashion.

8 MR. CAMERON: Thank you, Beatrice.

9 Chris.

10 MR. THOMAS: Yes. My name is Christopher
11 Thomas. I'm the Policy Director for HEAL Utah. I've
12 been working on depleted uranium issues for a couple
13 of years, and Mr. Larry Camper attributed us to
14 something in 2000. We've not been working on it that
15 long, but have been working on it for quite a while.

16 And also I just wanted to say, you know,
17 after attending the Radiation Control Board hearing
18 last night, and many of you were not there, but some
19 of you were, I have to just say that I do have
20 concerns that NRC is potentially not conducting this
21 rulemaking in a really open fashion, in as open
22 fashion as I would like to see. I think some of the
23 comments last night made to the Radiation Control
24 Board were fairly provocative and led them to certain
25 conclusions that I don't think were necessarily the

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1 case.

2 So what I would like to see out of this
3 workshop is really sort of restoring that idea that
4 NRC has not come to sort of predetermined conclusions
5 about this, is very open to legitimate scientific and
6 technical arguments, and that's what I'd like to see.

7 Thank you.

8 MR. CAMERON: Great. Thank you. Thank
9 you very much for that, Chris, and that's very
10 important, a very important topic, a very important
11 issue for the NRC to demonstrate throughout this
12 process, including today.

13 Peter.

14 MR. BURNS: Good morning. My name is
15 Peter Burns. I'm a Professor of Civil Engineering in
16 geological sciences and also of chemistry and
17 biochemistry at the University of Notre Dame. I'm an
18 expert in actinides and actinide geochemistry,
19 specifically and mostly uranium and its transport in
20 the environment.

21 I also direct a Center on Energy
22 Frontiers, Research Center on Materials Sciences of
23 Actinides at Notre Dame and several other
24 institutions, and that center focuses on, in part,
25 waste forms for actinides.

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1 So my purpose here is to bring some
2 expertise in these areas and, of course, being a
3 professor, I'm anxious to learn from this proceeding
4 and for other people's views and carry some of that
5 back to my students.

6 MR. KOCHER: Hi. My name is David Kocher.

7 I'm a health physicist by profession. I work for a
8 small consulting firm in Oak Ridge, Tennessee called
9 SENES Oak Ridge.

10 I don't have a dog in this particular
11 hunt, but for 15 years or so while working at Oak
12 Ridge National Lab, I was involved in performance
13 assessments at Department of Energy low level waste
14 sites, particularly in Oak Ridge and Savannah River.
15 I was sort of the environmental pathways intruder
16 scenario representative on these performance
17 assessment teams. I guess I had some influence in
18 developing DOE policies for how intrusion analyses
19 would be done and the kind of criteria that would be
20 used and the role of site specificity versus generic
21 prescriptions. Those kinds of over arching policy
22 issues I guess I had some say in.

23 I don't come here with a predisposed
24 position about how depleted uranium and other things
25 like that should be disposed of. What I'm interested

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1 in trying to contribute to as best I can is that
2 whatever approach that the NRC comes up with has a
3 fairly firm technical basis and that everybody
4 understands kind of what the rules of the game are
5 that we're playing by.

6 MR. CAMERON: Thank you very much.

7 Steve.

8 MR. WEBB: Yes. My name is Stephen Webb
9 from Sandia National Labs. What I am expert in, gas
10 transport and porous media. What I've worked on a
11 number of waste repositories, with also Yucca
12 Mountain.

13 MR. CAMERON: Thank you, Steve.

14 Dane.

15 MR. FINERFROCK: I'm Dane Finerfrock.
16 I'm the Director of the Utah Division of Radiation
17 Control. We're part of the Department of
18 Environmental Quality.

19 The Division of Radiation Control has the
20 responsibility for regulating Energy Solutions. We
21 are also going to be the recipients of any performance
22 assessment they may do associated with the disposal of
23 depleted uranium.

24 My expectations, and I'm speaking for many
25 of many staff who are here as well today, we want to

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1 learn as much as we can because the decisions we make
2 are very important to the welfare of Utah and its
3 citizens.

4 MR. CAMERON: Thank you, Dane.

5 And Chris.

6 MR. MCKENNEY: Hi. I'm Chris McKenney.
7 I'm the Branch Chief in charge of the Performance
8 Assessment Branch at the Division of Waste Management,
9 Environmental Protection, at NRC.

10 I have been doing performance assessment
11 in low level waste since 1991, mostly in the area of
12 my training, which is environmental transport and
13 health physics, and scenario development has been my
14 area of most use.

15 My intentions are I want to get as many
16 issues out on the table and discussed so that we can
17 have the best ability to try to address all of those
18 issues as part of the technical basis development and
19 so that the draft rule is closer to what is a good
20 rule than something that is throw another rock out
21 there and have to do it again. I'd rather deal with
22 issues now than have to revisit them and revisit them.

23 MR. CAMERON: Thank you.

24 David.

25 MR. ESH: Hi. I'm David Esh. I'm a

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1 senior systems performance analyst in the Division of
2 Waste Management and Environmental Protection, and
3 you'll be hearing a lot from me today especially.

4 I've worked in performance assessment for
5 about 15 years on a variety of different projects,
6 complex decommissioning sites, low level waste,
7 incidental waste sites, and Yucca Mountain, the high
8 level waste repository.

9 The objectives for me for this workshop
10 are to get input on a diversity of views that we can
11 reflect in the rulemaking and guidance development
12 process. We particularly want to hear what people
13 want to think should be in rulemaking, what should be
14 in guidance. We're going to cover what we thought we
15 had identified in our screening analysis as some of
16 the main issues for this process, but would also like
17 to hear about things that people feel should be on the
18 list that weren't on the list. We'd also like to hear
19 things that are on the list that people don't think
20 should be on the list.

21 But the bottom line is, as Chris has
22 mentioned, we want to develop a rulemaking and
23 associated technical basis document and guidance
24 document that is clear, people understand, maybe not
25 necessarily that everyone agrees with all of the

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1 content because we definitely have some diverging
2 views on some of these topics, but at least you
3 deserve to understand what's there and why it's there.

4 MR. CAMERON: Thank you, and Chris.

5 MR. GROSSMAN: My name is Chris Grossman.

6 I'm a performance analyst in the Division of Waste
7 Management and Environmental Protection. I work with
8 Chris and Dave.

9 My expectation or I guess I'll give a
10 little bit more on my background. I'm a performance
11 analyst, and I've been working on risk assessments for
12 approximately eight years. Largely my work was
13 concentrated in high level waste on the Yucca Mountain
14 project before moving over to low level waste issues
15 the last couple of years.

16 My expectation for this meeting is the
17 Commission directed the staff to do a limited
18 rulemaking on the disposal of unique waste streams,
19 including depleted uranium, and the limited rulemaking
20 sounds like it might be a fairly easy task, but when
21 you look at the issues, it's a lot more complex than
22 it may seem, and so I know the staff has worked very
23 hard to assemble a diverse group of participants in
24 this panel so that we make sure we can collect nice,
25 divergent views, and make sure that we can grasp a lot

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1 of the issues that are out there.

2 Because, as my wife likes to remind me,
3 you don't know everything and you can't know
4 everything, and so I want to make sure that we capture
5 those views here today.

6 And I'd also like to echo what Dave said.

7 For us it's important to know what would be
8 appropriate for the regulation, as well as what would
9 be more appropriate to put into guidance that would be
10 associated with the rule.

11 MR. CAMERON: Great. Thank you all.

12 You're going to be meeting several other
13 NRC staff along the way during the next two days as
14 they speak on various topics. We have not only
15 members of the NRC technical staff here. We also have
16 representatives of our legal staff and our public
17 affairs staff with us.

18 And in that regard, if there are any media
19 here who need some orientation, Dave McIntyre is our
20 public affairs representative back there. If you
21 could just talk to Dave about that.

22 And I would encourage a lot of the useful
23 sharing of information as not just around the table,
24 but at breaks and lunch. So I would encourage you to
25 talk with each other, of course, and with the NRC

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1 staff.

2 I just want to spend a couple of minutes
3 and just give you a quick agenda overview, see if
4 there's any questions on that, and then we can get
5 started.

6 Before I get into the agenda, I just
7 wanted to make an observation about this second round
8 table that we're having. All of you know that we've
9 already had one round table in Bethesda, Maryland on
10 these issues, and I just wanted to emphasize that do
11 not feel limited in any way by the previous
12 discussion. Each group has its own chemistry. Each
13 individual has their unique perspectives, and also
14 their unique way of expressing them so that we can all
15 learn anew from that.

16 But with that said, I would note that
17 there were two issues. What is a significant quantity
18 of depleted uranium and unique waste streams that were
19 discussed, and we will be discussing those here. They
20 were discussed at the Bethesda meeting, and those were
21 two topics on which there was general agreement. I
22 always hesitate to say that, to characterize that, but
23 I think I can.

24 On those two issues there was general
25 agreement on the approach that should be taken, and I

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1 would just ask when we get there if perhaps one of the
2 participants who was at the Bethesda meeting could
3 just sort of perhaps summarize that, what was the
4 discussion on those particular issues, the conclusion,
5 and we'll see whether all of you feel the same way,
6 and perhaps we can move those through those topics
7 very quickly and have more time for other topics.

8 Dane used the word "learning," and that's
9 how we're going to start the day today, by providing
10 you some information and context on what the NRC is
11 doing, and this is not only to aid you in the
12 development of the discussion over the next two days,
13 but also to inform your written comments if you choose
14 to submit those.

15 We're going to start with Larry Camper,
16 who is the Director of the Division of Waste
17 Management and Environmental Protection, and Larry is
18 going to give you an overview.

19 We're then going to go to Andrew Carrera,
20 who is with our rulemaking staff. He's going to talk
21 about the rulemaking process.

22 And then we have Dave Esh, who is going to
23 talk about the technical basis that was developed to
24 aid the staff and the Commission in decision making on
25 this particular subject.

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1 After each of those presentations, we're
2 going to go to you for any clarifying questions you
3 might have. We won't be jumping into discussion or
4 problem solving on them because we're going to have
5 specific discussion issues on those, but if a question
6 raises an issue, I'll keep track of that in the
7 parking lot.

8 Dave's presentation is lengthy. So we're
9 going to break that into basically three parts and go
10 to you for questions on those, and I would just ask if
11 each speaker could get through his presentation or her
12 presentation before we go to questions.

13 And the rest of the agenda discussion
14 topics, you can see them laid out, time period,
15 significant quantities, time period of performance;
16 they're all there. The famous compatibility
17 discussion tomorrow, and at the end of the day
18 tomorrow we will be having the open mic that I
19 mentioned for people who want to make comments.

20 Lunchtime, the hotel is setting up a
21 buffet. Okay? I think it's \$10.95 if you want to do
22 that. I think that there are some restaurants within
23 walking distance, and the NRC staff can tell us more
24 about that.

25 And tomorrow they are doing a grill out in

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1 the back alley out there on the lawn, whatever that is
2 called. So that will be the buffet lunch tomorrow.

3 And with that, any questions on agenda
4 before we get to Larry?

5 (No response.)

6 MR. CAMERON: Okay. Larry Camper.

7 MR. CAMPER: Good morning, everyone.

8 Thank you, Chip.

9 Let me start off by thanking all of you
10 for being here. We appreciate your interest. I
11 especially want to thank the panelists in advance.
12 Some of you were in our meeting in Maryland a few
13 weeks ago, and I appreciate you showing up again and
14 participating. There was a lot of very valuable
15 discussion that took place in Maryland. I think there
16 will be a lot of very valuable discussion here today,
17 of course, and tomorrow.

18 The panel has been constructed in such a
19 fashion that there is a diversity of views. We want
20 that. That's very important. This is a very complex
21 subject. It's a very complicated subject, and in some
22 cases for some people it's even an emotional subject.

23 That's okay. We're here to talk about it. We've
24 been given an assignment by our Commission to proceed
25 with the particular rulemaking. We'll talk about that

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1 at great length, and so all of your views are greatly
2 welcomed and greatly appreciated.

3 I'm going to read some remarks that have
4 been prepared for me by my staff. I don't normally
5 like to read a presentation. I generally find that
6 something I don't like to do. I like to say I never
7 give the same presentation twice even if I do it back
8 to back, but the important thing is there's a lot of
9 background information, and it's important that
10 everyone hear the same thing. It's important that our
11 panelists have the benefit of the same information
12 that is conveyed to the panelists in Washington.

13 So I beg your indulgence for doing that
14 and for the panelists who suffer through it one time
15 already I especially beg your indulgence.

16 This is the second of two public workshops
17 NRC will be hosting to solicit early input on the
18 proposed rulemaking for unique waste streams. We are
19 here today because we want to gather information on
20 key technical issues associated with the disposal of
21 significant quantities of unique waste streams and in
22 particular depleted uranium or DU. We want to focus
23 on DU for a good portion of the workshop, but we also
24 want to think about other potential waste streams that
25 could be considered unique and that could be included

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1 in this proposed rulemaking. So our scope is, indeed,
2 broader than only depleted uranium.

3 We're really looking forward to the
4 collaborative discussion from all of you. We are here
5 to listen seriously to your thoughts and concerns both
6 on technical issues as well as policy issues. We want
7 to make sure everyone understands the steps involved
8 in the rulemaking process and see areas where the
9 public has opportunities for providing input.

10 This is a complicated issue. Now, we
11 understand there will be a lot of different viewpoints
12 to share, and we are open to hearing all of them.

13 In terms of background, we had developed
14 the term "unique waste stream" for significant
15 quantities of DU because it is different than typical
16 low level waste, LLW. Foremost, it is a new waste
17 stream in the sense that there were no commercial
18 entities generating significant quantities of it when
19 our current regulations in Part 61 were put in place.

20 DOE was the only entity operating in enrichment
21 facilities in the United States at that time. As a
22 result, only small quantities of DU were considered in
23 the environmental documents associated with the
24 regulation.

25 DU is also unique because it behaves

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1 differently than typical low level waste. The hazard
2 from most commercial LLW decreases over time in
3 contrast to DU where not only does the hazard
4 increase; it persists for much longer time frame due
5 to the ingrowth of long-lived daughter products.

6 However, the impacts from the disposal of
7 significant quantities of DU can be mitigated, for
8 example, by increasing burial depth through the use or
9 the use of robust radon barriers whose performance can
10 be demonstrated over a long time frame.

11 In terms of continuing background,
12 currently Section 61.55(a)(6) determines any
13 radionuclide not on the classification tables to be
14 Class A by default. The statement was an attempt at
15 the time the regulation was promulgated to capture any
16 waste streams that had not been included in Part 61 in
17 the final form.

18 It was envisioned that these other waste
19 streams would not be of significant quantity or
20 concentration to warrant a limit in the tables.

21 Approximately six metric tons of DU were
22 soon to be Class A waste in that draft environmental
23 impact statement with a concentration of .05
24 microcuries per cubic centimeter as the basis for
25 their determination.

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1 This draft concentration limit was not
2 adopted in the final environmental impact statement
3 based on the Part 61 FEIS conclusion that "types of
4 uranium bearing waste being typically disposed of by
5 NRC licensees do not present a sufficient hazard to
6 warrant limitation on the concentration of this
7 naturally occurring material."

8 However, the specific activity of depleted
9 uranium is 0.5 microcuries per cubic centimeter, and
10 now the landscape for waste stream generation is
11 changing. So clearly, the NRC is entering new
12 territory, remarkably different than that which was
13 envisioned when Part 61 was put in place.

14 In terms of the current situation,
15 commercial facilities generating large quantities of
16 DU and the DO/DOE is planning to dispose of large
17 quantities of DU at sites regulated by NRC agreement
18 states, including the State of Utah. Commercial
19 facilities have the option of transferring their DU to
20 the DOE under Section 3113 of the 1996 USEC
21 Privatization Act or they can pursue commercial de-
22 conversion disposal options.

23 There are no licensed commercial de-
24 conversion facilities built at this time. The NRC
25 would license such plants should that be the case.

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1 LES, or Louisiana Energy Service, is
2 expected to start limited operations in the spring of
3 2010. GE Hitachi has filed an environmental report in
4 a license application that are currently under review
5 by the NRC, and the Global Laser Enrichment Facility
6 in Wilmington, North Carolina also is in the midst of
7 preparing an application, and we are reviewing.

8 AREVA has filed a license application,
9 including its environmental report for the Eagle Rock
10 Enrichment Facility in Booneville County, Idaho, which
11 has also been accepted for NRC review.

12 DOE has 700,000 metric tons of DUF-6 it
13 has been storing safely on site for decades at its
14 Paducah and Portsmouth gaseous diffusion plants. It
15 is currently building deconversion facilities at these
16 sites to convert the DUF-6 to DU-308 for disposal at a
17 commercial disposal site.

18 So the cylinder that you see in the
19 picture will be deconverted into an oxide powder. DOE
20 has said that it will need to begin disposal of
21 shipments from the DUF-6 facilities in mid-2010.

22 More than one million metric tons of
23 depleted uranium will need to be disposed of over the
24 next several years.

25 Next slide.

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1 Commission direction. The Commission
2 realized the uranium enrichment landscape was
3 drastically changing. So when doing the hearings for
4 the LES facility, intervenors filed contentions
5 regarding the impact from DU disposal. The Commission
6 directed the staff to evaluate these impacts separate
7 from the hearing process.

8 The Commission stressed in their order to
9 the NRC staff to consider the quantities of DU at
10 issue and noted that these large quantities were
11 outside of the bounds of the evaluation which was
12 conducted as part of the environmental impact
13 statement for the 1980 Part 61 rulemaking.

14 In the final analysis, the staff's
15 response to the Commission direction was yes. The
16 staff did recommend that Section A-6 of Part 61.55 be
17 modified through a rulemaking to specify a requirement
18 for site specific analysis for significant quantities
19 of DU and the technical requirements for such an
20 analysis also be part of that rulemaking.

21 The Commission accepted this
22 recommendation in their staff requirements memorandum
23 and further directed the staff in a future budget
24 request to propose the necessary resources for a
25 comprehensive revision to risk inform the 10 CFR Part

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1 61 waste classification framework.

2 In terms of the Commission paper that the
3 staff prepared in response to the Commission direction
4 in the SRM, I just cite it.

5 In answering the Commission direction, the
6 staff completed a Commission paper that presented a
7 range of regulatory options that were informed by
8 technical analysis. You're going to hear a lot of
9 detail about that technical analysis during Dr. Esh's
10 talk, since he was the lead for that staff analysis.
11 I'll just describe it briefly as a screening model we
12 use to evaluate the radiological risk and
13 uncertainties associated with the near surface
14 disposal of large quantities of DU at a generic low
15 level waste disposal site that had a broad range of
16 site specific conditions.

17 So we looked at a range of characteristics
18 of disposal sites rather than looking at one
19 particular disposal site.

20 In terms of the options that the staff
21 evaluated, the first option we evaluated was the staff
22 would issue a generic communication, for example, a
23 regulatory information summary, which is like a
24 guidance document that would clarify that for disposal
25 of large quantities of DU, compliance with existing

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1 performance objectives needs to be demonstrated and
2 the classification under 61.55(a)(6) should not be
3 relied upon solely for this purpose.

4 The second option was to conduct a
5 rulemaking to require the disposal facility licensee
6 to perform a site specific analysis demonstrating that
7 the unique waste stream, including large quantities of
8 DU, can be disposed of at a site in conformance with
9 the performance objectives of Part 61.

10 The third option was to develop a generic
11 waste classification, for example, A, B or C, for DU
12 and associated concentration limit to be added to the
13 waste classification tables. Staff would begin with
14 the existing technical analysis, which was consistent
15 with the part 61 methodology, but updated to include
16 recent advances in modeling and performance of
17 substantive techniques.

18 The last option was to evaluate the entire
19 basis for the waste classification framework and
20 update it for all radionuclides, not just DU. The
21 staff recommended, and the Commission agreed, to
22 pursue a rulemaking to specify site specific analysis
23 to be performed prior to disposal of significant
24 quantities of DU and to specify the technical
25 requirements to be included in the analysis for that

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1 performance assessment.

2 In terms of the path forward, the
3 Commission chose to combine two options into a
4 thorough approach to address both immediate changes
5 needed to NRC regulations and to address issues with
6 the existing waste classification framework overall.
7 The Commission agreed with the staff's recommendation
8 to conduct a rulemaking to require a site specific
9 performance assessment prior to the disposal of
10 significant quantities of DU, to identify the
11 technical parameters that need to be evaluated and to
12 develop guidance that would be provided to the
13 agreement state regulators and their licensees or
14 applicants.

15 The Commission further directed the staff
16 in a future budget request to propose the necessary
17 resources for a comprehensive revision to risk inform
18 10 CFR Part 61 waste classification framework. The
19 staff assumes this direction means to go beyond the
20 budgeting process and has proceeded with plans to use
21 FY '11 budget resources to begin the rulemaking
22 process in Fiscal Year '11.

23 The initial rulemaking, which is the
24 subject of this two-day public meeting. The
25 rulemaking will require the disposal facility

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1 licensees to perform a site specific analysis
2 demonstrating that the unique waste stream, including
3 significant quantities of DU can be disposed of at the
4 site in conformance with the performance objectives
5 set forth in Part 61.

6 The analysis will be reviewed and approved
7 by the agreement state since the likely disposal
8 facilities are located in agreement states. The
9 rulemaking is designed to be comprehensive in that it
10 addresses unique waste streams, including significant
11 quantities of DU.

12 We would define unique waste streams and
13 significant quantities in the rule language. These
14 are topics which we want to discuss with you here
15 today, and as Chip pointed out in his remarks, during
16 the last meeting a couple of weeks ago in Maryland,
17 the panel gave the staff some very significant and
18 rather clear impressions about those two particular
19 topics, and we hope that the panel today will also
20 weigh in as effectively.

21 This option creates a legally binding
22 requirement to do a site specific analysis.
23 Specifying the technical parameters for the site
24 specific analysis in the rule language will provide
25 uniformity in the technical approach used by the

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1 agreement states and their disposal facility licensees
2 and allow more alignment amongst the disposal sites.

3 The NRC will also publish regulatory
4 guidance implementation to help insure more uniformity
5 and to assist with implementation of the rule.

6 Now, the role of the performance
7 assessment. You're going to hear an awful lot today
8 about the performance assessment. The backbone of a
9 site specific analysis of this initial rulemaking will
10 be the requirement of a performance assessment. The
11 performance assessment is meant to be a living tool
12 for both the site regulator and the operator to be
13 able to assess future compliance of the disposal
14 facility with the performance objective set forth in
15 61.41 through 61.44 or the agreement state equivalent,
16 the performance objectives.

17 During the licensing of a disposal site,
18 assumptions must be made based on expected waste
19 volumes and streams of a possible final inventory of a
20 site or of a specific disposal unit within that site.

21 As operations occur, these assumptions should be
22 updated on a periodic basis with actual waste volumes
23 and any revised information of future waste that is to
24 be received.

25 The results of the performance assessment

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1 can then be used to evaluate whether reasonable
2 assurance still remains at the disposal unit or the
3 site as a whole will remain in compliance with the
4 performance objectives set forth in Part 61. If the
5 result of the performance assessment is that
6 compliance is uncertain or unlikely, additional data
7 collection and modeling may be performed. The
8 facility could be modified or future waste volumes or
9 specific radionuclide quantities or concentrations
10 could be reduced. The decisions on what actions to
11 take should involve both the site operator as well as
12 the affected regulator.

13 This slide has a lot of information on it.

14 It's kind of noisy. I apologize for that, but what
15 we'd like to do is show you just briefly who will be
16 conducting the review of these site specific
17 performance assessments. The slide shows the location
18 of the three operating disposal sites and the one
19 that's been proposed in west Texas. These are in
20 South Carolina, Utah, and Washington State and to be
21 Texas.

22 On the right is a table that identifies
23 the facilities, the waste it is authorized to accept,
24 and the compact restrictions that apply to that
25 particular facility. Texas is developing a new site,

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1 but it is restricted to waste that comes from Texas
2 and the State of Vermont.

3 Of particular note is that the Clive, Utah
4 site accepts Class A waste for most of the United
5 States, but the Barnwell site accepts the majority of
6 the Class BC waste in the United States, is closed to
7 out of compact generators, which affects 36 states.

8 These are the most likely disposal paths
9 for commercial DU waste. For the moment, I would
10 note that three of the sites are in arid environments,
11 and that only one of them is in a humid environment,
12 and this is an issue of considerable consideration as
13 the staff was developing its technical analysis, and
14 Dr. Esh will talk more about that during his
15 presentation.

16 In terms of Phase 2 or the long-term
17 rulemaking, recalling that the Commission gave the
18 staff a two-part direction, the second part of this
19 rulemaking effort is what we are calling the longer
20 term rulemaking. Specifically the Commission directed
21 the staff to prepare the necessary resources for a
22 comprehensive revision to risk inform the 10 CFR waste
23 classification framework using updated assumptions and
24 referencing the latest International Committee on
25 Radiation Protection, ICRP, methodology.

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1 This revision would likely involve
2 different updated methodologies and assumptions than
3 the original Part 61 methodology for key variables,
4 such as disposal configurations, performance periods,
5 institutional control periods, waste forms, site
6 conditions, exposure pathways, and receptor scenarios.

7 This effort would address all radionuclides, not just
8 DU, and would explicitly address the waste
9 classification for DU.

10 Other considerations. Thus far I have
11 covered the history of how we got to where we are and
12 the purpose for why we are here, but we recognize that
13 there are other concerns on your minds, and we have
14 reserved some time on the agenda tomorrow to discuss
15 those. We've set aside a specific time frame to do
16 that.

17 The few issues shown on this slide are
18 just some of the notable issues that we've been
19 thinking about, but there may be others. We know
20 these are important issues, and we want to hear your
21 concerns and invest the time down into the agenda.

22 For example, previously disposed volumes
23 of DU should be addressed through the site's specific
24 performance assessment as we have been discussing; the
25 PA as a living tool designed to insure compliance with

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1 the performance objective.

2 The second topic is something we have also
3 been discussing with the agreement state regulators,
4 and they are in agreement with us on the following
5 point. If a site wishes to dispose of a significant
6 amount of depleted uranium before the initial
7 rulemaking is completed, it would be prudent for the
8 site operator and the state regulator to review the
9 existing performance assessment supporting the site
10 and determine whether the issues that were raised in
11 the technical analysis performed by the staff and
12 presented to the Commission and were considered as
13 part of the Commission's decision have been adequately
14 addressed within the existing performance assessment.

15 If not, it would be prudent for the
16 performance assessment to be revised, to adequately
17 address these issues on a site specific basis before
18 disposal of significant quantities of concentrated
19 depleted uranium take place.

20 I'm aware from discussion with Dane
21 Finerfrock of the State of Utah that the performance
22 assessment for the Clive site is, in fact, going to be
23 updated. The operator, Energy Solutions, has
24 initiated that process. Dane discussed a time frame
25 yesterday during the Board meeting for when that

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1 performance assessment updating would be completed and
2 reviewed.

3 Finally, when we reexamine the waste
4 classification framework, we will need to think about
5 any consequences for DU that has been previously
6 disposed of under the initial rulemaking.

7 In terms of the agenda, first we will
8 start off with the technical aspects of the site
9 specific analysis for DU, and then we will broaden the
10 topic to think about other unique waste streams that
11 this rulemaking might apply to.

12 Then we will discuss how the agreement
13 states would implement the NRC change in regulations
14 and what NRC recommends states do in the interim
15 before both NRC's rulemakings are final and before the
16 agreement states have adopted changes in their
17 respective regulations.

18 Next we will discuss the long-term
19 rulemaking and what potential changes could be made to
20 the classification of depleted uranium or other
21 radionuclides, and finally we will conclude with some
22 time to discuss any questions people may have that are
23 not directly related to the Commission direction thus
24 far but are still important to discuss at this
25 workshop.

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1 So at that point, that concludes my formal
2 remarks. Again, I thank you for bearing with me as I
3 read through all of that, but again, it is important
4 that everyone hear the same thing in both public
5 meetings. There's a lot of background. It is a
6 complicated topic. So thanks for your indulgence.

7 With that, Chip, any clarifying questions?

8 MR. CAMERON: Thanks, Larry.

9 Before we go to you for questions, Susan
10 Jablonski of the State of Texas has joined us, and
11 I'll just ask her to just briefly introduce herself to
12 us, and then we'll go on for questions.

13 Welcome, Susan.

14 MS. JABLONSKI: As Chip said, my name is
15 Susan Jablonski, and I'm representing the Texas
16 Commission on Environmental Quality, and we have
17 regulatory authority in Texas over the disposal
18 activity.

19 MR. CAMERON: Great. Thank you.

20 Are there questions for Larry about his
21 presentation? Let's go to David, and then we'll go to
22 Christopher.

23 David.

24 MR. KOCHER: I have a fairly basic
25 question about something that I must confess confusion

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1 about. You talk about an initial rulemaking that
2 would require a site specific analysis, and I ask:
3 site specific analysis with respect to what? Because
4 surely any site is already required to do a site
5 specific analysis with regard to the requirement for
6 protecting the public from releases to the
7 environment.

8 So is what we're really talking about here
9 a site specific analysis with respect to the intruder
10 protection requirement or am I completely misled about
11 this?

12 MR. CAMPER: No, you're not. It's a great
13 question. When the staff was looking at the
14 assignment given to us by the Commission, we realized
15 that in 61.12 and 61.13 there is language that talks
16 about technical parameters to be evaluated and the
17 need for a technical analysis. The term "performance
18 assessment" is not used, but "technical analysis" was
19 used.

20 You are completely correct that any of the
21 existing commercial low level waste facilities today
22 have, in fact, completed a technical analysis that
23 considers all of the radionuclides that are to be
24 disposed of at that site of the operation of that
25 site, the volumes, the Curie content, et cetera.

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1 And in our discussions, we asked
2 ourselves, frankly, maybe isn't that enough. Would it
3 be sufficient just to clarify that?

4 And the first option that I talked about
5 where we would put out an informational type of thing,
6 we actually pondered that. However, as I pointed out
7 in my remarks, clearly, the quantities of depleted
8 uranium that are now going to need to be disposed of
9 were not envisioned in any way, shape or form at the
10 time that 61.12 and 61.13 were created.

11 If you couple that with language that the
12 Commission espoused in one of its orders during the
13 adjudicatory process for LES in which the Commission
14 stated in essence it would expect the agreement states
15 or the Department of Energy to conduct a site specific
16 performance assessment, in the final analysis the
17 staff thought it was important to require a site
18 specific performance assessment for significant
19 quantities of depleted uranium and be explicitly clear
20 that that was the expectation and not rely upon the
21 language that already exists from 61.12 and 61.13,
22 because the conditions are markedly different today
23 than in 1980.

24 MR. KOCHER: So with respect to this 61.41
25 performance objective for the public, you're basically

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1 wanting to have stronger language about reopening your
2 performance assessment to account for this new waste?

3 But what might be really new is a site
4 specific performance assessment with respect to
5 protecting intruders.

6 MR. KOCHER: That's an interesting point.

7 The performance objectives of 61.41 through 44,
8 including protection of the public, cannot change, but
9 the Commission was very clear during the adjudicatory
10 process, and it said the bottom line is the
11 performance objectives have to be met.

12 That would be the driving goal, of course,
13 of the performance assessment, to insure that those
14 performance objectives are met.

15 Now, this question of intruder analysis is
16 an interesting question because when the evaluation
17 took place years ago and the waste classification
18 scheme was created, the intruder analysis was the
19 driver. Five hundred millirem was the dose, but
20 that's not specified in the regulation. Perhaps as we
21 proceed through this rulemaking we may get feedback
22 that leads the staff to believe that in addition to
23 requiring the site specific performance assessment,
24 perhaps more should be done to clarify those
25 performance objectives, particularly on the question

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1 of the intruder analysis.

2 Because it was the driving force behind
3 the classification scheme, but those are great
4 questions. Thank you.

5 MR. CAMERON: Okay, and, Dave Esh, will
6 you be talking a little bit more about this in your
7 presentation?

8 MR. ESH: Yes, I will.

9 MR. CAMERON: Okay. Then we'll get more
10 into that. Thank you, David.

11 Christopher.

12 MR. THOMAS: Yes, thank you.

13 And, David, I really appreciated you
14 comment because my thoughts were along the same lines.

15 Because the performance assessment or the technical
16 analysis that I've seen so far for the Energy
17 Solutions Facility, for example, looks at a time frame
18 of 500 years, and as you know, that can radically
19 change the outcomes of the analysis.

20 For instance, you don't yet have a
21 significant hazard from radon at that time period.
22 The other thing is it does not actually consider an
23 on-site intruder scenario. That was ruled out of the
24 analysis. So I do think that's an area for fruitful
25 discussion.

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1 Along those lines, Larry, I just wanted to
2 go back to something you said, which was, you know,
3 you know -- I just wanted to clarify. There was a
4 suggestion that the agreement states go back and
5 revisit the existing performance analyses now, before
6 acceptance of significant quantities of depleted
7 uranium, and I guess my concern is that we know there
8 are significant quantities of depleted uranium coming
9 to Utah, and yet we know that this new performance
10 analysis that Energy Solutions is going to conduct
11 won't be done, I think, until 2010, and then it will
12 take some time for the state to review. And I think
13 our Executive Secretary said about a year.

14 So I just wanted to clarify. Was that a
15 recommendation on the part of NRC that the existing
16 performance analysis be updated? Why is it not a
17 requirement that those be updated prior to acceptance
18 of significant quantities of depleted uranium?

19 MR. KOCHER: It's a recommendation. We
20 recognize -- first, the Commission has directed the
21 staff to proceed with a rulemaking that would require
22 a site specific performance assessment. A rulemaking
23 takes time. This rulemaking will take about three
24 years.

25 So in three years, assuming this

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1 rulemaking proceeds as we envision at the moment, the
2 Commission would have clearly articulated in its
3 regulations, and it would be an item of compatibility
4 for the agreement states, that such a site specific
5 performance assessment would be done; that the
6 technical parameters identified would be evaluated at
7 all sites; and we would develop guidance.

8 But it takes time. So what we have done
9 is make a recommendation that we talk to the agreement
10 states about this before these public meetings. They
11 were in total agreement that it would be prudent to
12 revisit the existing PAs, especially if you are
13 receiving or expect to receive more depleted uranium,
14 but it's a recommendation.

15 MR. CAMERON: And, Chris, we not only want
16 to hear from Larry on this, but also want to hear from
17 the States of Texas, Washington, and of course Utah on
18 this, and when we get to the so-called "other
19 considerations" part of the agenda tomorrow, we'll
20 have an extensive discussion of this issue.

21 If it keeps coming up during our
22 discussion of other issues, we may just want to jump
23 into it then, but we will have a specific thorough
24 discussion on this particular issue.

25 MR. CAMPER: And, Chip, I would add and,

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1 Chris, I would add one more comment, too. We are
2 considering after we complete these two workshops
3 should we put out more guidance on this question. I
4 mean, we have taken the position that it would be
5 prudent for the obvious reasons. We've communicated
6 with the agreement states. They agree, but we're also
7 asking ourselves should we do more in guidance space
8 soon on that topic. So that's under consideration by
9 the staff as well.

10 MR. CAMERON: So, Larry, can we put that
11 in the parking lot, that particular issue, for
12 discussion tomorrow?

13 MR. CAMPER: Sure, of course.

14 MR. CAMERON: Okay. The need for more NRC
15 guidance sooner than the rule.

16 MR. CAMPER: Sure, of course.

17 MR. CAMERON: MR. KOCHER: Okay. Great.

18 And, Stephen, let me give you this.
19 Stephen Webb.

20 MR. WEBB: I have a couple of issues.
21 One, I think more for the parking lot, but they aren't
22 covered here. At the Maryland meeting they weren't
23 covered there either. A model is only a model. But I
24 guess are there any plans or rules for local model
25 validation and/or long-term monitoring?

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1 MR. CAMPER: Well, with regards to the --
2 well, I think part one of your question I'll sort of
3 defer to Dr. Esh when he goes through his presentation
4 because he'll talk about the methodology that was
5 used.

6 The modeling that we use when we did the
7 staff's analysis, as you know, was talked about at
8 great length. There were some concerns that the model
9 that the staff had used had not been validated. We
10 did talk about the fact that this was done for a
11 particular reason, to assist the Commission reaching a
12 decision. Whatever we do as part of this rulemaking
13 will go through a much more rigorous, classically
14 acceptable type of validation, if you will. It will
15 all be publicly available, and so forth.

16 With regards to monitoring, I mean, if I
17 understand your question, two kinds of monitoring will
18 happen. I mean, the states will monitor the
19 performance of their operators over time, consistent
20 with the performance assessment that's done for that
21 site, and then we have a role in monitoring the
22 agreement states' performance through our agreement
23 state program and our IMPEP process where we go and
24 review the state's activities.

25 So there is monitoring that goes on, if I

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1 understand your question really in two ways. It's the
2 regulator monitoring the operator. The operator is
3 insuring that they're fulfilling the actions they said
4 they would do as part of their performance assessment
5 in terms of placement of waste, configuration of
6 waste, and so forth, and then we monitor the
7 performance of the agreement states through our IMPEP
8 program, if I understand correctly.

9 MR. CAMERON: Chris, did you want to add
10 on that before we go to Steve?

11 MR. MCKENNEY: Yeah. Dave is going to go
12 into the monitoring a little bit in his talk, too, but
13 I just wanted to clarify right now and also add that
14 there is requirements for long-term monitoring of the
15 site after closure. Unfortunately compared to the
16 lifetime DU, it's not long-term compared to that, but
17 relative to civilization and most assumptions you can
18 make about how long you can make somebody do something
19 in a civilization, it's about 100 years.

20 But there is those requirements already in
21 Part 61. So obviously we could revisit that in this
22 discussion to say are there other things that are
23 needed.

24 MR. CAMERON: Okay. Thank you.

25 We'll go to Steve, and, Drew, did you have

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1 something? Well, let's go to Steve and then Drew and
2 then we'll come back to Beatrice.

3 Steve.

4 MR. STEVE NELSON: With respect to site
5 specific analysis performance assessment, site
6 suitability and monitoring, all of these issues are
7 completely different at time scales of a few hundred
8 years compared to ten to the fourth, ten to the fifth
9 or ten to the sixth years, and so I'm wondering what
10 kind of monitoring we can expect at ten to the fifth
11 or ten to the sixth years when activities in depleted
12 uranium are increasing by a factor of ten or 12 or 13
13 or mote.

14 I don't really expect an answer.

15 MR. CAMPER: Good. That's good. I
16 wouldn't begin to proffer one.

17 MR. CAMERON: And I think that point was
18 noted when we got into Dave's presentation and more
19 discussion.

20 MR. CAMPER: Yeah. No, it's a great
21 question, and obviously you're referring to the half-
22 life of this particular radionuclide and how long it
23 will be around and so forth, and that is a very
24 challenging question. No question about it.

25 MR. CAMERON: Okay. Drew.

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1 MR. THATCHER: I think you brought up a
2 good point, Steve. As far as the long term when we're
3 talking about model and model validation, certainly
4 when we go out beyond 10,000 years or whatever number,
5 there's great uncertainty, but I think there could be
6 as far as validation goes some work done in the near
7 term to help insure regardless of geologic scales that
8 we're looking at that let's say your radon emanation
9 or something like that in the model that you actually
10 use is validated on. We perhaps have closed uranium
11 mill tail sites in the U.S. now that we could actually
12 use to help validate whether the actual model works as
13 predicted as far as emanation rates and that kind of
14 stuff.

15 So there are some near term validation, I
16 think, that can be done to help minimize some of the
17 uncertainties over the long term.

18 MR. CAMPER: Well, good point. Thank you.

19 And Dave will talk again a lot about the
20 model we use and this question of validation and so
21 forth because we heard a lot in Maryland.

22 The period of performance discussion that
23 took place during the workshop in Maryland was,
24 indeed, an interesting discussion, and I'm sure it
25 will be here as well. You know, how long do you

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1 evaluate for?

2 I'm not going to steal the thunder of what
3 the panel told us in Maryland, but I will probably ask
4 this panel the very same question as you wind down
5 your discussions on the period of performance because
6 what we learned from the panel of Maryland gave the
7 staff something really meaningful to work with.

8 I mean, we have to go away from here and
9 evaluate all of the comments that are made, develop
10 the technical basis for the rulemaking, and so coming
11 out with something workable that we can articulate and
12 explain to the Commission why we think this particular
13 period of performance or that particular period of
14 performance is a viable approach, is something that's
15 terribly important. So we'll be looking for a lot of
16 feedback from this panel on that point.

17 MR. CAMERON: And, Drew, bring that point
18 up again obviously when we get to the model validation
19 section.

20 And, Beatrice, is that comfortable for
21 you?

22 MS. BRAILSFORD: It's fine.

23 Has the NRC or any of the agreement states
24 that have low level waste sites been approached about
25 reviewing the performance assessment of your

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1 particular disposal facility under this process?

2 I know Energy Solutions has approached
3 Utah about going through this interim process. Has
4 either Waste Control Specialists or American Ecology
5 approached Washington or Texas?

6 MR. CAMERON: And we're going to go into
7 -- let's get a quick answer now, but when we have more
8 discussion of this tomorrow, let's go into it in more
9 detail, but Susan.

10 MS. JABLONSKI: We do not have a new
11 performance assessment to review for the interim in
12 Texas.

13 MR. CAMERON: And Drew?

14 MR. THATCHER: We've talked about it in
15 good detail. I think the prudent thing we've decided
16 is we really need to wait until this kind of works
17 through because we could do a performance assessment
18 that may not meet the criteria that the NRC ends up
19 getting, and you'd end up having to do it twice. So I
20 think from our standpoint we wait.

21 MR. CAMERON: Okay.

22 MR. CAMPER: Beatrice, during the course
23 of developing the Commission paper we did have several
24 conference calls with the states. In fact, we talked
25 about the role of the performance assessment. There

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1 was general agreement about the nature and the
2 importance of performance assessment. There was
3 general agreement that articulating requirements for
4 performance assessment -- you know, articulating the
5 requirements for a performance assessment does two
6 things.

7 One, it identifies the technical
8 parameters that all states would evaluate so that you
9 have a consistent approach.

10 But equally importantly, having an
11 appropriate performance assessment with the technical
12 parameters identified is designed to provide the same
13 level of protection for public health and safety as
14 would a classification for waste. It has the same end
15 objective, and the NRC and agreement states were
16 certainly in agreement upon that as we discussed this
17 topic of performance assessment.

18 MR. CAMERON: Okay. I think we're going
19 to move. Thank you, Larry.

20 MR. CAMPER: Okay.

21 MR. CAMERON: And we're going to move to
22 Andrew Carrera, who is the project manager in our it's
23 no the Rulemaking Division, but the division that
24 takes care of rulemaking and other issues. He's going
25 to talk to you about the rulemaking process, and then

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1 we'll go for questions on that.

2 Andrew Carrera.

3 MR. CARRERA: Thank you, Chip.

4 Good morning. My name is Andrew Carrera,
5 and I'm also a health physicist in the Officer of the
6 Federal and State Materials and Environmental
7 Management Programs, Divisions of Intergovernment
8 Liaison Rulemaking.

9 In looking around the room, I've seen
10 quite a few old, familiar faces that I've seen from
11 the previous workshop, and I will be giving the same
12 presentation as I did at the previous workshop, and
13 some of you have come to me and requested that I give
14 my presentation in either Vietnamese or Dutch. So
15 just to be consistent with the last workshop, I will
16 have to give it in English.

17 MR. CAMERON: Thank you. Thank you,
18 Andrew.

19 MR. CARRERA: Before beginning, I would
20 like to thank you for taking time out of your busy
21 schedule to attend this workshop, and I would also
22 like to thank the Division of Waste Management and
23 Environmental Protection for inviting me to give a
24 brief presentation on the NRC rulemaking process.

25 Rulemaking is a process used by government

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1 agencies, such as the NRC, to develop regulation, and
2 NRC regulations primarily applies to applicants and
3 licensees who are involved in the transportation of
4 nuclear materials or use of nuclear materials in
5 medical, industrial, or academic settings, or
6 operating facilities such as power plants, uranium
7 mills, fuel fabrication, and for today's purpose,
8 waste depository sites.

9 NRC's rulemaking authority stems from the
10 Atomic Energy Act of 1954, as amended, which
11 established the Atomic Energy Commission, which is now
12 the NRC. It also delegated the rulemaking authority
13 to the Commission.

14 However, the Commission is bounded by the
15 Administrative Procedure Act of 1946, which is also
16 known as the APA, and the APA established procedures
17 that regulatory agencies must follow to implement
18 their regulatory programs. Among other things, it
19 sets requirements for publication of proposed rule and
20 final rule in the Federal Register for public review
21 and comments.

22 There are a significant number of people
23 and organizations that are directly and indirectly
24 involved in the rulemaking process. On the screen you
25 will see a variety of stakeholders ranging from

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1 federal to non-federal government organizations,
2 highlighted in blue; the general public and industry
3 highlighted in pink; as well as different offices
4 within the NRC highlighted in green.

5 Roles of the stakeholders may include
6 requesting a rule to be developed, for example,
7 through the petition for rulemaking process, or
8 gathering and assembling information to support the
9 rulemaking or drafting the rule text and supporting
10 documents or providing comments after the rule is
11 drafted.

12 So let's now talk about the rulemaking
13 process. Before the rulemaking process begins, a
14 regulatory basis and sometimes referred to as a
15 technical basis should be developed, and the
16 development of the regulatory basis is not part of the
17 rulemaking process itself. However, it's a very, very
18 important preliminary step prior to the rulemaking
19 process.

20 The regulatory basis contained a
21 justification for the rule and serves as an effective
22 foundation, foundation of effective regulation. And
23 the purpose of today's and tomorrow's session to a
24 major extent is to gather information in support of
25 the development of the regulatory basis.

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1 And once the regulatory basis is
2 completed, a proposed rule is developed and published
3 for public review and comments. After public comments
4 are collected from the proposed rule publication, the
5 comments are analyzed and considered for the final
6 rule, and after the final rule is published, the rule
7 is implement.

8 And I will now discuss the regulatory
9 basis, the proposed rule and the final rule in greater
10 detail.

11 The regulatory basis. For our purpose,
12 the first step is to develop a regulatory basis for
13 the unique waste stream rulemaking. The development
14 of a sound regulatory basis has become very important
15 in supporting and making the NRC rulemaking process
16 more efficient. The regulatory basis provides the
17 foundation of effective regulation, and it is the
18 rationale for the rulemaking action.

19 If you answer the questions of who, when,
20 what, where, and why, you should have at minimum
21 explain why the current rules, regulation or policy is
22 insufficient or needs to be changed. It should
23 provide scientific policy or legal information that
24 supports the decision to undertake the rulemaking.

25 And more importantly, it should also

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1 discuss the stakeholder's point of view to the extent
2 known. And as I stated earlier, a major purpose for
3 today's and tomorrow's workshop is to gather
4 information to support the development of the
5 regulatory basis for the unique waste stream
6 rulemaking.

7 Proposed rule. Once we have a strong
8 regulatory basis and it has been accepted by the
9 Rulemaking Branch, a working group is assembled. The
10 working group consists of NRC staff with technical,
11 legal, and administrative expertise from various
12 organizations throughout the NRC.

13 In addition, if the rule is to be
14 implemented by the agreement states, like the unique
15 waste stream rule is expected to be, the NRC will add
16 agreement state representatives to the working group.

17 The working group uses the regulatory
18 basis to draft the proposed rule text and supporting
19 documents. Supporting documents may include an
20 analysis of environmental impacts from the proposed
21 action, as well as regulatory analysis to evaluate the
22 benefits and cost of the proposed action.

23 The proposed rule package is sent to the
24 Commission for review. In this particular case, the
25 draft rule text will be sent to the agreement states

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1 for their review before it goes to the Commission, and
2 if the Commission approves the proposed rule, it is
3 sent for publication in the Federal Register for
4 comments, and normally the public comment period is 75
5 days.

6 Final rule. After the comment period on
7 the proposed rule ends, the NRC begins the preparation
8 of the final rule package. The final rule is a
9 logical outgrowth of the proposed rule and with
10 considerations to the comments received on the
11 proposed rule. There should not be huge disconnects,
12 revisions, or changes from the proposed rule.

13 Documents supporting the proposed rule are
14 also updated to be consistent with the final rule
15 text. Once the final rule package is drafted, it is
16 sent to mission for review. Agreement state
17 participation is similar to the proposed rule stage,
18 and after the Commission approves the final rule, it
19 is published in the Federal Register.

20 The Federal Register notice includes the
21 final rule text and responses to all substantive
22 comments.

23 The final rule will be implemented on a
24 schedule as posted in the Federal Register notice.

25 How long does it take to finalize a rule?

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1 The complete rulemaking process may take several
2 years. Rulemaking starts with acceptance of a
3 regulatory basis.

4 Excuse me. The regulatory basis itself
5 can take anywhere from months to years to complete
6 depending upon the complexity of the issues and the
7 availability of the information. We are currently
8 scheduled to complete the development of the
9 regulatory basis for the unique waste stream
10 rulemaking by September of 2010.

11 Once the regulatory basis is completed,
12 the proposed rule is to be drafted. It usually takes
13 about one year to complete the proposed rule and
14 submit it to the Commission for the review. However,
15 this time frame varies from rule to rule.

16 For the unique waste stream rulemaking we
17 would hope to submit the proposed rule to the
18 Commission by September of 2011, and once the rule
19 goes to the Commission, it may take anywhere from
20 weeks to months or more for the Commission to take
21 action and approve it to be published in the Federal
22 Register for public comment.

23 And after the public comment period ends,
24 the final rule is to be drafted with consideration to
25 comments received from the proposed rule. It usually

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1 takes about one year to prepare and publish the final
2 rule, but again, it may vary based on the complexity
3 of the comments received.

4 For the unique waste stream rule we would
5 expect to provide the final rule to the Commission for
6 the review by September of 2012, and with the
7 beginning of the implementation phase of the NRC
8 rulemaking process ends, the agreement states
9 typically takes up to three years to finalize the
10 equivalent rules. Therefore, under the current
11 schedule we may see the implementation of the unique
12 waste stream rulemaking rule by the agreement state in
13 late of 2015.

14 As I summarize my presentation about the
15 NRC rulemaking process, with that in mind I thank you
16 for your patience and time, and I would like to answer
17 any question that you may have on the rulemaking
18 process.

19 MR. CAMERON: Thank you, Andrew.

20 Beatrice?

21 MS. BRAILSFORD: It's my understanding
22 that there is a required environmental assessment or,
23 if warranted, an environmental impact statement. Does
24 that come -- is that correct? And if it is correct,
25 does that come in the proposed rule step of this

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1 sequence?

2 MR. CARRERA: Yes. We are following the
3 NRC process. I believe we will be performing an
4 environmental assessment for this rulemaking,
5 simultaneously with the proposed rule, and depending
6 on the outcome of that environmental assessment, we
7 would know whether it's going to go forward, move
8 forward into an environmental impact statement. So it
9 would be simultaneously with the proposed rule
10 development.

11 MR. CAMERON: Is that something Beatrice
12 and others, the environmental assessment, would find
13 in the Federal Register notice for the proposed rule
14 or would there be a separate announcement on the
15 environmental assessment? Would comments be
16 solicited?

17 I think that's the type of information
18 you're looking for.

19 MS. BRAILSFORD: That kind of information
20 and also I understand the sequence of doing an
21 environmental assessment to see if you need an
22 environmental impact statement. I guess I also
23 understand that there are many situations where it is
24 presumed that the federal action is major enough to
25 warrant an EIS.

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1 MR. CARRERA: Yes. For the first item,
2 the Federal Register notice will have a reference to a
3 separately published environmental assessment.

4 On the second item, we understand that
5 there is some federal action, for example, a licensed
6 renewal, for example, that would automatically kick
7 into the environmental impact statement area.

8 However, for this particular rulemaking,
9 we're going to follow process and start with
10 environmental assessment first, and it depends on the
11 outcome to see whether we would want to go into the
12 EIS part.

13 Thank you.

14 MR. CAMERON: Christopher.

15 MR. THOMAS: Just to follow along with
16 that, will that environmental assessment have its own
17 sort of scoping meeting or any, I guess, specific
18 public comment opportunity before that gets underway
19 that's different from this process that we're doing
20 right now?

21 MR. CARRERA: In my passage for
22 environmental assessment will have public comments
23 through the publication of Federal Register. The
24 public will have the chance to comment on it, but I
25 would have to rely on the Division of Environmental

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1 Protection and Waste Management to answer that
2 question.

3 MR. CAMERON: There may be several
4 different ways that the staff can proceed on that, and
5 I don't know if the staff is prepared to give some
6 examples. Pat, let me bring you this. It will be
7 easier.

8 MS. BUBAR: Yeah, good morning. I'm Patty
9 Bubar, and I'm the Deputy in the Division of Waste
10 Management, Environmental Protection, and the staff
11 that are up here today are in that directorate.

12 But our directorate is also responsible
13 for doing any environmental analyses for license
14 applications. We generally don't do the environmental
15 analyses that are associated with rulemaking, as those
16 come out of Andrew and Gary Comfort's organization.

17 But we would not anticipate that we would
18 have scoping associated with the environmental
19 assessment for the rulemaking. As Andrew had said, we
20 would put the environmental assessment out with the
21 draft rulemaking package, and that would be our
22 opportunity to hear comments from the public, but we
23 do not anticipate having scoping associated with the
24 environmental assessment for this rulemaking.

25 MR. CARRERA: Thank you, Patty.

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1 MR. CAMERON: And you have maybe a little
2 bit of confusion on this, and I just want to make sure
3 it's clear. If you mentioned draft rule, you might
4 have meant proposed. I don't know, but I guess will
5 the request for comments on the environmental
6 assessment be all part of that same Federal Register
7 notice asking for comments on the proposed rule or
8 will it be separate, just so people know what to look
9 for?

10 MR. CARRERA: It will be on -- Gary, do
11 you want to? I see you're nodding your head.

12 MR. COMFORT: Hi. I'm Gary Comfort. I'm
13 a Senior Project Manager in the rulemaking group in
14 DILR.

15 Basically, if it's an environmental
16 assessment, it will be published or it will be made
17 available and be noticed as part of the Federal
18 Register that asks for comment on the Federal Register
19 in the rule language and statements of consideration.

20 At that point the directions of how you can get a
21 copy and, you know, provide comments through that same
22 process, it will have the same time scope, et cetera,
23 to be issued.

24 To further clarify, if through this
25 process we can determine earlier than developing an

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1 environmental assessment that it needs to go to an
2 EIS, we would do that. We try to do that as early as
3 possible to not hold up the process, and at that point
4 we'd be holding scoping meetings for that EIS also and
5 stuff, just to make that clear.

6 MR. CAMERON: Okay. So that comments on
7 the environmental assessment will be fair game with
8 the proposed rulemaking, and those comments would be
9 considered and may be influential with the staff in
10 terms of deciding, well, we really need to do an
11 environmental impact statement. Okay.

12 Any other questions on the rulemaking
13 process?

14 (No response.)

15 MR. CAMERON: Okay. Let me just check in
16 with the audience and then we'll take a break. Any
17 questions on the two presentations that you've heard
18 so far? All right, Dirk.

19 MR. DUNNING: With some of the questions
20 -- I'm sorry. I'm Dirk Dunning with the State of
21 Oregon, Department of Energy.

22 We do a lot of work on the Hanford site,
23 all kinds of performance assessments, environmental
24 assessments, environmental impact statements and
25 related, and in particular I'm very involved in the

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1 technical analysis on the Hanford site.

2 One question that wasn't asked, but I
3 think that they implied/intend to ask is if you're
4 going to do an environmental assessment, which either
5 goes to a finding of no significant impact or triggers
6 an environmental impact statement or terminates the
7 action, one of the three, or potentially reaches a
8 categorical exclusion, would you then, given the
9 interest of the folks asking the questions, insure
10 that they are on distribution and notice when that
11 hits the Federal Register?

12 MR. CARRERA: Yes. Gary is shaking his
13 head. So yes.

14 MR. CAMERON: Yeah, a lot of people were
15 shaking their heads affirmatively to that, and we will
16 keep everybody around the table in the loop on
17 whatever is happening on this particular rulemaking in
18 the future, whether we're having a round table or
19 public meetings or whatever.

20 Christopher.

21 MR. THOMAS: Sorry to come back to this.
22 I just wanted to clarify. In terms of the regulatory
23 guidance document, I mean, that's not something I'm
24 familiar with. So is that going to be up for public
25 comment at the same time as the proposed rule or

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1 before the proposed rule?

2 MR. CARRERA: The guidance document is
3 being prepared by the requesting office.

4 MR. CAMERON: There's a long history of
5 different ways that the NRC does this, and I'm going
6 to ask Gary what the -- and it's a policy issue. So
7 it could be done in a lot of different ways, but what
8 do we usually do?

9 MR. COMFORT: Again, I'm Gary Comfort.

10 In general, regulatory analysis or a
11 regulatory basis is I guess the term we're using now,
12 is an interoffice memo basically with discussion of
13 what they think should be done and what needs to be
14 done based on comments, and it's generally not made
15 publicly available.

16 We have had opportunities where we have
17 changed, you know, based on either a lot of public
18 interest or other direction, made them publicly
19 available.

20 Is your question on regulatory guidance or
21 the regulatory basis that's used to develop the
22 proposed rule?

23 MR. THOMAS: I misspoke. It is the
24 regulatory basis because I got from your presentation,
25 Andrew, that that is a very important -- I mean, that

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1 sort of sets the direction of the entire rulemaking,
2 and so it would be helpful from our perspective to be
3 able to see that document and comment on it.

4 MR. COMFORT: That's something that we'll
5 have to look at because our normal policy is not to
6 make those publicly available, but I am aware that we
7 have done some, and I'll have to look at the
8 procedures to see what has to be done and what
9 triggers that to be made publicly available.

10 MR. THOMAS: Okay.

11 MR. CAMERON: And we'll put that in the
12 parking lot, and when we get to the parking lot item
13 of the need for perhaps sooner regulatory guidance on
14 this issue, we can revisit the process issue of how
15 the guidance document is made available for comment,
16 but thank you for asking that question, Kirk.

17 There's coffee outside, but it's not free,
18 but there is coffee outside and it's not too
19 expensive. I don't know what that means, but I guess
20 it's all relative.

21 But anyway, let's come back in 15 minutes.

22 That's around 20 minutes after.

23 Andrew, thank you very much.

24 MR. CARRERA: Thank you, Chip.

25 (Whereupon, the foregoing matter went off the record

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1 at 10:07 a.m. and went back on the record
2 at 10:28 a.m.)

3 MR. CAMERON: Okay. We're going to get
4 rolling.

5 We're going to go into our next
6 presentation on the technical analysis, and Dave Esh
7 is going to do that for us, and it is sort of long.
8 It's comprehensive, and so we're going to break at
9 three different times, including the end, and we'll go
10 for questions on that particular segment and then
11 we'll go on with it.

12 David, I'll just turn it over to you.

13 MR. ESH: All right. Thank you, Chip.

14 I heard today on the TV that 60 is the new
15 35, and since today is my birthday, that makes me
16 about 15, I think.

17 (Laughter.)

18 MR. ESH: Thank you.

19 I'm going to talk about the site specific
20 performance assessment and NRC depleted uranium
21 technical analysis overview. It is a little bit long.
22 We cover a lot of ground. I've talked about this a
23 lot lately. So if I skip over something and it
24 doesn't make sense, feel free to say, "I don't know
25 what you're talking about," or it didn't make sense.

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1 I'll try to go back and clarify.

2 I want to emphasize that this is a
3 workshop today just like we had in Maryland. This is
4 your opportunity to give input on this rulemaking
5 process and associated guidance. So I hear a lot
6 about, well, we need to wait and hear what NRC says or
7 we need to go by what NRC does. This is your
8 opportunity to decide, in part, what NRC says or does.

9 So we really do want all of your input.
10 We want all of the different views, and I don't feel
11 we've prejudged any particular decisions. We want
12 good, sound technical input to make good, sound
13 technical decisions, and that's the bottom line for
14 us.

15 So I'm going to go over performance
16 assessment and low level waste analyses together, and
17 then we'll do a second part on analysis of depleted
18 uranium disposal, and then what we felt were some of
19 the key issues that came out of that.

20 The objectives of our analyses were in two
21 main parts. One, we wanted to see do we need to
22 change our existing regulation, and the answer we came
23 up with was, yes, we need to change it.

24 And David Kocher hit the nail on the head
25 when he talked about it earlier this morning, which

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1 was in our Part 61 that was done in the early '80s,
2 they basically did an intruder analyses to develop
3 waste concentration tables, which are in the
4 regulation. They had to make some assumptions and do
5 some analysis to determine what they thought the waste
6 streams were going to be for the commercial low level
7 waste facilities.

8 They did as good a job as they could at
9 that time, and I'd say they did a very good job.
10 There's a lot of detail in the EIS and the draft EIS
11 about the waste streams they considered, the isotopic
12 profiles, all those sorts of things. It was a very
13 good effort, but obviously, we didn't do so good with
14 anticipating this depleted uranium waste stream, and I
15 would argue part of this workshop is also trying to
16 think about what other waste streams may be out there
17 because I don't want to be here on my near 60th
18 birthday having another workshop deciding, well, what
19 didn't we do so good of a job on 20 years ago when we
20 did this unique waste stream rulemaking.

21 So I would really like people to think
22 about that. I know depleted uranium is the problem of
23 the day, but also I want people to consider what sort
24 of regulatory requirements could you put in place to
25 catch other things that may come up in the future.

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1 That was the first objective of our
2 analyses. The second objective of our analyses was
3 to, in a first order type of way, determine what are
4 the key issues for these unique waste streams in terms
5 of performance that we need to address either in
6 rulemaking or in guidance. So those were the two main
7 objectives for the analysis that we did.

8 So just an overview of performance
9 assessment. For some of you who may not be familiar,
10 performance assessment is a learning process. It
11 involves the collection of data, development of models
12 or development of conceptual models, conversion of
13 those into numerical or computer models, an estimation
14 of the combined effects of different models. It
15 includes consideration of site characteristics, the
16 waste material you're considering, the disposal
17 environment that you're putting it in, the geologic
18 system that that disposal facility is located in.
19 It's a systematic analysis of what could happen at a
20 particular site.

21 And what we try to assess if what can
22 happen, how likely is it, and what can result.

23 How is it conducted? I just covered that,
24 the various steps.

25 Why do we use it? We use it for complex

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1 systems. It's a systematic way to evaluate data
2 that's used internationally. It can provide a lot of
3 insights to decision makers, but performance
4 assessments do not make your decision for you.
5 Decision makers make your decision. They need to
6 factor more than just technical input sometimes.

7 And when you do one of these analyses, you
8 need to understand it does have advantages. It's a
9 way to convert a lot of complex information into an
10 output that sometimes we can't do ourselves thinking
11 them through, but it does have limitations. You need
12 to understand those limitations and the decision
13 makers need to understand those limitations.

14 Why do we require a performance
15 assessment? It provides sign and design data,
16 describes the barriers that isolate waste, evaluate
17 features, events and processes that affect safety,
18 provide technical basis for models and input that
19 account for variability and uncertainty, and evaluate
20 the results from alternative models as needed.

21 We have an expectation and we've
22 highlighted it in more recent guidance that we've
23 developed, such as our NUREG 1854 that applies for
24 incidental waste disposal, but you need to consider
25 alternative models. There's not just one model. I

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1 think Stephen Webb commented on that this morning
2 about validation of models.

3 In a performance assessment, you cannot
4 validate the model in a traditional sense because
5 you're doing a projection over maybe very long time
6 frames, but you do need to develop model support.
7 Model support is very important. It can have a lot of
8 different aspects to it ranging from consideration of
9 analogs, use of a variety of different computational
10 tools, experimental data, but model support is one of
11 the most important aspects of doing a performance
12 assessment.

13 So in terms of like radon specifically,
14 yes, that's a hard problem to model, and I think you
15 need to collect a lot of data, such as maybe Drew
16 Thatcher mentioned; collect data, use that to
17 constrain the calculations or at least understand or
18 provide some basis that you think they're reasonable.

19 So in picture form here, what does a
20 performance assessment look like? They're taking some
21 sort of real system. They're going to represent it
22 with mathematical models of some type, in this case
23 representing a source term and infiltration and
24 release and transport through various pathways.
25 That's a mathematical model, but it is an abstraction

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1 of reality.

2 Of course, you have to make some sort of
3 simplifications to represent the problem. You can't
4 usually have all the detail of a real system. It is
5 an abstraction, but you should understand the
6 implications of those abstractions and how they affect
7 your calculation.

8 And then ultimately you're trying to
9 estimate future performance of some sort of waste
10 disposal facility, and you get pretty charts like
11 that.

12 Low level waste frameworks, switching
13 gears a little bit. In our low level waste analyses,
14 one of the cornerstones of the system is stability,
15 but also isolation of the waste and isolation is
16 considered from a variety of respects. You need to
17 choose a site that's stable. Generally you're looking
18 for a site in a low population area. So you wouldn't
19 want to put a disposal facility in a city. You design
20 your site so that it's compatible with the site that
21 you select, and you need to consider the interaction
22 of the waste with your facility, and the interaction
23 of your facility with your site.

24 Then you also apply site control and
25 monitoring of that disposal facility, and lots of

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1 times we get talking in the abstract, but the reality
2 is for a low level waste facility it's anticipated
3 that it will be under institutional control for at
4 least the next hundred years, and then federal and
5 state land ownership for an indefinite period.

6 There's a lot of perspective about how
7 much reliance you can place on institutional controls.

8 This was covered in the draft EIS and EIS for the
9 development of Part 61, and the consensus that came
10 out of that process, much like the process we're doing
11 now for this workshop and unique waste streams, was to
12 not allow for more than 100 years of institutional
13 control for these sorts of facilities because there's
14 difficulty in insuring the political or process type
15 requirements, the durability of those over long
16 periods of time.

17 And I think that's, in general, pretty
18 much an international perspective, too. We heard from
19 Phil Metcalf of the IAEA out at the Radwaste summit in
20 Las Vegas a few weeks ago, I guess it was, and he
21 advocated that position from an international
22 perspective.

23 But this analyses, the low level waste
24 framework and analyses, it's to evaluate public
25 exposures, both off site, so near the disposal

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1 facility but not on its; workers during operations
2 today and while the facility is operating, and then
3 also the potential for inadvertent intrusion.
4 Somebody uses that facility in an unanticipated way in
5 the future.

6 The disposal site, one of the requirements
7 is that the disposal site shall be capable of being
8 characterized, modeled, analyzed, and monitored. Now,
9 that may be more clear whenever you have short-lived
10 waste and you're talking about hundreds of years' time
11 frames.

12 When you have long-lived waste and
13 especially high concentrations of it, this becomes a
14 much more challenging requirement, and I think we
15 heard about that this morning, and I don't disagree
16 with it. The problem becomes harder when your waste
17 is longer lived and you have a lot of it.

18 So in the EIS developmental analyses, the
19 commercial low level waste stream was what was
20 envisioned in the early 1980s. They looked at four
21 referenced disposal site environments ranging from
22 arid to humid, and they looked at the impacts to the
23 public basically doing environmental pathway analyses
24 from all sorts of pathways, water pathways, air
25 pathways, et cetera.

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1 As part of that EIS developmental
2 analyses, they developed a waste classification
3 system, and that was developed by doing intruder and
4 various scenario analyses and basically doing an
5 inverse calculation.

6 So they did the analyses. They set a dose
7 limit that they were trying to achieve, and then they
8 did a backwards calculation to determine what
9 concentrations would give me those impacts. And
10 that's what you see in the table values that are in
11 the regulations right now.

12 So where we are now, if we have a waste
13 stream that's a lot different or could be a lot
14 different than what was analyzed. Then you have to
15 say, well, I don't have table values for that. So
16 what do I need to do about it?

17 And our opinion is we need to change the
18 regulations and insure you could either develop new
19 table values or you could insure that they do the
20 analysis, but somebody has to do the analysis. You
21 can't have an unanalyzed situation basically.

22 The waste classification concentrations
23 were based primarily on the inadvertent intruder
24 exposure scenario, but not totally, but primarily on
25 that. So what does it look like as we dig into that

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1 old analyses?

2 Well, they had a disposal area that was
3 broken into trenches, and then they looked at a
4 variety of potential exposure points ranging from an
5 individual well right next to the facility, a boundary
6 well, then a larger, maybe population well downstream,
7 and then a surface water body. So they had to
8 represent the release of the radioactivity from the
9 facility and then impacts at different points to
10 potential receptors. So those considered potential
11 access locations for people.

12 But if we take that a step further and dig
13 down, then you had to convert that representation of
14 release and transport into the system into a
15 mathematical model, and this just gives you an idea of
16 the type of mathematical model they used in the 1980s.

17 They took a planer source term and did 1D advection
18 dispersion to a water table, and then transport from
19 the water table to the receptor points using a
20 streamline approach and velocities and dispersion
21 coefficients, those sorts of things, and it's a pretty
22 common approach that was done, especially in the
23 1980s.

24 Now we have maybe some more sophisticated
25 tools, that people can do three dimensional modeling

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1 and all of those sorts of things. Unless you have a
2 lot of data to constrain that analyses though, I don't
3 know sometimes whether that dimensionality and extra
4 complexity is warranted. You're basically limited by
5 what you know, and if you don't know a lot, then you
6 can do all of the fancy modeling in the world, but it
7 isn't really proving anything.

8 So you really are constrained by the data
9 you have, and if you need to justify a hard problem,
10 then that probably says you need some more data to
11 justify it.

12 So one aspect of this analyses though that
13 was clear to us and that I want to convey to you today
14 is the need to consider the site specific
15 characteristics. So what I have here on this slide on
16 the left-hand side is the retardation coefficients
17 that were used in the DEIS/EIS analyses for different
18 regional sites, northeast, southeast, midwest and
19 southwest.

20 And I pulled out some numbers here to
21 convey a point to you. This shows that, say, for
22 strontium there was about a factor of four difference
23 between the most absorptive sites and the least
24 sorptive sites, and the reason why distribution
25 coefficients or retardation coefficients are

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1 important, especially for something like Strontium 90,
2 that's a rough measure of how long the geologic system
3 or how much delay the geologic system can provide to
4 that radionuclide before it reaches an exposure point.

5 So in the case of strontium, distribution coefficient
6 of, say, 73 might be enough that it all decays during
7 transport before it gets to a receptor point, where
8 when you get to the low end of the spectrum, maybe you
9 can get strontium release out of you facility.

10 So what I did was I took a commonly used
11 reference today, the Sheppard and Thibault references
12 that provides a compendium of distribution
13 coefficients by soil type. Basically they looked at a
14 lot of data and they looked at a lot of data
15 throughout the country. They divided it by soil type.

16 It's a gross simplification of the geochemical
17 processes.

18 I know Peter Burns is just rubbing his
19 head thinking, "Oh, my goodness," here, but it is what
20 is typically done in a lot of performance assessments,
21 is they do somewhat crude approximations of some of
22 these processes and behaviors.

23 The retardation factor is a function of
24 the porosity, the bulk density, and the distribution
25 coefficient that's measured. The distribution

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1 coefficient is the ratio of what you find attached to
2 soil particles compared to the liquid phase in the
3 system, but the bottom line in this compendium, this
4 more recent data and with a lot more data points, they
5 find that, say, strontium, if I convert the data in
6 this reference to a common value to compare to the
7 chart on the left, the minimum value from that
8 reference would be about one. The maximum would be
9 about 1400. The geometric mean would be about 90.
10 You can see that this range is a lot more broad than,
11 say what was considered in that EIS analyses, and then
12 it varies differently depending on the specific
13 radionuclide. So uranium, a minimum of two, maximum
14 of 21,000.

15 Well, in many disposal facilities if you
16 have two for uranium, you're going to see the impacts
17 from uranium and not an inordinate amount of time in
18 the future, whereas at 21,000, that uranium might stay
19 in the system for a very, very long period of time.

20 So there's a big difference in these
21 performance assessment calculations based on site
22 specific information, and what was done in the draft
23 EIS and the EIS in the early 1980s, the waste
24 concentration values and the tables were based on the
25 humid southeastern site. So maybe it's not fair for

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1 the data that's being used in generation of those
2 table values, probably mostly in a conservative
3 direction, but it wouldn't be unexpected that maybe
4 you could have something in the nonconservative
5 direction or the pessimistic direction, but mainly in
6 the conservative direction that you're applying limits
7 for a humid southeastern site and say my facility is
8 in New Mexico. Well, maybe that type of approach is
9 not reasonable at all.

10 So the site specific behavior, this is
11 just an example from distribution coefficients, but it
12 applies to especially many of the other things that
13 influence the depleted uranium risk like the moisture
14 content in the system, which affects the radon
15 transport.

16 The site specific characteristics are very
17 important. So I think that's the end of Part 1, and
18 we can get some questions, and then we'll go on for
19 Part 2.

20 MR. CAMERON: Questions?

21 And we are going to be going over this
22 ground, again individual topics. So if you don't have
23 a question now, but it comes later, we'll be able to
24 deal with that, but, Chris, did you have anything now?

25 MR. THOMAS: I'm okay for now. I'll talk

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1 to it later.

2 MR. CAMERON: Okay.

3 MR. ESH: We're going to have pretty much
4 an hour on the lot of the individual things here, not
5 necessarily performance assessment in general, but the
6 specific technical things we'll have an hour round
7 table discussion on. So you should have ample
8 opportunity to talk about them then.

9 MR. CAMERON: David has.

10 MR. ESH: Oh, I'm sorry. David.

11 MR. KOCHER: Just a quick comment. As I
12 mentioned, when I introduce myself I worked on
13 performance assessments at a number of sites, and one
14 of the things that comes out of a PA in general, when
15 you look at the protection of off-site members of the
16 public versus protection of inadvertent intruders,
17 depending on how you choose your criteria and the
18 properties of the site and all of that, but generally
19 speaking, for most radionuclides it's the intruder
20 protection that is the limiting consideration in terms
21 of what the allowable concentrations are. It's only
22 for a few radionuclides that the release and transport
23 off site turns out to be the controlling factor, and
24 that's something to bear in mind here as we go
25 forward.

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1 MR. ESH: Yeah, sure. Thank you.

2 MR. CAMERON: Thank you, David.

3 Dave, if you want to continue with Part 2.

4 MR. ESH: Sure, okay. Now I'll step into
5 the depleted uranium and NRC analyses that we did for
6 the SECY. As I said when I first started speaking, we
7 had two objectives for that. One, do we need a change
8 the rule at all or not?

9 Two, if we do change the rule, what are
10 the types of things we need to cover?

11 And hopefully you'll see that from what I
12 go through here.

13 So I'm going to go over the problem
14 context, a little bit of background about uranium and
15 radon, uranium geochemistry, scenarios and receptors,
16 and period of performance.

17 The analysis we did was with the small
18 team, myself, Chris Grossman, Karen Pinkston. We had
19 direction from our Low Level Waste Branch. Basically
20 they got to this point where they were looking at this
21 direction from the Commission and do we need a change
22 to the rule or not, and they said, "Well, we really
23 need to understand the problem better. Can you do an
24 analysis for us to help us understand the problem to
25 make these decisions about what we might need to

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1 change and how?"

2 So the nuclear fuel cycle, where did
3 depleted uranium come from? It comes from the
4 enrichment process. We have a representative here
5 representing the enrichment industry. It comes from
6 the enrichment process. It's a byproduct. NRC
7 doesn't take a position of whether it's waste or not.

8 We're only here to say if people want to dispose of
9 it as waste, then what do you need to do to do that
10 safely?

11 So the decision about whether it's waste
12 or not is in other areas of agencies of the
13 government.

14 And some context for why we're here, and
15 Larry already covered this in his presentation.
16 Basically the large quantities were not evaluated in
17 EIS. They did something like 17 Curies of Uranium-238
18 and three Curies of Uranium 235, and something like a
19 million cubic meters of waste in the analyses, and if
20 you look at the potential waste streams that may be
21 anticipated, you could be looking at something like
22 470,000 Curies of Uranium-238. So you're really
23 outside of the box from what was done, and we
24 recognize that, and that's why we're here today.

25 And uranium in the environment, uranium in

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1 surface soils is about one to five parts per million,
2 more or less. There are lots of things that can
3 modify that number. If you used phosphate
4 fertilizers, for instance, in farming that can
5 increase the uranium concentrations, the 15 to 30
6 parts per million or so.

7 But these concentrations in surface soils
8 of one to five parts per million result in about a
9 mean atmospheric rate on concentration of a half or a
10 quarter of a picocurie per liter or so outside.
11 Inside they're higher because the air exchange rate is
12 lower. You have less mixing of air not containing
13 radon with air containing radon. So you get higher
14 concentrations, roughly a factor of ten or so from
15 indoor to outdoor.

16 And radon contributes roughly 70 percent
17 of the average annual dose in the United States, maybe
18 250 millirem or so, but it can vary quite a bit, and
19 it's driven partly by how much uranium you have in the
20 environment and the environmental conditions where
21 that uranium is present.

22 So the red areas are areas of higher
23 uranium concentrations, with the blue areas being
24 areas of lower uranium concentrations.

25 Maybe this is a neat leaching picture here

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1 though. Look at that, blue on the coasts and red in
2 the center. I didn't notice that before.

3 (Laughter.)

4 MR. ESH: So what does depleted uranium
5 look like compared to normal commercial low level
6 waste? Well, I put some things up here that people
7 may be familiar with just to give some context. U.S.
8 uranium mill tailings contain much, much less usually
9 than one weight percent uranium oxide, and they have
10 daughters, radium, thorium, other daughters, too. I
11 just listed a couple here, and concentrations for,
12 say, Radium-226 ranging from 26 to 400 picocuries per
13 gram and Thorium-230, 70 to 600 picocuries per gram.

14 So the natural uranium or the byproduct of
15 the milling process, the daughter products are
16 associated with those byproducts of the uranium mining
17 and milling process.

18 And depleted uranium, by comparison, it
19 has a much higher concentration of uranium. So we
20 call it depleted uranium because it's depleted in the
21 U-235 isotope, but chemically it's really concentrated
22 uranium because you've made pure uranium out of the
23 process of trying to develop fuel for reactors. And
24 the depleted uranium is a little bit different from,
25 say, the uranium mill tailing because initially it

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1 doesn't have the daughters in it. It's pretty much
2 pure uranium. It does have some impurities or other
3 things in it, but they're at pretty low levels.

4 By about year 1000 though the radium in-
5 growth gets to a value similar to maybe U.S. uranium
6 mill tailings, and then at very long times you could
7 have a significantly higher concentration.

8 This is just a theoretical calculation
9 assuming no loss from the system, of course. So just
10 build up decay and in-growth, a health physicist type
11 of calculation, not a geochemical evolution type of
12 calculation that you could have loss from the system,
13 too.

14 But you end up with a behavior that's
15 something like this, where you start off with much
16 less in the mill tailings. You end up with probably
17 quite a bit more.

18 Now, I did say U.S. uranium mill tailings
19 because there is uranium in other countries that the
20 ore is much higher concentrations, and their mill
21 tailings may even be much closer to this depleted
22 uranium types of concentrations that you end up with
23 today, not in a million years, but it has been there
24 underground at a high concentration for millions of
25 years. The daughter products are in very high

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1 concentrations in that material, too. I think Canada
2 has some uranium mines that would fit that
3 description.

4 On the right here I have the activity
5 ratio of depleted uranium to a typical commercial low
6 level waste stream, and what you see is that initially
7 the depleted uranium -- and I hate these gross
8 comparisons, but I did it anyway because I figured it
9 was a way to communicate about the source.

10 Initially the depleted uranium has much
11 less activity than a typical commercial low level
12 waste stream because a commercial low level waste
13 stream has a lot of short-lived, high activity
14 components potentially.

15 Over time the activity of the low level
16 waste decreases rapidly, although it does have a long
17 lived component to it now. It's not unique that
18 depleted uranium is long lived and low level waste is
19 not. Low level waste can have long lived isotopes in
20 it. It's just generally they aren't at very high
21 concentrations.

22 So the low level waste drops off pretty
23 rapidly. The depleted uranium is flat for a very long
24 period of time essentially, and then it starts
25 increasing. So you get this behavior where initially

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1 the activity ration is low, and then eventually it can
2 be somewhat higher, a factor of ten to 20 or so.

3 So in our analyses what did we do? We did
4 a screening model. We had all of the basic
5 fundamental physical processes associated with source
6 term release and transport through water pathways and
7 air pathways. We developed it to examine these key
8 variables. What did we want to talk about in these
9 workshops and/or address in the regulation or guidance
10 that we develop?

11 Some of the key variables that came out of
12 that were the period of performance associated with
13 the characteristics of this material; the disposal
14 depth, and that's the driver for both radon and long
15 term stability; receptor types and scenarios, so there
16 were receptor types and scenarios that were done in
17 the 1980s for low level waste analyses, but we
18 received lots of comments from people over time about
19 the appropriateness of those scenarios in both
20 directions.

21 And then as I talked about on the one
22 slide in the earlier Part 1, the site characteristics
23 are very important for this type of material, maybe
24 more so than some other radionuclides.

25 We performed a probabilistic assessment of

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1 the problem to look at the effects of uncertainty and
2 variability, and the analysis methodology overall that
3 we used for unique waste streams was consistent with
4 the original Part 1 or Part 61 analyses, and we did
5 that because we wanted somewhat of an apples to apples
6 comparison.

7 So if we take this receptor type scenarios
8 and analysis methodology and convert it into a
9 picture, we have something like this, receptor
10 scenarios where, one, we had a resident potentially
11 living next to the disposal facility. They could use
12 water. They could have a garden. The model was set
13 up so that it could be a resident farmer or a
14 resident, either one. It could also be a recreational
15 receptor, but in general most of our results that I'll
16 show you was for a resident type receptor.

17 They had a house with a basement. The
18 primary difference between the resident and the
19 chronic intruder, the chronic intruder could
20 potentially build a house on the facility and have a
21 garden and they had a well that they could use
22 contaminated water. They could potentially get radon
23 in their house from diffusion from the depleted
24 uranium source into the basement of their house,
25 whereas the resident living next to the facility gets

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1 radon from the atmosphere, either outside or in their
2 house.

3 And you could have leaching of the uranium
4 and the source term through an unsaturated zone to the
5 water table, transport through an aquifer and then
6 potentially uptake in a well and use to water a garden
7 for domestic consumption and other purposes.

8 But we have to convert then this receptor
9 scenarios and problem into a mathematical model. We
10 use the software package GoldSim, which is a generic
11 simulation package that's used for a lot of different
12 problems. There are a lot of organizations that use
13 it for rad waste problems, and it was a good tool for
14 us for this type of problem and this type of analyses
15 where we weren't interested in very refined I'd say
16 dimensional effects. Like we weren't analyzing a
17 particular site, and so we didn't have distributions
18 of different geologic materials and their
19 heterogeneity and all of those sorts of things. We
20 used generally homogeneous properties in the analyses
21 to assess on a first order what are the drivers of the
22 impacts of this type of problem.

23 So if we take then this conceptual
24 representation of a mathematical model into an actual
25 calculation, this is a screen snapshot of one of the

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1 panes in the calculation that we did. We have
2 different packages which contain basically submodels
3 or subprocesses of the calculation.

4 You have a tree view here on the side and
5 then this plan view here, which you can use to
6 navigate throughout the model, but the software
7 package itself, like if you've got a license for
8 GoldSim, which is a commercial product, you open this
9 up and it's a blank page. So it's just like if you
10 bought Excel and you need to make a spreadsheet. You
11 have to build the spreadsheet. In this case you have
12 to build the model. It's a pretty good tool for this
13 type of analyses, or it was for us.

14 So the major variables I talked about, we
15 did do uncertainty analysis with genetic algorithms,
16 which we find work well for these types of data sets
17 where you have a lot of potential drivers of
18 uncertainty and variability in the results, and many
19 standard techniques can have trouble trying to
20 elucidate what are the drivers in the output. We find
21 this technique works well for these types of problems.

22 The key parameters that we identified were
23 hydraulic conductivity and gradient of the aquifer
24 infiltration rate, your chemical conditions, liquid
25 saturation. These all affect water pathway type

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1 releases.

2 And then for radon, they were liquid
3 saturation and properties of the house and the
4 scenario. So like their exchange rate of the house
5 and time spent in the basement and those sorts of
6 things, but there were two sets of drivers for the
7 output, things related to water pathway, things
8 related to radon.

9 Now, this is a table, spent a little bit
10 of time on. It's percent of realization so from this
11 analyses that met the regulatory limit. So the right-
12 most column here we have our chronic intruder, which
13 was all pathways, and it's basically the frequency of
14 the amount of time that you could meet the regulatory
15 limit for this probabilistic analyses.

16 We were representing, say, moisture state
17 of the system, arid or humid or even disposal depth or
18 grout. We had to fix some of those things in the
19 analyses to understand how they impacted the results.

20 The reality is we know these things may
21 vary. Okay? But the approach used is we took real
22 variability and represented it as epistemic
23 uncertainty or as uncertainty. So what that means is
24 when you run an analyses that way, you'll get a range
25 of results which show you if you had a site that was,

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1 say, very dry, we have a liquid saturation for arid
2 conditions that range from .2 to .6. So if you have a
3 very dry site and it's persistently dry, that will
4 give you one result of an output distribution here.

5 Most likely, you have a challenge meeting
6 the inhalation dose criteria, but you had the other
7 end of the distribution, say, a .6 value, or a site
8 with like a .6 liquid saturation may be able to meet
9 the inhalation component of an all pathways does, but
10 it's important to understand what we did and why we
11 did it.

12 We represented variability as uncertainty
13 to understand how that variability on a site basis all
14 over the country if you had a disposal facility in
15 different environments would translate into a risk
16 impact, and it wasn't correct to take those results
17 and say convert the overall output into a mean result
18 for a different state of this table because it doesn't
19 make any sense. The mean result would tell you on
20 average what happens in the country, but that's not
21 really meaningful for trying to decide at a particular
22 site driven by particular conditions whether it could
23 meet the criteria or not.

24 So we had a chronic intruder and we had
25 the resident receptors, and it's broken down into the

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1 all pathways, drinking water, and inhalation to show
2 you differently which pathways are driving. We broke
3 it down into different periods of performance
4 potentially and then some various scenarios, and those
5 scenarios were determined by moisture state, disposal
6 depth, and in at least one case shown on this table
7 here we looked at a different waste form.

8 And what you see is that for shallow
9 burial, if you do an intruder analyses, you have
10 trouble at any time meeting a 500 millirem dose
11 criteria, and that's because you have a lot of
12 uranium, and just inhalation of uranium can cause you
13 dose issues. So if you do an intruder analyses, you
14 have trouble meeting the performance objectives if you
15 put a highly concentrated source in a very shallow
16 disposal environment.

17 Now, in our low level waste regulations,
18 near surface disposal is in the top 30 meters. So you
19 have 30 meters to work with, and I would argue that
20 there's a lot of difference between one meter and 30
21 meters. Maybe when you get to a million years, you
22 know, our expert geologist here would say that there's
23 no difference between one meter and 30 meters, but
24 certainly at shorter time frames I'd say there's a big
25 difference between one meter and 30 meters.

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1 We looked at some different disposal
2 depths. The inhalation component at shallow depths
3 can be a challenge for the resident, and also the
4 ground water is roughly about half the time depending
5 on the geochemical conditions, infiltration rate, all
6 of those sorts of things, that it could meet the
7 performance objectives.

8 As you increase the depth at an arid site,
9 then you increase the likelihood that you could meet
10 your inhalation performance objectives, but you don't
11 do a lot to affect your drinking water pathways, and
12 the chronic intruder also because it was being driven
13 primarily by inhalation pathways here. You increase
14 the likelihood that you could meet the performance
15 objectives from the inhalation risk.

16 At a humid site, at short times uranium
17 takes some time even at a humid site to get from Point
18 A to Point B. You can meet the performance objectives
19 with a fair amount of the time, but as you go out to
20 longer times, it becomes much more of a challenge to
21 meet the performance objectives at a humid site
22 because you just get too much uranium leaching.

23 And that same effect then applies to the
24 chronic intruder. This is the effect of the water
25 pathway to humid site on a chronic intruder.

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1 We did look at some things you may do to
2 try to change this problem, whether it's somebody
3 might consider, such as grouting the material. Grout
4 could have a couple effects. Grout may reduce the
5 water that impacts and that interacts with the source
6 term. It may modify the geochemistry in favorable or
7 unfavorable directions, and it could decrease the
8 emanation rate, say, for radon.

9 We talk about this depleted uranium
10 disposal of these large quantities, and I would say
11 that technically there's a difference between whether
12 depleted uranium is in a powder form or whether it's
13 in a large ingot, such as maybe Greg Komp deals with
14 in a lot of his activities with the U.S. military.

15 Those are different from a risk
16 perspective. In this analyses, we were looking at the
17 potential for large quantities of material that was in
18 pretty much a powder type form that has a large
19 specific surface area, and that changes the results a
20 lot.

21 So chronic intruders, shallow depths, the
22 radon can challenge the performance objectives for
23 humid site. Groundwater can challenge it for both the
24 chronic intruder or the resident, and then even at an
25 arid site though you need to know about your

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1 geochemical conditions and your infiltration rate and
2 your aquifer and all of those sorts of things. That
3 will determine whether you could meet performance
4 objectives from the water pathway.

5 And these are not doses. These are
6 percents of realizations that met dose limits, which
7 in this case were 500 millirem and 25 millirem TEDE
8 that we applied for this analyses.

9 So the conclusions, if radon is included,
10 the shallow disposal at an arid site can be
11 challenging. Also if you dispose of it very
12 shallowly, you'd have trouble with intruder
13 performance objectives. For humid sites, these
14 groundwater pathways can exceed the performance
15 objectives, but we understand the problems are a lot
16 more complicated than what we did in the analyses. So
17 it's a generalization. These are generalizations, but
18 that doesn't mean that a specific site with knowledge
19 about that site might be able to show something
20 different from these generalizations. So they
21 shouldn't be taken out of context.

22 For this type of material, there is a very
23 strong need for greater consideration of long-term
24 stability. If you have long-lived waste and you're
25 trying to isolate it from the environment, at least it

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1 should be a consideration in your disposal action, how
2 you're going to insure the stability of that material
3 over longer periods.

4 Site specific conditions can result in
5 large variance of the impacts. So I think that's our
6 summary of our analyses that we can take questions on,
7 and then in this Part 3 we have a few slides on each
8 of the issues that we're going to cover throughout the
9 workshop for the next two days and talk about in
10 detail for an hour or so.

11 MR. CAMERON: Good. Thank you. Thank
12 you, Dave.

13 We'll start with Steve, and let me bring
14 you this microphone.

15 MR. THOMAS: I'll just talk freestyle.

16 MR. CAMERON: Well, you need to use the
17 mic because it can't get on the transcript even if you
18 yell and scream. Please, don't do that.

19 MR. THOMAS: I'll try to contain myself
20 them.

21 Two quick questions. Well, the second one
22 will be rhetorical. Did you consider any disruptive
23 events in your analysis?

24 MR. ESH: Yes, we did not consider, say,
25 natural system disruptive events. The intruder

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1 analysis is essentially a human disruptive event, but
2 we didn't consider natural system disruptive events.

3 MR. THOMAS: And my second rhetorical
4 question, I'm not necessarily asking for an answer,
5 but if you want to give me, that's great. I wonder if
6 you or anyone in this room believes that a landfill
7 constructed above grade is going to be anything
8 resembling intact after a million years.

9 MR. ESH: It's a good rhetorical question.
10 I do not have an answer for it.

11 (Laughter.)

12 MR. CAMERON: Okay. If anybody is brave
13 enough to take that on over the next two days, we'll
14 remember that question.

15 Chris.

16 MR. THOMAS: Thank you.

17 I guess I wanted to clarify some things.
18 You know, last night at the presentation, and I
19 believe it's in the DU paper as well, the statement
20 that it can be disposed of, DU can be disposed of and
21 meet the performance objectives at an arid site.

22 Now, I guess I would quibble a little bit
23 with that statement. To me it may be; it may be
24 depending upon the other site specific parameters.
25 Would you agree with that assessment?

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1 MR. ESH: Yeah, I would agree with that.
2 It's not a guarantee that you can. You have to
3 basically do the site specific analysis and determine
4 whether it can at a particular site. I think if our
5 conclusions were interpreted that because you have an
6 arid site, therefore you can do it, that's not
7 correct.

8 MR. THOMAS: And I will put down for the
9 record I do believe that that was how that statement
10 has been interpreted by many parties. For instance, I
11 mean, it was interesting to me that Energy Solutions
12 in a prior date said, look, we're going to take the
13 results of the NRC analysis. We're going to try to do
14 the best we can with that, and we're going to say
15 we'll guarantee that we'll dispose of our depleted
16 uranium at three meters' depth.

17 And because the NRC said that can meet the
18 performance objectives, that's great. Well, I look at
19 this table that you showed and I'm looking at three
20 meters disposal depth in an arid site. I'm looking at
21 1,000 years for the chronic intruder, and I see the
22 number two. Well, so just to locate it, it's in that.

23 Does everybody see that?

24 MR. CAMERON: Yeah, yeah. It's right
25 here.

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1 MR. STEVE NELSON: Yeah. So it's at the
2 three meter disposal depth, 1,000. So I see two, and
3 I interpret that to mean two percent of the site
4 variability model met the performance standard, and
5 I'm going that seems to be a very small number upon
6 which to make a statement that it can be safe.

7 MR. ESH: The three meters in particular?

8 MR. STEVE NELSON: Yes.

9 MR. ESH: I guess I'm confused with the
10 three meter reference that you're coming back from.

11 MR. STEVE NELSON: So arid three meters --

12 MR. ESH: No, I understand this one, but
13 I'm talking about in the context of yesterday.

14 MR. STEVE NELSON: Oh, no. I'm talking
15 about Energy Solutions, and they can certainly speak
16 if they think I'm misrepresenting, but --

17 (Laughter.)

18 MR. STEVE NELSON: -- that was very loud
19 and emphatic.

20 At one point they said, well, we'll
21 guarantee, and I think it actually went into the
22 license recently that they would guarantee to dispose
23 of at least three meter disposal depth.

24 MR. ESH: Yeah.

25 MR. STEVE NELSON: And so I'm saying,

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1 okay, but based upon your analysis which didn't even
2 look specifically at their site, only two percent of
3 the sites modeled met the performance objective at
4 this shortest time period looked at; is that correct?

5 MR. ESH: Yeah, I understand what you're
6 saying, and for this chronic intruder three meter
7 depth, if the house has a basement, then the basement
8 is essentially right up against the waste. So you get
9 radon flux rates that are very high in that situation,
10 and that would be a challenge to meet the performance
11 objectives.

12 So if you do an analysis where you, number
13 one, assume that an intruder uses the site; number
14 two, that they have a house with a basement; then you
15 get results like this, yeah, and so you're not
16 misinterpreting it.

17 MR. STEVE NELSON: Okay, great. I
18 appreciate that.

19 And then I guess the next question is is
20 it reasonable to assume that when you say three meter
21 disposal depth, that that will persist up to a million
22 years or was that pretty much a contrivance?

23 MR. ESH: It was a contrivance. What I
24 think, I don't know if we said it in our SECY -- I
25 work on a lot of projects. So I don't know if we said

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1 it in the SECY paper or maybe I'm thinking of our
2 NUREG 1854, but whenever we have talked about this
3 intruder scenario more recently, we've basically said
4 if you need to have some sort of depth that protects
5 your material and you need to protect it for a certain
6 period of time, then you need to assess the ability to
7 maintain that thickness over that time you need it to
8 persist for.

9 So in this analyses and in our low level
10 waste regulations, we have requirements for stability.

11 They have to consider surface geologic processes,
12 mass wasting, erosion, all of those sorts of things.
13 So I guess we could say that there's a built in
14 assumption that somebody is going to need to meet
15 those regulatory requirements because if you can't
16 meet those regulatory requirements, then you wouldn't
17 be able to site and license that facility.

18 So that assumption is inherently built
19 into this analyses and therefore what you termed the
20 contrivance about the depth, yeah.

21 MR. THOMAS: So in terms of that
22 stability, I mean, even with that, is it reasonable to
23 even assume that a sight that's engineered could have
24 sites to stability over the types of time frames that
25 we're looking -- I mean, without active maintenance of

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1 the site.

2 MR. ESH: Yeah, I think that it's a
3 definite challenge to say the least. Now, we have
4 considered the ability of man to work on these sorts
5 of problems and try to come up with solutions to them.

6 We do have experience in uranium mill tailing program
7 where they design these large erosion covers. They're
8 designed for a goal of 1,000 years, but if you have
9 the opportunity to see them, they look impressive.
10 You know, in terms of whether they have this
11 robustness for the longevity that they're trying to
12 achieve, I think that's a more difficult question to
13 answer.

14 And in our decommissioning guidance where
15 we developed some guidance for use of engineer
16 barriers and decommissioning, we considered examples,
17 natural analogs like the Indian burial mounds that are
18 found even in humid locations which have had
19 durability and persistence for thousands of years, and
20 those were engineered by people that maybe you could
21 argue were much smarter than us, but they were
22 engineered a long time ago, and they've had some
23 persistence to them.

24 But it is a challenging problem. I do
25 think you have to consider what experience we have,

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1 and we do need to consider natural analog. So not too
2 long ago I read a report. I think it was about the
3 Paran Plains in Israel, that they estimated an erosion
4 rate of .3 meters per year for a million years, and
5 that environment though has unique characteristics
6 that help determine long-term stability, and those are
7 hyper aridity or aridity, lack of extreme seismic
8 events which change your land surface, little relief
9 so that you don't want a lot of relief, and then
10 materials which by their very nature form these desert
11 pavements, which is nature's way of preventing soil
12 loss.

13 So it's a very good comment. It's a very
14 good input to our rulemaking process, and we're going
15 to have to address this long-term stability.

16 MR. CAMERON: And, Dave, we're going to
17 have a chance to discuss these particular types of
18 issues when we get to some of the specific agenda
19 items.

20 MR. ESH: Yeah, I think so, yeah.

21 MR. CAMERON: And I just would make a note
22 that it may be useful to refer to particular sites,
23 situations as examples to illustrate a generic point
24 here, but I don't think that we want to have a debate
25 about a particular site or what happened.

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1 MR. THOMAS: I agree with that.

2 MR. CAMERON: Okay. Thank you, Chris.

3 In that respect though, I do want to give
4 Tom or Dan, if you want to say anything about the
5 point that Chris raised, let's do it, and then we'll
6 move on.

7 MR. MAGETTE: Just very briefly, the
8 reason I think it's a misrepresentation is because we
9 didn't rely on that chronic intruder scenario, making
10 that conclusion, and there is a point on the agenda to
11 get to that, Chip. I'll be glad to talk about it more
12 there if we think it's appropriate, but that's the
13 notion of scenario selection and being part of the
14 guidance. We had a lot of discussion about that in
15 Maryland, but there is a reliance on some of the
16 conclusions that David reached in his study, and so I
17 think the reliance on the chronic intruder at the
18 Clive site is not an appropriate scenario, and we
19 didn't use that in reaching the conclusion.

20 So I just want to clarify that. To the
21 extent we want to go into this and the fact that we
22 think our site specific characteristics are even more
23 conservative than the ones David used, we can do that,
24 but here, again, I don't think this is the time or
25 place.

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1 MR. CAMERON: Okay, and if that discussion
2 when we get to that point is a good illustration of
3 the generic issues, then let's do that.

4 Let's go to Beatrice and then David, and
5 then we'll go over to Drew and back to Marty.

6 Beatrice.

7 MS. BRAILSFORD: I want all of the mics.

8 (Laughter.)

9 MS. BRAILSFORD: I have a number of
10 questions that I've now, because I've been taking
11 notes -- sorry.

12 On the NRC analysis that you did as the
13 basis for the SECY paper, just some sort of
14 clarifications for me, and this is not -- I'm not
15 opining on. I'd written down this question before.
16 When you talk about disposal depth, do you mean below
17 grade?

18 MR. ESH: In this analyses, it was below
19 grade.

20 MS. BRAILSFORD: Okay. You said that you
21 used the methodology for these unique waste streams
22 that was consistent with the original Part 61 analysis
23 because you wanted it to be apples to apples. Will
24 the methodology you use in real time to develop the
25 rule be different?

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1 MR. ESH: At this time I think we're
2 looking for input in the workshop about that
3 methodology, and if needed, we may do some different
4 things, in particular, because we have 25 years of
5 experience in doing new analyses and things like that.

6 For instance, the dosimetry that was used in the
7 1980s, we've had more recent direction from the
8 Commission to use more modern methods. So that's one
9 area that I could point to that we would probably do
10 differently.

11 But the guts of the analyses in terms of
12 how you do release and transport and pathway analyses,
13 those would not change significantly. They're still
14 pretty much the same today as they were then.

15 MS. BRAILSFORD: Okay. You do say
16 analysis methodology for unique waste streams. Did
17 you analyze other waste streams besides DU?

18 MR. ESH: Yeah, in this case, no. We only
19 analyzed depleted uranium. We did analyze different
20 forms of it, but it was all depleted uranium.

21 MS. BRAILSFORD: I guess those are my only
22 questions, but I know we're going to be talking about
23 this a good deal more. It seems to me that you have
24 some anachronisms in the goals that you've set
25 yourselves, and I would encourage the NRC not to

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1 overreach. You want to have these -- you know, you
2 want to cover not only depleted uranium but other
3 unique waste streams so that you don't have to revisit
4 it in 20 years or we don't have to revisit it in 20
5 years.

6 Well, it will be you. I'm already at 35.

7 At the same time, a steady theme of all
8 the technical discussion is that we know a good deal
9 more than we did 20 years ago. So I'm not entirely
10 convinced that it's particularly profitable for NRC to
11 try to come up with, okay, here's the deal. We've got
12 it. We got our unique waste streams. We know how to
13 analyze them. End of story. We just have to look at
14 the regs and keep doing it.

15 MR. ESH: Sure, but to more --

16 MS. BRAILSFORD: That's a comment.

17 MR. ESH: But to be open and flexible to
18 future changes and deal with those as they may arise
19 is that.

20 MR. CAMERON: Okay. Thank you, Beatrice.

21 David.

22 MR. KOCHER: Could you go back to your
23 page 21 again, your table of results?

24 I wanted to -- and, Chip, if this is not
25 the place to comment, I wanted to make a comment about

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1 the inclusion of a groundwater pathway in the intruder
2 analysis. I may be a minority of one, but I don't
3 think this is a good idea, and let me explain why.

4 Fundamentally, near surface disposal,
5 determining acceptable near surface disposals is a
6 balancing act between two competing things. The first
7 is how much can you allow to be released into the
8 environment and expose the general public, and the
9 second is how much can you leave behind that an
10 intruder would get in.

11 And with that in mind, intrusion scenarios
12 are about intrusion into waste, period. The
13 groundwater pathway is basically redundant with the
14 analysis you're doing for the general public, and I
15 guess I can say if I had one success in the DOE system
16 is that I got this idea across, and it's in their
17 regulations.

18 Intruder is about getting into the waste.
19 How much can you leave behind in the waste that
20 somebody might get in? And the other part for the
21 public is how much can you let leak out.

22 And I would just beg you not to include a
23 water pathway in your intrusion analysis. You're
24 basically shooting yourself in the foot. And I know
25 that's a controversial statement.

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1 MR. CAMERON: Okay.

2 MR. ESH: Good comment. Thank you.

3 MR. CAMERON: And, David, when we get to
4 an appropriate point in our discussion to reiterate
5 that, would you please do it if I don't recognize it?

6 Okay?

7 And the same for you, David. Thank you.

8 Drew, let's go to Drew for a question or
9 comment.

10 MR. THATCHER: Two. One, I want to follow
11 up to what Dave said just briefly. In my view, for an
12 intruder analysis, some of the waste, certainly Class
13 C and for long-term periods is going to be very pretty
14 deep, in our case greater than 23 feet below ground.
15 Without a well drilled by an intruder, I don't know
16 how you get the waste up. So in my mind, that's a
17 pretty standard assumption for that.

18 And if you're looking at limits, you know,
19 25 millirem to a full 500 for an intruder is not that
20 big a deal. So I'd like to talk about that a little
21 more later maybe.

22 The second one, and I do just want to make
23 this parking lot, is I really want to make sure we
24 follow up on what Dave was talking about as far as the
25 powdered form of the uranium, and I think it's clear

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1 that you really can't use a grout, but maybe we look
2 at something else, you know, whether it's an epoxy or
3 whether perhaps it's sealed more in an aluminum or
4 something like that where you get that oxide layer
5 that's pretty stable.

6 Just -- I don't know -- think outside of
7 the box and try to think of some ways that you don't
8 have all of that surface area for that uranium such
9 that even a small solubility issue becomes a big value
10 when you have a million tons.

11 MR. ESH: Yeah, we discussed that at the
12 last workshop, and I hope we'll discuss it again today
13 during that session. Dr. Burns had at least some
14 suggestions about things you could consider along
15 those lines.

16 MR. CAMERON: Okay, and we have it in the
17 parking lot.

18 Oh, Marty.

19 MR. LETOURNEAU: Go ahead and put your 21
20 back up there again.

21 MR. ESH: Everybody likes 21, don't they?
22 Or dislikes it.

23 MR. LETOURNEAU: I just wanted to make a
24 point that gets a little bit to some of the questions
25 that Christopher was asking. You know, this technical

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1 analysis that was done by the NRC staff to support the
2 SECY paper has been depicted as a screening analysis,
3 and it's important to understand what that means as a
4 screening analysis. This is not a performance
5 assessment. This is not a risk assessment. This
6 doesn't tell you anything about the ability of any
7 specific facility or site to meet or not meet
8 performance objectives under any conditions.

9 All this does is provide an insight into
10 what aspects of this the rulemaking may need to look
11 into further and what aspects of it the NRC staff
12 needs to look into it further.

13 But to use this at all as a means of
14 saying that proves that this facility or that facility
15 can't do, that is absolutely inappropriate in
16 interpretation of this analysis.

17 MR. CAMERON: Thanks, Marty.

18 And, David, Marty's characterization is
19 correct on that.

20 MR. ESH: Yeah, it's spot on. I think we
21 say that in our SECY paper, and I tried to say that in
22 various times throughout our workshops.

23 MR. CAMERON: Okay, and Larry Camper would
24 like to add something on that.

25 MR. CAMPER: Well, what I'd like to do, I

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1 think, Dave, if you would, is we're talking a lot
2 about intruder analyses. Describe the depth to which
3 intruder analyses have been constructed.

4 MR. ESH: Okay. Well, in this analyses
5 where we're looking at the effect of depth and how it
6 can affect an intruder, we had logic in the model
7 where if the depth was less than three meters, then
8 they could put a house in with a basement, dig up the
9 material, spread it around, do all of their typical
10 residential activities.

11 If the depth of the material was less than
12 three meters, down to, I think, maybe eight meters or
13 so -- or, sorry, greater than three meters down to
14 eight meters, the logic was either do a drill going
15 through, install a well through the material; you
16 drill through it and the cuttings come up and are
17 spread around, or check and see whether the indirect
18 effects from radon were greater than that. So it did
19 the greater of those two calculations.

20 When the depth was very deep in the
21 calculation, then it was just the well going through
22 the material and the cuttings spread around. So that
23 was the way that we analyzed depth in intruder
24 scenarios in the analyses.

25 MR. CAMERON: Okay. Thank you.

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1 I wanted to give this gentleman a chance
2 to ask a question. Yes, sir. Could you introduce
3 yourself, too?

4 MR. HARLAN NELSON: Harlan Nelson, a
5 contractor in Salt Lake City for 63 years.

6 I've lived here a long time, and I'm an
7 engineer and a contractor and a businessman
8 representing over 50 employees. So I'm well
9 established, and I have an opinion that I'd like to
10 get across over this issue without all the details I
11 don't have time for.

12 I see a unique opportunity for the people
13 of Utah, for Utah to provide a service for the nuclear
14 industry everywhere, all over the world. We have a
15 most unique geological situation. We have the largest
16 body of salt on earth with no outlets at all, and a
17 desert west of Tooele out here where as far as I'm
18 concerned it will never be used for anything, and it's
19 good for disposal of uranium waste.

20 Now, Utahans can make some money and we
21 can save on income tax. Next to us is Nevada whose
22 income tax is paid by the gambling, the gamblers that
23 come there.. Wyoming has no income tax. It's paid
24 for by a plethora of gas and oil.

25 Utah has an equal opportunity if we can

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1 see it. The very thing we're talking about, uranium
2 disposal. I'm for it. I'm for making an industry of
3 it that's profitable for people of Utah. I pay
4 normally \$30,000 state income tax to the State of
5 Utah. I'd like not to have to pay that like my
6 friends in Nevada and Wyoming. And I am for what
7 we're doing.

8 MR. CAMERON: Okay.

9 MR. HARLAN NELSON: Is that sufficient?

10 MR. CAMERON: That's sufficient. I think
11 you got the point across.

12 (Laughter.)

13 MR. CAMERON: And if you don't mind me
14 using you as an example of a process issue, and that
15 comment -- thank you -- is on the record for us, is
16 that that's a type of comment that we were looking for
17 tomorrow afternoon from the public on the issues
18 generally and what people's feelings are.

19 So thanks for doing it in advance, and
20 we'll just save anything else like that until tomorrow
21 afternoon. Thank you, sir.

22 Are we ready for Part 3?

23 MR. ESH: All right. Let's do --

24 MR. CAMERON: Christopher.

25 MR. THOMAS: Thank you.

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1 I've got a question about this chronic
2 intruder scenario, and one thing that's helpful for
3 me, so one of my primary concerns is if the waste
4 becomes uncovered -- and I don't really necessarily
5 think that somebody building a house is necessarily
6 the most reasonable scenario for that to happen. I'm
7 more concerned about long-term effects that will
8 happen, erosion or other long-term effects.

9 So my question is can the things that you
10 -- can your results, can you extrapolate from those
11 how long it would take if the waste were to be
12 uncovered? How long would it take for somebody who
13 comes into contact with that waste to exceed, to have
14 their dose limits exceeded?

15 MR. ESH: Yeah, I understand.

16 MR. THOMAS: Like the number of hours.

17 MR. ESH: Yeah, I understand the question,
18 and I could extrapolate, but it wouldn't be worth
19 anything. So I can give you what my views about how
20 you would consider that, and I think in most of our
21 problems it would be reasonable if you have concerns
22 about long-term stability to look at a scenario where
23 the material may be uncovered and see what the impacts
24 are associated with that.

25 And when you do that assessment though,

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1 you have to be careful. You can't have it both ways.

2 So if you have natural processes, for instance, that
3 you need to defeat an engineered system and disturb
4 your material. That's also potentially going to
5 create some dilution and dispersion of the material as
6 the result of that process, and I think an analysis of
7 a scenario like that or if you felt like, well,
8 material may be exposed and my scenario is somebody
9 may hunt there, for instance, or ride ATVs or whatever
10 usage you might foresee with technology 100,000 years
11 in the future.

12 But I think it would be reasonable to look
13 at alternative scenarios for a particular disposal
14 facility and the concentrations that may result from
15 the processes that you expect to happen.

16 MR. CAMERON: Okay. Thank you.

17 Just a process check for all of you now.
18 We note that we're running behind, but I don't think
19 it's anything to worry about. We'll make it up at
20 various points. The only pacing factor for us is the
21 fact that they will have this buffet lunch set up. So
22 we can be a little bit late for going to that, but I
23 don't think we can be real late for it.

24 So we want to get on with Part 3 and see
25 if we might be able to deal with significant

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1 quantities. I don't know, but maybe we'll give that a
2 try before we break.

3 Peter did you want to say anything quickly
4 for us? Then we'll go on then.

5 MR. BURNS: I'll be quick. I just wanted
6 to simply make a comment that the discussion in the
7 preceding half hour or so is primarily focused on the
8 dose for an individual who happens to drill into the
9 deposit or builds a cellar, basement right beside it
10 or hunts on that site and so on.

11 But I would point out that perhaps a much
12 bigger issue that impacts a much broader portion of
13 humanity is groundwater contamination, and a site such
14 as this, especially if it's uranium dioxide -- pardon
15 me -- U-308 powder that ultimately gets exposed to
16 groundwater. It gets exposed to rain and so on by
17 whatever processes. You can expect that uranium to be
18 highly mobile and you can expect it to contaminate a
19 large scale aquifer, and there the impact is much more
20 dramatic than the guy in his basement.

21 MR. CAMERON: Thank you.

22 Just let me ask one clarification. Is
23 that diametrically the opposite of -- I don't want to
24 get into a discussion now -- but is that diametrically
25 opposite of what David said? I'm just trying to

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1 understand the context.

2 MR. BURNS: Well, I'd argue that it
3 probably is close to that, diametrically opposite.
4 The exposure pathway that you can rely 100 percent on
5 over the long term is through water and through
6 release of dissolved uranium.

7 I was looking for the slides from the last
8 meeting that dealt with this a little bit, but they're
9 not in your talk anymore. So I guess I can't talk
10 specifically about those, but --

11 MR. ESH: The talks are the same. So it
12 might be in a future presentation during this
13 workshop.

14 MR. CAMERON: And that's what we'll get
15 to. I just wanted to flag this. This will be a
16 discussion issue for us, and I just wanted to make
17 sure that I understood that there was a difference of
18 opinion.

19 MR. BURNS: Yeah, and I don't want to be
20 hard on the guy who, you know, builds his cellar, his
21 basement in the waste deposit, but that's only one
22 guy. I'm thinking of the, oh, say, tens of millions
23 downstream that could ultimately be impacted by a
24 substantial leak into groundwater.

25 MR. CAMERON: Okay, and we'll have a

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1 discussion of that, David and Peter.

2 Dave, do you want to go ahead?

3 MR. ESH: Sure. Part 3, Key Issues for
4 Depleted Uranium Disposal. The first one that we have
5 a session on -- is it this afternoon or tomorrow? I
6 don't remember -- radon. Radon is a decay product
7 from uranium, and it's ubiquitous in the environment.

8 I talked about that in some of the introductory
9 materials.

10 It's transported via diffusion and
11 advection in gas or liquid phases. One of the
12 challenges with it is the rate of radon transport is
13 strongly affected by the moisture content in the
14 system or liquid saturation. So diffusivity and
15 tortuosity, the things that determine how quickly it
16 moves through geologic materials are very nonlinear
17 functions of the moisture that you have in the system.

18 The complexities associated with it can
19 include -- and that's because radon itself and its
20 daughters have a fairly short half-life. So this
21 transport rate through the materials in the
22 environment can allow it to decay during transport,
23 and then it doesn't pose a risk.

24 The complexities include discrete
25 features, barometric pumping and emanation, among

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1 other things. The low level waste EIS did not include
2 radon.

3 The next issue that we'll cover is uranium
4 geochemistry. The observed uranium concentrations and
5 transport rates vary widely. They're dependent on
6 site specific conditions. The good thing about it is
7 we have a lot of data all throughout the U.S. of
8 uranium, and I think that data can be taken into
9 consideration when people try to do their individual
10 assessments, modeling, et cetera.

11 We heard information at the low level
12 waste forum in the previous two days about all that
13 EPA is doing to look at the impacts of uranium in the
14 environment, in particular, on the Navajo Nation, and
15 it looks like that they've been collecting a lot of
16 data about uranium and their impacts to people.

17 The uranium is relatively mobile under
18 humid and oxidizing conditions. It's fairly immobile
19 under reducing conditions. So that's a key
20 consideration for uranium geochemistry. It is
21 available for transport under arid conditions, but the
22 availability of water can result in long transport
23 times.

24 So there's a natural analog site for
25 uranium in the environment at Pena Blanca in Mexico,

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1 which is a pretty arid site, and that deposit has been
2 dated at, I think, between two to eight million years,
3 something like that, and it's a fairly near surface
4 deposit of uranium and hasn't moved very much in that
5 period of time.

6 So we need to consider natural analogs
7 when we're talking about uranium and disposal along
8 large quantities of uranium.

9 One of the other sessions we'll have is
10 going to be on scenarios and receptors. Institutional
11 controls are required for these low level waste sites
12 for up to 100 years.

13 Now, that doesn't maybe buy you a lot for
14 very long-lived material, but it certainly buys you an
15 awful lot with protecting the current generation and
16 the immediate generations that follow. The
17 implication is that the risk to them should be very,
18 very small.

19 Multiple scenarios for land use are
20 normally considered. We talked some about that with
21 respect to intruders. We get a lot of comments on
22 scenarios and receptors and scenarios, and scenarios
23 and receptors can be key inputs to assessment of the
24 impacts of these types of decisions.

25 Normal public exposures we evaluate near

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1 but not on the disposal facility. We're open for
2 comment on whether that's appropriate or not.
3 Unanticipated public exposures are termed "intruders."

4 They're evaluated on the disposal facility, and they
5 can take a variety of different forms.

6 The limiting scenarios usually involve
7 residential, agricultural practices. Those are
8 because you're using a lot of pathways and spending a
9 lot of time there. So if you use less pathways and
10 spend less time, you get less impact.

11 Period of performance is probably
12 everyone's favorite. I know it's mine. Our low level
13 waste regulations do not provide a value for period of
14 performance. It's open to interpretation, and outside
15 of Yucca Mountain a period of performance longer than
16 10,000 years has not been applied in the U.S. to any
17 waste disposal problem, and I would say we work in the
18 nuclear field. We work on nuclear waste problems and
19 disposal. We don't have a lot of opportunity to think
20 outside the box, but we do have disposal of industrial
21 metals that occurs in the United States and all over
22 the world.

23 In some countries they do consider very
24 long impacts, but I don't believe that is the case in
25 the United States when they make those disposal

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1 decisions.

2 There is not an international consensus on
3 this though. I have a good report from the NEA that
4 just came out. I can give anybody the reference if
5 they want, where they talk about period of performance
6 and how you go about selecting one and the
7 considerations that you make, and it's really a
8 decision about the obligations of society today to
9 protect future obligations and how much effort you
10 should put into that and how much expense. It's the
11 bottom line of period of performance.

12 Our analyses, it provides a basic
13 description. The SECY paper provides a basic
14 description of assessment and assumptions. I know we
15 get a lot of comments about, well, can we have the
16 calculation; we want the calculation, and I don't have
17 any problem with that whatsoever. The calculation
18 fully supports the objectives that we used it for for
19 this analyses.

20 But what I would not want or I do not like
21 is that I know it will probably be misused to support
22 one case or another, and the cases you want to make
23 about the suitability of disposal should be made by
24 your own merits, and that's my only apprehension about
25 the analysis that was done in the SECY whether we

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1 distribute that model or not.

2 I feel it should be our objective to
3 provide all of the information possible for our
4 decision making processes, and so for our rulemaking
5 that will absolutely be true. The analysis that we
6 did was not intended to replace a site specific
7 evaluation. All future calculations supporting the
8 proposed regulations will be fully documented and will
9 be provided for stakeholder review and comment.

10 The basic inclusion overall from our
11 analyses was that we needed to change our rule to
12 address unique waste streams.

13 MR. CAMERON: Thank you. Thank you, Dave.

14 Great overview, and this last part was like a preview
15 of what's to come.

16 So I would just ask you to limit this to
17 any questions you might have, and those things fall in
18 the well.

19 MR. THATCHER: Does that still count?

20 MR. CAMERON: Yeah.

21 MR. THATCHER: I wanted two for the
22 parking lot if we could.

23 MR. CAMERON: Okay.

24 MR. THATCHER: And I think for the group I
25 think it's important to cover a little more detail

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1 about what really are oxidizing and reducing
2 conditions so everyone really understands what we're
3 talking about. I think that would be helpful.

4 And then make sure we do talk about -- I
5 know we will. It's probably tomorrow on time lines,
6 et cetera -- there are some standards. In fact, I've
7 got the IAEA guidance right here. We should talk
8 about some of that. So --

9 MR. ESH: Good. Thanks.

10 MR. CAMERON: Okay. Thanks, Drew.

11 Any other questions around the table?
12 Marty.

13 MR. LETOURNEAU: I think this is also a
14 parking lot issue. Back on your second slide you had
15 indicated that the low level waste EIS did not include
16 radon, but clearly in your screening analysis we did
17 include radon, and I think we ought to address on the
18 parking lot to what extent does the whole pathway dose
19 or total effective dose equivalent include or exclude
20 radon.

21 MR. ESH: Yeah, agreed. We included it.
22 We talk about like the modeling and the science about
23 radon, but an issue is whether you include it in the
24 total dose limit or not and, if not, what other
25 standard you may apply for it.

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1 MR. CAMERON: Okay, great. Thank you.

2 And Beatrice.

3 MS. BRAILSFORD: This is a question that
4 I'll need to have answered before we have specific
5 discussions. So maybe it's now or maybe it's after
6 lunch or whatever.

7 MR. CAMERON: Good, good.

8 MS. BRAILSFORD: Could you explain the
9 differing ramifications of whether or not a specific
10 piece is in the rule or in the guidance?

11 MR. ESH: Yeah, sure. If something is in
12 the regulation, then you don't have much flexibility
13 in interpreting it. It's a requirement that you have
14 to meet. Whereas if we put something in guidance,
15 it's just that. It's guidance. Somebody can follow
16 it or not. They can do a different approach. They
17 can justify a different approach.

18 So maybe I've said the wrong thing.

19 (Laughter.)

20 MR. ESH: Go ahead. Be more specific.

21 MS. BRAILSFORD: Well, a follow-on to what
22 Dave said is what are the opportunities for public
23 input on rules and guidance.

24 MR. CAMERON: Okay. That's --

25 MR. ESH: Do you want to do that, Chris?

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1 MR. CAMERON: Yeah, that was an issue that
2 sort of came up indirectly about how do you comment on
3 guidance, and, Chris, do you want to talk to that?

4 MR. McKENNEY: I wanted to talk about this
5 in the whole thing. First of all, we're going to get
6 into this in a slide bar of the most confusing topic
7 to most people, which is compatibility.

8 MR. CAMERON: Speak up.

9 MR. McKENNEY: Sorry. I'll move forward.

10 I want to talk about there's one of the
11 big defining ones is between rules and guidance, is
12 the issue between the requirements on compatibility
13 with the agreement states. If something is in a rule,
14 then we'll have to figure out do the agreement states
15 need to have that exactly worded in their rules or
16 have something similar put in their rules that meets
17 the same intent?

18 And then we have our own review process of
19 the rules, and of course, everybody's rulemaking
20 process has public input into various levels of it, of
21 how you have to go about doing the rulemaking process.

22 If things get put in guidance, guidance
23 does not have to be followed directly by the agreement
24 states, and so there is that whole part of whether it
25 goes into rules or guidance. As Dave said also,

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1 depending on how you write the rules and guidance, the
2 level of flexibility in how you want to do something
3 on a site specific basis may influence how you want to
4 put it in because if you wanted to put in all of the
5 specific parameters, say, for an intruder analysis,
6 thou shalt do an intruder analysis that looks at A, B,
7 C, D, E and F; well, are A, B, C, D, E and F
8 appropriate to do for every site around the country?

9 Now, if some of those are, those might be
10 in the rule, but if some of them are more related to
11 that can be justified as appropriate or inappropriate
12 for a site, you may want to put that in guidance, and
13 you might have a criteria still in the rule that says
14 you must do intruder analyses, and then have some of
15 those specifics about how to do an intruder analysis
16 in the guidance that develops it.

17 MR. CAMERON: And the public comment on
18 regulatory guidance?

19 MR. McKENNEY: Regulatory guidance goes
20 out for public review also. We put that out for
21 public review in draft form and then have a process
22 that goes through that to deal with comments and to go
23 back into a final form, and then those also can be
24 revised over time as we get more and more comments
25 about their use.

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1 MS. BRAILSFORD: Are there any
2 enforceability issues?

3 MR. MCKENNEY: Again, guidance issues are
4 usually viewed -- they're not rules. So they're
5 viewed as not having enforceability from the point of
6 view unless the licensee makes, in the case of the
7 licensee versus the state or the NRC, is if the
8 licensee makes a commitment to follow it.

9 If they say, "We shall do our actions as
10 set in this guidance document by the methods set in
11 this guidance document," then they've got to do it by
12 the guidance document. But when they're coming in to
13 say, "We're trying to meet the standard. You have
14 this guidance document that meets that standard, that
15 shows a method to meet that standard. Well, we have
16 an alternate method and we can show how it's just as
17 protective as the method you put in your regulatory
18 guidance," then they don't have to meet the regulatory
19 guidance if we agree that that alternate method is
20 just as protective.

21 MR. CAMERON: But it usually adds time to
22 the review.

23 MR. MCKENNEY: That adds to the review and
24 everything else, but it is.

25 MR. CAMERON: And the very, very important

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1 question, Beatrice, that we'll get into more
2 discussion of, but let me ask Larry to just say one
3 thing on it.

4 Larry.

5 MR. CAMPER: Thank you, Chip. Thank you,
6 Beatrice, for the question.

7 I want to draw a couple distinctions here.

8 Earlier we were talking about the technical basis for
9 the rules, rates for impact analysis, and we were kind
10 of mixing that in one point of our discussion with
11 guidance, two separate things. Okay?

12 When we publish a rule for comment, there
13 is a discussion that takes place as to how the
14 contents of the rule are arrived at. I mean, the
15 public has the opportunity to see that when they
16 choose to comment on the proposed rule.

17 Now, this issue of guidance is a different
18 things. The guidance as Chris is pointing out, our
19 rules say do, in this case conduct a performance
20 assessment. It has a period of performance, some
21 number, perhaps do the following things. The guidance
22 is about how to implement the rule. The rules are
23 skeletal in nature by design because if they weren't
24 they would be voluminous because the devil is in the
25 details, as the saying goes. How do you do this?

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1 Oftentimes we'll publish guidance with a
2 proposed rule. We try to do that. We don't always do
3 that. We will put out guidance for comment or we
4 might not put it out for comment; don't have to, but
5 there has been a general trend to try to put it out
6 for comment for the obvious reasons that you have on
7 your mind.

8 The other thing is I would point out when
9 we deal with guidance, we have a lot of flexibility as
10 to how we go about that. I mean, for example, we
11 could put a guidance document out on how to implement
12 this rule and just invite comment. We might choose to
13 have a workshop on it and talk about it in the public
14 forum.

15 We're working currently to revise the
16 branch technical position on concentration averaging.

17 We intend to hold a public workshop next year to
18 discuss that, and generally what drives us to do that
19 is the degree and nature of interest in a given
20 subject.

21 So there's a lot of flexibility as to how
22 we go about getting the guidance out, but certainly a
23 driver is to have maximal opportunity for input.

24 MR. CAMERON: Okay. Good. Thank you.
25 Thank you, Larry.

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1 And just as a process point, we're going
2 to try to do the tee-off on significant quantities and
3 sort of a summary of what the discussion was in
4 Bethesda, see how much discussion there is on that
5 before lunch. I know that some people in the audience
6 may have a question about some of the things that they
7 heard. We'll do that quickly before lunch.

8 We were going to wait for -- the gentleman
9 who gave a comment that would have ordinarily been
10 reserved for the public comment period, we were going
11 to hold those until the end of tomorrow, but what I
12 think we'll do is we'll have a session at the end of
13 today where people who are here today can offer that
14 type of public comment.

15 Okay. Beatrice, did you have one more
16 question?

17 MS. BRAILSFORD: Well, I just wanted to
18 ask Larry is it NRC's intention in this case to
19 publish the rules and guidance together.

20 MR. CAMERON: And I'm not sure the NRC has
21 made that decision yet, but let's see if we can get a
22 quick answer.

23 MR. CAMPER: That's the correct answer.
24 No, we have not made that decision yet. I think to a
25 large degree that decision could come out of the kinds

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1 of things we are hearing during these public
2 workshops.

3 As I say, there's been a tendency in the
4 agency over the last few years to try to put the
5 guidance out at the same time, and on certain things
6 when you're looking at things like Part 20, for
7 example, which is the standards for radiation
8 protection, there's this need to get the guidance out
9 at the same time.

10 But it's variable, but what we're hearing
11 factors into that.

12 MR. CAMERON: Tom, do you have something
13 before we go to -- okay.

14 We're going to tee up the definition of
15 "significant quantities" discussion, and we'll see how
16 long that is going to go and then we'll decide when to
17 break for lunch.

18 David.

19 MR. ESH: Okay. For each of these
20 sessions the NRC staff gives a brief introduction to
21 the topic, and then we have an open discussion about
22 the topic. We did this at the last workshop, and in
23 this area I think there was at least a loose consensus
24 that we did not necessarily need to define the
25 significant quantities of depleted uranium, but yet

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1 that would be determined by the site specific analysis
2 which is done.

3 We did have some other views expressed
4 that you should consider identifying a lower level,
5 which would not kick you into needing to do the
6 requirements of the unique waste stream disposal
7 requirements that may be generated.

8 So I'll go over background, significance
9 level, and methods to determine significance, and then
10 we can have an open discussion on it, and how long you
11 talk will determine whether you get hot or cold food,
12 I suppose.

13 Insignificant quantities, development of
14 10 CFR Part 61 considered uranium. The quantities
15 were limited. I talked about these in the previous
16 presentation. If you take these numbers and you
17 assume that the uranium is homogeneously distributed
18 in this volume, you end up with something like 30
19 parts per million uranium, depending on the density.

20 If you said, okay, instead I'm going to
21 look at a concentrated source, you get something on
22 the order like 90 55-gallon drums.

23 So in terms of defining significance, we
24 at least have one point of data where somebody thought
25 something was insignificant. At least NRC thought

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1 something was insignificant. They decided there was
2 no need for waste classification limits for uranium
3 based on the limited quantities expected. That's
4 these sorts of numbers, and what I would note is that
5 risk is a strong function of quantity and
6 concentration, or can be.

7 So we have certainly a much larger number
8 now. We think it's not insignificant, but where you
9 draw this line between significance and insignificance
10 could have implications for a lot of people. I would
11 say there's a big difference between disposing of
12 large quantities of concentrated depleted uranium
13 generated, say, from enrichment facilities and
14 disposing of contaminated piping from maybe
15 decommissioning of one of those enrichment facilities.

16 They can have quite a bit different levels of
17 concentration of material in them, and they have
18 different risk implications.

19 So methods to determine significance, what
20 could we do? We can look at historical values like
21 that point that I gave there. We could do something
22 like compare the local background. So would you want
23 to limit your disposal facility to a uranium value
24 that is less than in the natural environment? That
25 might be a tough thing for the disposal facility to

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1 meet.

2 And then regardless of how we define
3 significance, if we did, we could do it a couple of
4 different ways. We could define it in regulation
5 based on, say, okay, you could use a calculational
6 procedure to determine whether it's significant or
7 not, or we could do what has been done in a variety of
8 waste areas, which is more by where it comes from or
9 how it's defined.

10 There are pros and cons to each of these
11 approaches, and that's what we want to get input on
12 from the people at the table here. So you can define
13 it in regulation. You could allow somebody to do an
14 analysis and to justify whether they're in the
15 significance category or not. There are lots of
16 things you can do.

17 So we're seeking your feedback on the
18 considerations that we should have for defining
19 whether it's significant or not. What factors should
20 we consider and what approaches should we consider?

21 I think to be fair to the discussion last
22 time, there was a general consensus that if you're
23 going to have to do a site specific performance
24 assessment, then that's going to determine whether you
25 have a significant quantity or not, but I did hear the

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1 opposing view, which was you may be applying these
2 requirements for a large quantity situation which
3 don't make a lot of sense if you have very low
4 concentrations.

5 MR. CAMERON: Well, that was the so-called
6 de minimis or whatever.

7 MR. ESH: Yes.

8 MR. CAMERON: That was what you referred
9 to earlier.

10 MR. ESH: If all we were dealing with were
11 low concentrations, such as like the numbers I had on
12 that second slide, that was already covered in the
13 NRC's EIS and the Part 61 analyses.

14 MR. CAMERON: Okay. Thank you for that
15 tee-up, Dave.

16 And let me go to Tom. Tom Magette.

17 MR. MAGETTE: Thanks, Chip.

18 I would suggest that you don't need a
19 threshold. The reason for that is, as we talked about
20 in Maryland, that if you look at the numbers that have
21 come up so far, if you take the 90 55-gallon drums,
22 for example, that David just referenced, that would be
23 on the order of five or six times. If you look at
24 SECY 080147 had a number of one to nine times, might
25 be a level of below significance.

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1 So there are a lot of numbers floating
2 around, but they're all really small in the context of
3 disposing of depleted uranium from an enrichment
4 process. So if you're going to be disposing of that
5 waste, you're going to easily exceed any of the
6 thresholds that I've seen mentioned or that I would
7 think should be mentioned.

8 So it seems to me that you're going to be
9 in the position, presuming that the NRC goes forward
10 as I think we are expecting them to with a new
11 61.55(a)(9) that requires a performance assessment, of
12 having to do a performance assessment if you're taking
13 any quantities of depleted uranium of any
14 significance, and I think if you try to set a
15 threshold, you're going to spend a lot of time doing
16 it. The NRC is going to spend a lot of time. The
17 public is going to spend a lot of time. You're going
18 to have to justify it. It's going to be a lot of
19 technical work, which frankly I think is simply not
20 merited.

21 So I say you don't need a lower limit.
22 Now, the view that David mentioned that was expressed
23 at the other workshop, Bill Dornsife, WCS, offered a
24 slightly different view. Amazingly, Bill and I were
25 not in complete agreement, but I also have a lot of

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1 sympathy for his view, and I wouldn't argue
2 strenuously against his view.

3 He made the point, which is completely
4 accurate, that we get lots of waste that is manifested
5 depleted uranium, and David used a good example of a
6 decommissioning waste from an old enrichment plant for
7 example. We get a lot of waste not just from DOE, but
8 from other NRC licensees that is manifested to include
9 depleted uranium, not in, you know, large quantities,
10 not drums of U-308 or, for that matter, uranium
11 hexofluoride or some other form, but some content of
12 depleted uranium.

13 So if you suggest that that merits the
14 same level of analysis, I think that probably is
15 incorrect and not necessary. The bottom line is
16 though I still don't think anybody is going to be
17 excused, so to speak, from performing a site specific
18 performance assessment because we're all taking levels
19 of depleted uranium that would exceed whatever
20 threshold you put in place.

21 So, therefore, I see no reason for a
22 minimum threshold in either the rule or the guidance.

23 MR. CAMERON: And on the other end, on the
24 larger issue, so to speak of whether the NRC needed to
25 define significant quantities at all, as Dave

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1 indicated, people -- he called it a loose consensus --
2 people thought that the requirement to do a site
3 specific performance assessment would obviate the need
4 to try to define a significant quantity. I don't know
5 if you want to comment on that.

6 MR. MAGETTE: I think that's true. I
7 think there was complete agreement on the point,
8 actually even with Bill, and Bill was expressing his
9 concern relative to a slightly different problem,
10 which is that if there's going to be some sort of
11 prohibition in the interim, as long as it's there at
12 all, and maybe, Susan, you can speak to this in Texas,
13 that that would have a far-reaching implications
14 beyond enrichment streams.

15 But I don't think anybody disagreed with
16 the notion that a threshold was essentially going to
17 be exceeded by any disposal site and that, you know,
18 we'd spend a lot of time trying to define something
19 that wouldn't be useful.

20 MR. CAMERON: Okay.

21 MR. ESH: My thought along these lines was
22 this, that, say, hypothetically you came out with a
23 period of performance of a million years, okay, and
24 then you had a waste stream that wasn't a concentrated
25 uranium waste stream, but was a diluted uranium waste

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1 stream of three or five parts per million or something
2 like that. Would you want a disposal facility that's
3 taking that sort of waste stream to do a million-year
4 analysis when that's the same amount of uranium that's
5 in the environment surrounding that waste facility?

6 So I think like that's my concern. I
7 think we have to try to think of the law of unintended
8 consequences and how it may apply whenever we set
9 these requirements or make the decisions.

10 MR. CAMERON: Okay. Let me get a
11 viewpoint from Beatrice on this, and then let's go to
12 Scott, Marty.

13 Beatrice.

14 MS. BRAILSFORD: I guess if you could just
15 explain to me. David, sometimes you're saying
16 "quantity" and this says "quantity" and sometimes
17 you're saying "concentration." You know, there is no
18 amount of spent nuclear fuel that is not significant,
19 right? Quantity, not just concentration, but
20 quantity.

21 So if you could explain why you're
22 approaching this differently or why did you ask
23 yourselves this question?

24 MR. ESH: I think the answer is especially
25 in this circumstance, there can be a difference. I

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1 speak both quantity and concentration. I mix them
2 interchangeably, but the product of them is what can
3 drive risk. Okay?

4 So if you have a very large quantity of
5 very low concentration material, that may not cause
6 you a problem, but if you have a large quantity of
7 moderate concentration, that could cause you just as
8 much problem for one of your performance objectives as
9 a much smaller quantity of very concentrated material
10 could.

11 So I mix them interchangeably, but it's
12 related to what material you would have and how it
13 would be disposed of.

14 PARTICIPANT: (Speaking from an unmiked
15 location.)

16 MR. ESH: Yes. What was done in the Part
17 61 analyses is they basically hard wired a volume.
18 Okay? So they said, "We're going to have a volume of
19 material that goes into a disposal facility, and it's
20 going to have these radiological characteristics.

21 That's one approach to handle this problem
22 of trying to define what sort of concentrations you
23 may be able to accept at a disposal facility, but the
24 alternative approach is you don't impose a volume,
25 hard wiring, or even a regulatory analysis on what the

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1 value may be, but you allow it to be determined on the
2 merits of its own individual cases.

3 I mean, I think Marty Letourneau could
4 talk to that what's DOE does, for their disposal
5 facilities. They look at what can my disposal
6 facility accept, and then develop inventory limits and
7 waste acceptance criteria for that particular
8 facility.

9 The problem is we have a system in place
10 that has concentrations and it has the hard wired
11 volume associated with those concentrations, but that
12 doesn't mean we necessarily have to keep using that
13 approach. And so when I mix them, it's because of
14 those issues.

15 MR. CAMERON: Okay. Thank you.

16 Let's go to Scott and then to Marty.
17 Scott.

18 MR. KIRK: Thank you.

19 David, I agree with you. I think the way
20 that it was handled by WCS in our license application
21 the end result was I think we looked at ten different
22 waste streams, nine of which were now in our
23 application, and there was a threshold that was
24 applied. I believe it was ten nanocuries per gram,
25 and I think the total volume limits that we had in our

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1 license application was about 10,000 cubic meters.

2 Now, we have to containerize our waste. I
3 believe it's disposed of at a depth of about ten
4 meters. So since it is containerized, it does have an
5 intruder barrier, but it also has an additional
6 intruder barrier to it. So that was a way that we
7 addressed it.

8 But it was also recognized that because
9 this issue is controversial, because it is undergoing
10 a rulemaking, that maybe nobody should get too far
11 ahead of the NRC. So those limitations were placed on
12 the license.

13 MR. CAMERON: Thank you.

14 And Marty.

15 MR. LETOURNEAU: Yeah, I guess what I was
16 planning to say was a little bit redundant of what
17 Scott just said, but it was to go back to what David
18 was saying about the situation where you have a waste,
19 whether by volume or concentration; you have something
20 that approaches what has been identified as
21 insignificant. It's not unreasonable to expect that
22 there could be a very conservative lower level limit
23 and possibly a very concerted screening type analysis
24 that could be applied to a situation like that to say,
25 yeah, this clearly falls to the lower end and doesn't

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1 require the additional analysis.

2 MR. CAMERON: Go ahead, Scott.

3 MR. KIRK: The other thing I didn't add
4 though is that at least our license application in
5 Texas has a unique role in the fact that there is a
6 1,000-year performance period, but they also require
7 considerations of peak dose.

8 So I think the time period of
9 consideration that was evaluated for our site was -- I
10 believe I'm correct -- it's about 36,000 years into
11 the future, the point being that you can demonstrate
12 that these waste streams at least at certain
13 concentrations are safe well into the future, and that
14 has been demonstrated at least in our license
15 application that was approved finally a few weeks ago.

16 MR. CAMERON: Okay. Thanks.

17 Let's go to Susan. Susan.

18 MS. JABLONSKI: I just felt the need to
19 maybe make a little bit of clarification, and what
20 Scott had said about the license is generally correct,
21 but we were faced with this issue both on the front
22 end, for what the period of performance, being that
23 our rulemaking happened -- I'm sorry?

24 PARTICIPANT: We can't hear you.

25 MS. JABLONSKI: I will.

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1 We were faced with the issue of period of
2 performance before this issue arose, and I think it
3 had to do with our timing of when the rule change
4 happened in Texas in 2003. We went through a
5 rulemaking with extensive comments from the public,
6 the licensee, policy makers about what was appropriate
7 in the framework.

8 And so I'm interested to hear, you know,
9 what is happening in D.C. based on our experience was
10 that this was an issue that really drove some
11 differences in our rules from the guidance document at
12 NRC, the period of performance. I mean, if you look
13 at our rules right now, they look different, looking
14 at peak dose, and Scott mentioned time frames, and it
15 has raised some other conditions in the license to
16 actually look at performance assessment in more robust
17 ways to address some of the requirements of our rules
18 that go into a longer period of performance.

19 And so that's another feature of this, is
20 we're asking Waste Control to revisit all of that
21 before they would take waste again to try to get at
22 this period of performance issue in a way that the
23 application has not to date.

24 So we're also watching very closely how
25 this might impact rules we already have in place

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1 across the board for period of performance, and not
2 only in looking at these incidental waste streams, but
3 other waste streams that have long-lived radionuclides
4 because we have a requirement to look at peak dose.

5 So rather than just a guidance or a
6 policy, and I believe DOE is using that for their
7 internal discussions, they're looking at peak dose;
8 it's actually a regulatory requirement for us. So
9 that's definitely a part of it. What we're dealing
10 with in the interim, as Scott mentioned, you know,
11 we've made a prohibition for specific waste streams
12 that are tied to these larger quantities that would be
13 in deconversion, conversion, actually enrichment
14 processes.

15 But we recognize that there are these
16 other waste streams that fall in this loose definition
17 of what insignificant might be.

18 We have added a container requirement to
19 that as an additional requirement, that it wouldn't be
20 loose material coming in, and again, this revisit to
21 performance assessment to really look at peak dose
22 which would include those insignificant quantities
23 across the board that are already in the proposal.

24 So you know, we're in the middle
25 somewhere, I think, of where this is headed and kind

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1 of what our friends in other states have already had
2 to deal with.

3 MR. CAMERON: Okay. Thank you, Susan.

4 Just to check in with everybody on this,
5 you've heard what transpired at the last workshop.
6 You've heard some different approaches to these
7 issues. You may not feel that you have enough
8 information to have an opinion on this yet, and that's
9 why there is a written public comment period, but
10 based on what you've heard so far, does anybody have a
11 strong disagreement with the general agreement or the
12 agreement that -- not agreement, but consensus,
13 whatever we want to call it -- that occurred at the
14 Bethesda workshop that significant quantities do not
15 have to be define. It should be taken care of and it
16 will be taken care of in a performance assessment or
17 this other question about threshold quantities.

18 And I want to explore that issue with all
19 of you. Why don't we go to David, and then we'll go
20 to Christopher?

21 David.

22 MR. KOCHER: To go back to the first
23 comment I made this morning about the problem here is
24 really the intruder business because every site has to
25 do a performance assessment for whatever waste comes

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1 in the door for an off-site member of the public, and
2 I'm not a regulator and I've never been in that seat,
3 but I think what NRC is thinking about here and what
4 they probably need is that they need some kind of
5 statement in their regulation that triggers a look-see
6 at unusual waste.

7 It may not have to be a number. The
8 significance here is clearly with respect to meeting
9 performance objectives, and so you might say if a new
10 and unusual waste could change my projected dose to an
11 off-site member of the public or an inadvertent
12 intruder by ten percent or 50 percent or some number,
13 I think as a regulator you really probably are going
14 to want something that triggers a look-see at
15 something that's not routinely take into account in
16 the waste classification tables.

17 I don't know how to do it, but I don't
18 suspect that you can really ignore this totally in
19 writing a rule.

20 MR. CAMERON: Christopher, let's go to
21 you. I saw you nodding affirmatively listening to
22 David.

23 MR. THOMAS: Well, there's something kind
24 of circular here. I mean, it's like before, because
25 of this little reading of the regulations, any amount

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1 of depleted uranium has been considered class A
2 waste, right? And then we had this realization, oh,
3 my gosh, large, significant amounts were not
4 considered. In other words, only small amounts were
5 considered previously. Therefore, we want to take a
6 look at that and do something a little bit different.

7 In order to do something, David, like I
8 was thinking you were proposing, you'd already have to
9 have done the analysis. In other words, to say that
10 this doses would be affected by X percent, that would
11 require already having done a performance assessment,
12 and yet you need a trigger to trigger the performance
13 assessment.

14 So to me that's why that's kind of
15 circular, and so I kind of agree with the idea that,
16 yeah, there should be a trigger. It should be
17 specified that once you exceed a certain amount,
18 however you want to define that, of depleted uranium,
19 yes, at that point the licensee or whomever, there
20 should be an analysis that will take into
21 consideration -- and I think it should be cumulative,
22 too. I mean that's another thing that has been
23 addressed in some other areas, but I haven't heard it
24 yet here, but you know, there's cumulative amounts of
25 depleted uranium. In other words, it's not a

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1 shipment-by-shipment calculation. It's a total
2 overall amount.

3 So, you know, that's an interesting thing
4 to me, too. You know, at some point is it reasonable
5 to assume that any site, even if they're accepting
6 large amounts of low concentration, that they will
7 eventually reasonably go into the significant range?

8 MR. CAMERON: And let me ask a clarifying
9 question for the group in terms of this trigger
10 question, and I may have gotten this wrong from what I
11 heard at the Bethesda workshop, but what I heard there
12 was there would be a site specific performance
13 analysis or assessment required for the disposal of
14 depleted uranium.

15 In other words, the trigger was going to
16 be the disposal of depleted uranium. That's what
17 would trigger doing the performance assessment, and
18 we're going to go to everybody around the table who
19 has a card up, but let me just check in with Tom
20 Magette in terms of this trigger issue.

21 How would you respond to Christopher's and
22 others' comments on the trigger?

23 MR. MAGETTE: I think Christopher raises a
24 very good point, and it's one that I raised before,
25 too, and it's why I say essentially that the trigger

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1 as you just defined it, Chip, is the disposal of
2 depleted uranium because the cumulative aspect is
3 import, and if you're going to make some sort of
4 judgment -- David, this goes a little bit to your
5 point -- that when you're below that threshold, then
6 do you have to go write a regulation that somehow
7 requires you to account for that on a cumulative
8 basis? Because that's not there either.

9 So I don't think it's okay just to accept
10 certain concentrations over a large volume without
11 some other threshold being imposed, and then this gets
12 to another issue. This gets to the notion of the
13 rule.

14 As I have said before -- and we haven't
15 gotten to this yet -- I think the rule should be very
16 simple. I think this is a very short rule, and that a
17 lot of what we're going to talk about, have talked
18 about before belongs in guidance, but that what I
19 envision is the idea wording in the 61.55(a)(9) is
20 nota voluminous rule at all, and so then you start
21 getting into Larry's comment about once you start down
22 this path of starting to apply all these different
23 triggers and what this then means. Then you do start
24 to get to a rule that is unnecessarily complicated.

25 So I keep getting backed into this every

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1 time I try to think through what is this threshold,
2 and you bump into the difference between a
3 concentration and a volume or a mass when you do that
4 as well, to go to your earlier comments, David.

5 So I think the appropriate trigger is the
6 disposal of the depleted uranium, and, David, you
7 raised the issue that we're going to have another
8 entirely focused session on "and other stuff." I
9 don't think we need to talk about that yet.

10 So I think the trigger here is disposal of
11 depleted uranium.

12 MR. CAMERON: Okay, and thank you, Tom.

13 I'm going to go to Larry and then we'll
14 hear from Marty and Scott. And then I want to go back
15 and ask Christopher what he thinks about the trigger
16 being -- if you're going to dispose of it, you do the
17 analysis, and then that analysis has to take into
18 account any potential cumulative impacts, is the way
19 I'm hearing it.

20 Larry.

21 MR. CAMPER: This is good, and I think
22 you've kind of come to where the -- why did the staff
23 even have this on its mind, and I think we were driven
24 by this question of is there a graded approach that
25 could be brought to bear requiring a site specific

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1 performance assessment. Is there a trigger, whether
2 that trigger be in Curies per cubic meter or total
3 number of cubic meters disposed or metric tons?

4 That's what was on our mind, but what we
5 heard very clearly during the panel in Maryland, and
6 it's being discussed now is, look, in the final
7 analysis since it's so dependent upon the
8 characteristics of the site, it's irrelevant to pick a
9 number because the site performance assessment itself
10 will be the driver, and therefore you don't need to
11 ponder a trigger other than the disposal of depleted
12 uranium, if you will, as Tom just said.

13 But that's why we asked the question.

14 MR. CAMERON: Great, and let me go to
15 Marty and then Scott and then check back in with
16 Christopher.

17 MR. LETOURNEAU: I was resisting Dave's
18 invitation for me to talk about what DOE does, but
19 since Christopher brought it back up and it's becoming
20 pertinent, I want to take Dave up on the invitation
21 and just address one way that it can be done, and I'm
22 not suggesting this is the way, but this is the way
23 that the Department of Energy implements it.

24 Yes, we have to have a site specific,
25 radionuclide specific, facility specific performance

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1 assessment first, and based on that performance
2 assessment, we look at every radionuclide, and we
3 develop limits for each one of those radionuclides.

4 And that limit then tells us, based on
5 that performance assessment what the theoretical limit
6 is of each of these specific radionuclides that you
7 could take in that facility, what concentration.

8 So then we set a waste acceptance criteria
9 that is some fraction below that. We don't use the
10 full theoretical limit that's in the PA. We use some
11 fraction of that as what we're actually going to
12 accept.

13 And then we take some fraction of that
14 waste acceptance criteria that we use as a trigger,
15 which will tell us do I need to do more analysis when
16 this thing comes in the door.

17 What we then do is we keep track of
18 everything that's coming in. It's like a budget. So
19 on an annual basis we look at what we actually
20 received, and we can compare it against what was
21 actually in the PA, and we keep track of that over
22 time as a measure of whether we're staying within the
23 bounds of what the PA identified.

24 So what happens is a waste form, a waste
25 stream will come along with a different radionuclide

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1 in it or a concentration that was higher than what you
2 set your waste acceptance criteria at, and that
3 triggers doing a special analysis. So we go back to
4 the performance assessment, and now we include this
5 new information plus the real information that we've
6 been collecting over time, and we can look and see
7 whether we're still within the performance objectives.

8 So, again, this is just one way of doing
9 it. I'm not suggesting that that is the way of doing
10 it.

11 MR. CAMERON: And Scott. Thank you,
12 Marty.

13 MR. KIRK: This is probably easier.

14 I would agree with what Larry said. We do
15 need to handle it in a gradient manner, and I would go
16 further to say should we risk inform, and what I was
17 getting at, it sort of goes to what you were saying
18 about the cumulative effects. You know, once you run
19 up again a threshold, you know, before we've only been
20 looking at the period of performance being a 500,
21 1,000-year time period, but once you exceed that
22 threshold and you risk inform it and, say, maybe it's
23 ten nanocuries per gram or whatever it is, that you've
24 recognized a need that maybe you need additional
25 intruder barriers or additional containerization or

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1 that the performance period needs to be longer.
2 You're not looking at 1,000 years, but maybe 10,000
3 years or whatever it could be.

4 But my own thought is that the rule should
5 be risk informed, and that it should be graded, and it
6 should be able to have different periods of
7 performance.

8 MR. CAMERON: And bring that different
9 periods of performance back up again when we get to
10 that particular area.

11 What I'm going to suggest is we hear any
12 perspectives that Christopher has based on what he's
13 heard and then we're going to go quickly up to anybody
14 in the audience who has a question about either Dave
15 Esh's presentation or this particular issues; break
16 for lunch; we'll come back, and if we need to discuss
17 significant quantities anymore, we'll do that.

18 Christopher.

19 MR. THOMAS: Thank you.

20 I feel comfortable with the notion that
21 disposal of any amount of depleted uranium would
22 require a site specific performance analysis. I guess
23 I differ probably with Tom in that I don't see this
24 necessarily being a simple rule. I mean, one of the
25 things I'm really concerned about is insuring that the

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1 analysis is done in such a way that it is most
2 protective of the public, and to me when there are
3 those exposure limits and there are laws that say an
4 inadvertent intruder shall be protected when they come
5 into direct contact with the waste, I believe that
6 should be followed. I don't think that an on-site
7 intruder scenario should be allowed to be discarded
8 because it seems unlikely. I mean, that's the whole
9 point.

10 So I guess where I think we differ is that
11 if the trigger is disposal of any amount of depleted
12 uranium, I think that's super, and I think the
13 performance analysis done should have very, very hard
14 and fast requirements that are most protective of the
15 public, including an on-site intruder scenario in
16 direct contact with the waste since that is in our
17 state law, and I believe it's also in federal law.

18 MR. CAMERON: Okay. Thank you,
19 Christopher for that, and I think we all heard
20 Christopher's view on the trigger, this idea of
21 guidance versus rule.

22 When we come back after lunch, I'm going
23 to ask our OGC representatives to just give us another
24 reprise, so to speak, on guidance versus rule, and as
25 Chris McKenney pointed out, there's all sorts of

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1 considerations that go into what you want to have in
2 the text of a rule versus guidance, including the
3 flexibility to have to change things that you need to
4 change because going through a rulemaking can be --
5 where did I hear this? -- the rocky road of
6 rulemaking. Where did I hear that phrase recently?

7 But it can be a rocky road, and so let's
8 have a discussion, not only the specific issues, but
9 of this rule versus guidance idea. And while I'm
10 going out to the audience, Drew.

11 MR. THATCHER: I think you just hit it. I
12 thought what Christopher had said bears further
13 discussion probably tomorrow or something like that
14 because to me it doesn't work at all to say you will
15 consider that the intruder impact accesses the waste
16 because there are many instances, depending on the
17 waste classification and time frame where they simply
18 couldn't under credible circumstances access the
19 waste. So you have to look at it. There's more
20 details than just saying you've got to do this.

21 MR. CAMERON: Yeah, and maybe what we
22 should do is discuss some of these individual topics,
23 and then we would have a better sense tomorrow perhaps
24 to have the rule versus guidance discussion,
25 specifically after we see what all of these types of

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1 details are.

2 But I still would like perhaps Tison or
3 Lisa to talk to us about rule versus guidance.

4 Larry.

5 MR. CAMPER: (Speaking from an unmiked
6 location.

7 MR. CAMERON: Well, not when lunch is out
8 there.

9 MR. CAMPER: I'm sorry. You know, we're
10 discussing a rulemaking that would require site
11 specific performance assessment, but some things are
12 coming up along the way, and you might need to make
13 certain corollary or corresponding changes to other
14 parts of Part 61 as you did that.

15 For example, what I'm hearing here is if
16 one goes and looks today and 61.42, which is the
17 protection of individuals from inadvertent intrusion,
18 what you don't find is a dose limit.

19 Now, in the intruder analysis that was
20 done when the rule was put in place, the dose limit
21 driving was 500 millirem, nor is there a period of
22 performance in Part 61. So as the panel ponders this,
23 I mean, if you are struck by the fact that, okay, if
24 you modify 61.55(a)(6) to add a nine that requires a
25 site specific performance assessment, if you identify

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1 other things that warrant a corollary change, it would
2 be valuable to point that out so that the staff can go
3 back and ponder that.

4 Thank you.

5 MR. CAMERON: Thank you very much, Larry.

6 Real quick, Chris.

7 MR. MCKENNEY: I just wanted to point out
8 two things. One is we've been discussing a lot about
9 exposure scenarios. We'll do that later this
10 afternoon in a full session of that, and of course, on
11 the corollary we are talking about unique -- right now
12 we're focusing today a lot on DU specifically, and
13 then tomorrow we're going to roll back into, well,
14 does the same rules apply that we wanted to do for DU
15 apply for other unique waste streams, which goes to
16 Dave Kocher's point.

17 And also I wanted to point out that
18 actually in the draft rule for Part 61, the intruder
19 limit was there, and it was taken out in the final.

20 MR. CAMERON: Okay. Thank you. Thank you
21 all very much.

22 Marty, did you have your card up from
23 before or did you --

24 MR. LETOURNEAU: No, this is actually
25 relative to this topic, and it was the point that I

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1 often like to make, and it's somewhat provocative, and
2 we can talk about it later during the exposure
3 scenarios, but it's related to Larry's point, which is
4 the intruder scenario does not protect intruders. The
5 intruder scenario was simply a piece of analysis that
6 was used in the EIS as a basis for developing the
7 classification system, and in fact, it is a cartoon
8 analysis. It assumes that somebody is going to
9 intrude.

10 And this has been, I think, as Drew just
11 stated, there are situations where that may not be
12 appropriate. So what we do to protect the intruder to
13 meet the 10 CFR 61 requirements does not necessarily
14 mean an intruder scenario.

15 And when we start doing intruder
16 scenarios, we really ought to be clear about why we're
17 doing them and what purpose we intend to gain from
18 doing that analysis.

19 MR. CAMERON: Okay. Thank you. Thank
20 you.

21 And we will get to a specific discussion
22 of that. Audience, comments? And please introduce
23 yourself.

24 MR. GREEVES: John GrEeves with Talisman
25 International.

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1 Just an observation, Chip and all of you.

2 I think you have an opportunity here in your parking
3 lot to try and capture what this group thinks belongs
4 in a rule versus guidance, and you're going to have to
5 do it eventually. So at the end of tomorrow I'd like
6 to understand what people think needs to go in a rule
7 versus guidance.

8 I've learned a lot in these meetings, and
9 I would assert that the current rule requires a
10 performance assessment. It requires it at the
11 application. It requires it at an update stage. It
12 requires it at a closure stage, and what we're
13 struggling with is we're finding what I call an
14 unreviewed safety question that occurs here, and the
15 only way you really answer that is with a performance
16 assessment.

17 Unfortunately, Part 61 is not specific
18 about that. You look in 61.13. It calls for a
19 technical analysis. Unfortunately, it only calls for
20 a technical analysis for the public. You go to
21 another section in 61.13, and it talks about intruder,
22 but it talks about meeting the classification system.

23 So there are a few spots in this rule, I
24 would assert, that should be addressed, and I think it
25 would be useful at the end of tomorrow to see if

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1 there's any consensus. Which of these things you're
2 talking about today, is there a consensus that ought
3 to go into the rule versus in the guidance, and so on?

4 Anyhow, I would just offer that, I would
5 look forward to maybe seeing some of that tomorrow.

6 MR. CAMERON: Okay. Thank you, John, and
7 we will do that, and I think that discussion it seems
8 logically fits perhaps tomorrow after we've had
9 discussion of some of the substantive issues. We will
10 put that on the agenda.

11 Yes.

12 MS. DIAZ: Hi. I'm Angelique Diaz, an
13 engineer with the U.S. EPA Region 8 Denver office, and
14 I'm not sure if this is something that would be
15 covered tomorrow during the uranium geochemistry
16 modeling discussion, but it seems like a lot of what
17 we're talking about, a really important piece of it is
18 how the performance assessment is conducted, and I
19 wanted to ask about the use of KDs in modeling the
20 behavior of depleted uranium or whatever radionuclide
21 is being modeled.

22 And the reason is one of the things you
23 said was that's a gross simplification, which I think
24 most people that know about KDs would agree with, and
25 in your Slide No. 10, the KDs that are shown are from

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1 the 1990 article, and there's been a lot of research
2 between then and now on the effects of some other
3 geochemical or biogeochemical parameters. You
4 mentioned oxidation state, but also there's colloid
5 facilitated transport, natural organic matter, and
6 things like that.

7 So I just wanted to know what the NRC is
8 doing about that, if there's a range of KDs that need
9 to be modeled for the performance assessment or how
10 that's going to be handled.

11 MR. CAMERON: And KDs are?

12 MS. DIAZ: Distribution coefficients for
13 concentration in the soil versus in the water.

14 MR. CAMERON: Thank you. Thank you,
15 Angela.

16 Dave or Christopher?

17 MR. GROSSMAN: I'll just take a second to
18 respond to that. We will be talking about uranium
19 geochemistry in a session tomorrow. The session will
20 focus on some of the factors.

21 I'm sorry. Can you hear me? I'll scoot
22 as close as I can. Thanks, Dave.

23 We do have a session tomorrow on uranium
24 geochemistry, and we'll be talking about some of the
25 factors that our analysis pointed to that should be

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1 considered in a site specific analysis, and I think
2 that in conducting a site specific analysis the NRC
3 typically has taken a position that a licensee would
4 need to demonstrate whatever values are appropriate
5 for their site, and so they would need to have support
6 for those values and a basis for those.

7 MR. CAMERON: Okay. Thank you.

8 Yes, ma'am.

9 MS. FRANKLIN: My name is Naomi Franklin.

10 I would like to have a better grasp of the
11 quantity of DU which is in question. How much is in
12 the present waste pile, how much you anticipate in the
13 future stream.

14 MR. CAMERON: Can we just give her a
15 summary of what you had in the slide?

16 MR. ESH: Yeah, I believe that I'd say the
17 Clive facility in Utah has roughly 47,000 metric tons
18 of depleted uranium in it now. In the near future the
19 shipments from Savannah River that could potentially
20 be coming this month or in the near term, the 14,800
21 drums I believe it was, it converts into 14,000 metric
22 tons? Ten, point eight, 10.8 metric tons would be
23 the --

24 PARTICIPANT: Ten thousand eight hundred.

25 MR. ESH: Oh, sorry. Ten thousand eight

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1 hundred, yeah. That would be the next immediate batch
2 of material. Then in the long term operation of the
3 enrichment facilities, et cetera, it would be much
4 larger than that, potentially up to 700,000 metric
5 tons from DOE and another four or 500,000 metric tons
6 from other sources.

7 So potentially over a million metric tons
8 in the long term, but right now it's on the order of
9 50,000 metric tons.

10 MR. CAMERON: Okay.

11 MR. ESH: And the disposal facilities in
12 Washington and in South Carolina also have some
13 depleted uranium in them, on the order of ten metric
14 tons each.

15 MR. CAMERON: Thank you. Thank you, Dave.

16 Let's go. If you need further follow-up,
17 let's talk to Naomi off-line so that we can get done.

18 Yes.

19 MR. DUNNING: Dirk Dunning, State of
20 Oregon again.

21 A couple of questions. One, I'm not so
22 concerned that these be addressed now as much as
23 putting them on the list to be addressed at some
24 point. I think, number one, I would echo the comments
25 -- I think it's Angela?

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1 MS. DIAZ: Angelique.

2 MR. DUNNING: Angelique from EPA.

3 Particularly at Hanford on the KDs, if you
4 look at the chart that you see behind with the 1990s
5 data, with the exception of strontium, the actual
6 observed KDs in the soil at Hanford are lower than the
7 minimum in every case.

8 In the case of uranium, the actual
9 observed KDs are 0.3 to 0.6 observed, and so it
10 creates a real problem. One of the issues is that the
11 chemistry, there has been a lot of development of the
12 understanding of the chemistry in the last 20 years,
13 particularly about colloid facilitated transport and
14 all the others that she mentioned, but particularly
15 about the carbonate complexation of uranium which may
16 apply in all sorts of application.

17 The second question would be whether or
18 not you've looked carefully at how to include in the
19 rule conceptual model development as you apply this to
20 insure that that's done so that you include all of the
21 concepts so that we don't have homogeneous isotropic,
22 iso-everything modeling.

23 The third is in the past 15 years we've
24 seen a lot of development and understanding of
25 intruder -- what actually happens with intruder kind

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1 of scenarios, however those are used. Marty, I agree
2 with you. The purpose for them is different than is
3 commonly envisioned, but as an example, at Hanford we
4 currently see 20 to 30 meter intrusions in a blink
5 under industrial scenarios. Likewise, you see other
6 deep intrusions under residential scenarios or light
7 industrial in cities and that sort of thing, and so
8 there's some other considerations to take into
9 account.

10 MR. CAMERON: Okay. Thank you very much,
11 Dirk.

12 Okay. We're going to have a last comment
13 or question here, and then we're going to go to lunch.

14 MR. LIEBERMAN: I'm Jim Lieberman with
15 Talisman International.

16 In a former life I was the Director of the
17 Office of Enforcement at the NRC. I can't speak for
18 the NRC today, but I can speak about my experience
19 with guidance versus regulations, and this is really a
20 multi-edged sword issue.

21 A regulation obviously is enforceable, as
22 Chris pointed out. It has compatibility issues.
23 Guidance is not enforceable. Guidance doesn't go to
24 compatibility, and states have the option of adopting
25 the guidance or not.

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1 In the licensing process, when the
2 licensee wants to adopt the NRC guidance it's more
3 likely than not the NRC will accept that guidance as a
4 way to meet the regulation.

5 On the other hand, in the licensing
6 process and the hearing process, the licensing board
7 is not required to agree with the guidance because the
8 guidance is not a legally binding requirement, and in
9 the hearing process the burden is on the licensee or
10 the applicant to defend the basis for the guidance and
11 why they feel they're meeting the regulation.

12 On the other hand, take the license
13 termination rule, which is about three pages in 10
14 CFR, but there's two volumes of guidance in staff
15 guidance in the NUREGs, and as Larry pointed out, to
16 put all of the guidance that will be needed to
17 implement this rule in the regulation will take an
18 awful lot of space and you lose a lot of flexibility.

19 So these are the various actions you want
20 to consider in deciding a regulation versus a
21 guidance.

22 MR. CAMERON: Thank you. Thank you very
23 much, Jim, and thank all of you. That was a good
24 discussion, good session this morning.

25 Let's come back at two o'clock. That

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1 takes about 15 minutes away from your lunch, but it
2 will help us with the time.

3 So thank you. Two o'clock we'll start.

4 (Whereupon, at 12:46 p.m., the workshop
5 was recessed for lunch, to reconvene at 2:00 p.m., the
6 same day.)

7 MR. CAMERON: We're going to get started
8 with an agenda check actually. The subject, the issue
9 of rule versus guidance has come up several times, and
10 it is an over arching issue over all of these
11 substantive issues. I was going to suggest that we
12 have a specific topic on rule versus guidance after we
13 get through with a number of the specific issues, but
14 someone suggested that wouldn't it be better to ask
15 that rule versus guidance question at each specific
16 issue. Okay?

17 So that's what I'm putting forward to you,
18 but whatever we do, I'm putting that as a question to
19 you. Whatever we do our NRC OGC representatives have
20 put together a little slide show that tries to capture
21 a bunch of the comments that we've heard from around
22 the table and from the audience on rule versus
23 guidance. So we will do that.

24 Christopher, Beatrice, I'm going to look
25 for comments on this. Would any preference on how we

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1 do this? And I'm looking for comments from everybody,
2 but I didn't know. Let's hear from Tom.

3 MR. MAGETTE: I think this is an extremely
4 important topic, but I think it only has significance
5 on an issue by issue basis. I mean, the whole notion
6 of rule versus guidance is relative to the topic we're
7 discussing. So I think a boiler plate discussion of
8 rule versus guidance would just have us going through
9 the agenda list to figure out which one we think goes
10 where.

11 So I think if you do what you've suggested
12 and deal with it as you go along, that's the way that
13 makes more sense. If you want to wrap it up or roll
14 it up at the end in a summary way, that certainly
15 would be fine, but you're going to have to talk about
16 it in the context of period of performance or scenario
17 development or whatever the issue is for it to have
18 any meaning.

19 MR. CAMERON: Anybody have any strong
20 feelings the other way, or let me just say does
21 anybody have any other perspectives?

22 Christopher.

23 MR. THOMAS: I would prefer to go through
24 each issue area first and then go back to rule versus
25 guidance because I think there's can be a significant

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1 interplay between the issues. So if you look at them
2 in isolation, you can come up with a different result
3 than if you look at them all together at the end, and
4 rather than talking about this issue and then rather
5 than looking at period of performance and then kind of
6 having the conversation drive into exposure scenarios,
7 I'd rather deal with period of performance, then
8 exposure scenarios, et cetera, and then go back
9 cumulatively to talk about rule versus guidance.

10 MR. CAMERON: Okay. Other views around
11 the table?

12 And I know this is other views around the
13 table. Drew.

14 MR. THATCHER: I think it would be we'd be
15 able to do it maybe in a combination. I think if we
16 did it on a piece by piece basis I think we'd be able
17 to do it quicker. I'm just trying to think of
18 efficiency here, and you'd be able to wrap it, and
19 then you'd probably have an overall comprehensive at
20 the end, but I think if we're right on a given topic,
21 I think we'd all be able to quickly get our opinion on
22 there and move onward, whereas I see if we do it in
23 aggregate, to me it just gets all qualitative, and it
24 just gets -- I don't think we can get resolution as
25 fast. That's all.

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1 MR. CAMERON: Well, maybe what we should
2 do, and this is a suggestion -- well, let me hear from
3 Beatrice first.

4 Beatrice.

5 And the cables have grown longer.

6 MS. BRAILSFORD: Oh, here. I can move
7 that.

8 MR. CAMERON: You can actually move it
9 further up towards you.

10 MS. BRAILSFORD: I guess I would
11 appreciate seeing what the NRC staff has developed as
12 this kind of overview presentation. Then let's start
13 on the individual topics. I, too, think it -- I mean,
14 I understand what you're saying about efficiency, but
15 I think it would also be very valuable to have a lot
16 of the issues out on the table before or as or
17 whatever. I mean, you know, we're only talking a day
18 and a half more.

19 MR. CAMERON: Okay.

20 MS. BRAILSFORD: I don't want to piecemeal
21 the rules versus guidance discussion either.

22 MR. CAMERON: And there also may be, even
23 though we would offer suggestions on rule versus
24 guidance with each topic, it may be that once you've
25 heard all of the topics, that you may have a different

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1 take on rule versus guidance.

2 Why don't we do this? We're going to go
3 through the topics, and if people want to suggest, for
4 example, period of performance should be in the rule,
5 if people want to suggest that, let's have people
6 suggest it. In other words, we'll do what Tom
7 suggest, but when we get to right before the modeling
8 session, I think, let's just have a session just on
9 rule versus guidance. In other words, we'll do that.

10 We'll combine both of them.

11 With that in mind and so that you can have
12 some ideas on this, I think it would be good to hear
13 the OGC presentation at this point. Tison, are you
14 going to do the whole thing?

15 Okay, and just introduce yourself, too.

16 MR. CAMPBELL: Hi. I'm Tison Campbell, an
17 attorney with the NRC's Office of the General Counsel,
18 and we've just got a couple of slides we're going to
19 walk through.

20 Do you want me to go up to the podium?

21 MR. CAMERON: Whatever you feel most
22 comfortable with. But go up and try them somewhat.

23 And Tison is with the Assistant General
24 Counsel for rulemaking and fuel cycle as are these two
25 OGC representatives, and that's where the agreement

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1 state, that's where counsel on the agreement state
2 program, as well as rulemaking comes from. So they
3 know all of the answers.

4 MR. CAMPBELL: I don't know if I'd go that
5 far, Chip.

6 MR. CAMERON: Okay.

7 MR. CAMPBELL: As I mentioned, I'm Tison
8 Campbell, an attorney with the NRC's Office of the
9 General Counsel, and I just wanted to give you a quick
10 overview of regulations versus guidance. Most of this
11 you've heard already. Jim Lieberman's comments were
12 great and touched on pretty much all of the points I'm
13 going to bring up here.

14 So just very quickly, regulations impose
15 binding requirements upon NRC licensees and
16 applicants. They're codified in ten Code of Federal
17 Regulations, and in many cases they are adopted by
18 agreement states. There's a whole compatibility
19 process that determines to what extent our regulations
20 are adopted by the agreement states, and there is
21 going to be a presentation on that tomorrow. So if
22 you have any specific questions on compatibility, I'd
23 ask you to hold off on those until after the
24 presentation tomorrow because that's going to get into
25 a lot more detail as to the compatibility levels and

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1 what exactly goes on in that process.

2 As you heard this morning, regulations are
3 promulgated through the notice and comment process
4 under the APA. So there's an opportunity for public
5 comment on the proposed rule, and then when we publish
6 the final rule in the Federal Register that takes into
7 account the public comments.

8 Moving on to guidance, guidance is not
9 binding on licensees or applicants. It's merely one
10 way that you can comply with the regulations. So
11 there's no -- we cannot require applicants or
12 licensees to follow our guidance. It's just sort of
13 advisory. It's out there for people to look at and
14 get an idea as to how they could comply with the
15 regulations. Guidance does not have to be adopted by
16 the agreement states. Again, in many cases the
17 agreement states do choose to adopt guidance that's
18 similar or identical to the NRC's, but it's not
19 necessary, and it may or may not be issued for public
20 comment.

21 I believe in this case, and Larry will
22 correct me if I'm wrong, the NRC staff intends to
23 publish the guidance for this rulemaking with the
24 proposed rule for public comment.

25 And our guidance can come in many

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1 different forms. If you've looked on our public
2 Website, you've seen our NUREG publications,
3 regulatory guides which Jim Lieberman mentioned or
4 regulatory information summaries which go out to
5 licensees in agreement states and provide guidance or,
6 you know, information on regulations or policy matters
7 that the NRC is working on.

8 So that's just a very quick overview of
9 regulations and guidance, and I'd be happy to take any
10 questions that any of you may have.

11 MR. CAMERON: And before we do that, just
12 let me confirm as Tison noted what the plan was. In
13 this case, Larry, do you want to just say anything on
14 that?

15 Larry Camper.

16 MR. CAMPER: Thank you, Chip. Thank you,
17 Tison.

18 Yeah, we did go back and look during the
19 lunch break as to what we had planned to do on this
20 particular rule, and the plan is to develop the draft
21 guidance, public comment, as well as the proposed
22 rule, the same time, and our current schedule for
23 doing that is the September 2011. So guidance and
24 proposed rule out at the same time for public comment.

25 MR. CAMERON: Okay. Great, and let me

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1 introduce Tison's colleagues, Lisa London and Kevin
2 Roach.

3 So that's sort of an overview. You've
4 heard some of this before. Any questions for Tison or
5 his colleagues on this guidance versus rule process?

6 And Christopher.

7 MR. THOMAS: Yeah, thanks.

8 I'm just trying to wrap my head around.
9 So let's say there was guidance that the performance
10 period should be at least 10,000 years. Now, but that
11 wouldn't be binding on the licensee. They could
12 demonstrate performance objectives being met in other
13 ways.

14 Now, would they have to say what they did
15 was at least as good as 10,000 years or could they
16 choose another period of performance? Do you see what
17 I'm saying?

18 MR. CAMPBELL: It would depend on the
19 specifics. They would come to the staff with a
20 specific approach, and the staff would evaluate it to
21 see if the licensee's proposal complied with the
22 regulations.

23 MR. THOMAS: But the regulations then
24 would be the backstop, not the guidance at all.

25 MR. CAMPBELL: That's correct.

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1 MR. THOMAS: Okay.

2 MR. CAMERON: And under that example, it
3 would be --

4 MR. CAMPBELL: Or with the agreement
5 states. It wouldn't necessarily be the NRC staff.

6 MR. CAMERON: And the way that this might
7 be a useful example to use, the rule would say that
8 the period of performance -- there has to be a site
9 specific performance assessment that has to take into
10 account A, B, C, and C is period of performance, but
11 there's nothing said in the rule about what that
12 period of performance is. It's all in the guidance,
13 and I guess it would be worthwhile exploring this
14 question further than Tison's answer, and I would just
15 ask Chris.

16 Christopher. Okay. You have to consider
17 period of performance. Okay? The guidance says
18 10,000 years. Under what circumstances, how would the
19 NRC look at a different period of performance that
20 would be proposed by a licensee?

21 And I'm just using the NRC as just, you
22 know, a placeholder for agreement states because they
23 would be the ones doing it, and we'll get their
24 comments and other comments around the table, but how
25 do you think that would work?

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1 MR. MCKENNEY: In general, of course,
2 we're going to go back to what is the purpose of doing
3 period of performance, which is providing reasonable
4 assurance that the performance objectives are going to
5 be met. So that would be the regulatory basis for any
6 comparison or judgments on something.

7 So for other waste types, it maybe
8 possible to discuss or depending on site situations
9 and concentrations, other things like that, that they
10 could show and demonstrate that their analysis already
11 covers peak, but it's less than 10,000 years, and that
12 there's nothing that would drive because it's short-
13 lived materials. It's other things that it wouldn't
14 actually -- you know, most of the source term would
15 have already been analyzed by the time that that time
16 period was.

17 So that would be one method that they
18 could have an alternate time period that would be able
19 to say can we get to --the regulatory decision we have
20 to make is does the regulator have reasonable
21 assurance that the performance objectives will be met.

22 MR. CAMERON: And this is also a good
23 example of what you might want to put in a rule versus
24 guidance. In other words, this example was talking
25 about another unique waste stream. If the NRC knew

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1 that the risk of depleted uranium, that you're not
2 going to be able to show that it's all going to be
3 beyond 10,000, you're not going to be able to show
4 below 10,000, that might be a reason to put the number
5 in the rule.

6 MR. THOMAS: Well, exactly, and you know,
7 it's interesting, Christopher, that you talked about
8 peak, out to peak. My understanding is that there's
9 nothing in the current rules that require an analysis
10 to peak. I mean, that's my understanding.

11 MR. MCKENNEY: Correct, but I'm saying if
12 I'm looking at what is reasonable assurance and we
13 have said that we think because of various travel
14 times and we'll look into the performance of the
15 national system, that we believe that for most
16 radionuclides and low level waste you're going to see
17 the peak exposure some time because when we did the
18 performance assessment working group and we developed
19 1573, we looked at a large number of waste disposals
20 that happened in the '80s for volumes at various sites
21 and especially at a humid site, and we were looking at
22 what -- we looked well past 10,000 years for some
23 stylized calculations to see how that would affect
24 where the peaks tended to fall, and we thought that a
25 10,000-year analysis captured for most radionuclides

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1 you normally see in low level waste absence of DU, and
2 because we didn't have DU at large volumes and without
3 volume, was that for most radionuclides that drove the
4 total dose, you were seeing those before 10,000 years
5 at most sites.

6 Now, that's why I'm saying so if someone
7 else said, well, we usually run it for 5,000 because
8 we got our peak at 1,000 --

9 MR. THOMAS: Or 500.

10 MR. McKENNEY: Yeah, or something like
11 that. If you theoretically could demonstrate by
12 various other means that you had captured the peak,
13 you had made either conservative assumptions or some
14 other method that you could show and justify that you
15 had captured the peak and there isn't another peak out
16 there from something else that's bigger, so that would
17 be part of the justification. They would have to come
18 in and say, "Our analysis that we provide you in this
19 manner will provide you reasonable assurance." We
20 would have to then make an evaluation to say is that
21 true. Is there anything else out there that could
22 occur beyond this time period that would want us to
23 say, you know, at least 10,000 years or something
24 around there.

25 In addition, 1573 does talk about for arid

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1 sites 10,000 years itself might not be the right one,
2 and you may have to consider some longer time periods.

3 MR. CAMERON: Okay. Larry wants to say
4 something here, but I want to get -- let me get Dan on
5 the record and let's hear from Larry and also I don't
6 want to forget that Tison is up there. He led this
7 off.

8 (Laughter.)

9 MR. CAMERON: If he has anything to say on
10 this, and, Tison, if you want, you can come down to
11 sit at the table. In fact, you can sit right here.

12 But, Dan, why don't you talk and then
13 we'll hear from Larry, and then Tison will be here to
14 answer any.

15 MR. SHRUM: Thanks, Chip. I'll be quick.

16 In the spirit of moving forward, I would
17 like to go back to something that we have discussed,
18 and that is the definition of a significant quantity.

19 That has been something that we've talked about at
20 this table. We would propose or I would propose that
21 the definition of a significant quantity be included
22 in the rule, and we would also propose that there be
23 no definition of a significant quantity in such that
24 depleted uranium will require a performance
25 assessment.

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1 So that's kind of what we had anticipated
2 or wanted with this. Let's talk about them when they
3 come up after we've had good discussion.

4 MR. CAMERON: Thank you. Thank you, Dan.

5 Larry.

6 MR. CAMPER: Okay. At some point, you're
7 going to have a discussion about period of
8 performance. Is it now?

9 MR. CAMERON: No.

10 MR. CAMPER: Next. Okay. So you're going
11 to have a discussion about POP per se, and when you do
12 that and as you wind down your discussion, I'm going
13 to ask you the same question that I asked the group in
14 Maryland. So hold that question, but on this issue of
15 guidance versus rule, Christopher, you're right.
16 There's no period of performance specified in Part 61.

17 There are other regulations where we have a POP
18 specified, part 40, Part 60, Part 20, Subpart E for
19 decommissioning, and Part 63 for Yucca Mountain.

20 So there are places where POPs have been
21 specified. Okay? It is also fair to say that the --
22 and I conferred with Tom Magette a moment ago and he
23 verified my recollection -- is that the panel when you
24 talk about POP in Maryland reached a conclusion about
25 whether it should be in guidance or it should be in a

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1 rule, and that was it should be in a rule. Okay?

2 So that at least gives you the benefit of
3 knowing that POPs have been specified. Some parts
4 don't have it, and where the group was in Maryland.

5 MR. CAMERON: All right. Well, let's hear
6 from Drew and Marty.

7 Drew.

8 MR. THATCHER: Thanks.

9 I guess I want to make just a question as
10 to where we are. I was expected us to get started on
11 the time period of performance, and some of these are
12 related to that and others seen to be just more in
13 global where we're still talking about what if.

14 So if we're going to start talking about a
15 time period of performance and whether that goes in
16 rule and guidance, then I'd rather have the
17 presentation and then we discuss some of this because
18 I think it gives a better context to it.

19 MR. CAMERON: Oh, yeah. No, we don't want
20 to get off on -- you're right -- on the substantive
21 issue itself. I think this has just been used as an
22 example of how rule versus guidance works, and we're
23 going to go the period of performance. We'll tee that
24 up right after we hear from Marty, and I don't know,
25 Christopher, if you have anything else on this or not.

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1 MR. THOMAS: Well, yeah, I just wanted to
2 make a brief, very brief, comment.

3 MR. CAMERON: Okay. We'll go to you.
4 Let's hear from Marty and then we'll go to you and
5 then we'll tee up.

6 MR. LETOURNEAU: I don't want to be too
7 pedantic about this, but the goal of any regulator and
8 in this case I include ourselves at the Department of
9 Energy because we write our own requirements that we
10 implement under the Atomic Energy Act; they're not
11 regulations, but we have requirements versus guidance.

12 We use the philosophy that NRC uses, same philosophy
13 that IAEA uses, is you're trying to identify in the
14 requirement the what, and maybe a little bit of the
15 why, but then in the guidance is your opportunity to
16 provide examples of the how to satisfy the what.

17 And typically we try to, as people writing
18 requirements, to make the requirements as high level
19 as we can because of the need for flexibility and to
20 provide opportunities for interpretation.

21 Now, that being said, one example that's
22 pertinent to what we're talking about right now, and
23 it gets to what Dan was just talking about, when we
24 published DOE Order 435.1 in 1999, we included in
25 there a requirement that allows us to manage small

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1 quantities of 11(e)(2) material under our AEA
2 authority as low level waste and to meet the low level
3 waste performance objectives, very akin to what we're
4 talking about right now.

5 And in the guidance we spoke to the fact
6 that we felt that what that meant was we needed to do
7 a performance assessment on that, and we needed to
8 look to whether we met the performance objectives or
9 not.

10 Well, some years ago we got into a
11 situation with the State of Nevada where we wanted to
12 send some 11(e)(2) material from Fernald there, and
13 the state said, "You haven't defined small quantity."

14 We said, "Well, yeah, we talked about it
15 in the guidance."

16 And the state said, "No, no, no, no, no,
17 no, no. Right here you just say small quantity and
18 there's no definition of it."

19 So we're in the process of updating 435.1
20 right now. I suspect that we are going to take that
21 as a lessons learned and now include in the
22 requirement more discussion about what small quantity
23 means so that we don't have that problem.

24 MR. CAMERON: Thank you. That's very,
25 very instructive, Marty. Did you have a quick thing

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1 before we move on?

2 MR. LETOURNEAU: Well, yeah, and I think
3 it's great to move on to period of performance. I
4 guess it was just hard for me, Christopher, to hear
5 what you were saying because I don't think there is
6 any requirement currently to look out to the time of
7 peak dose. I mean, you know, I'm looking at a
8 performance assessment that goes to 500 years for a
9 certain company, and yet there's a hazard that's well
10 understood to persist well beyond that.

11 So to the extent that there's room for
12 interpretation, that makes me uncomfortable because
13 I've seen in my mind that used to create a scenario
14 that doesn't capture the risk. So that's my point on
15 that.

16 MR. CAMERON: Okay. That's a great segue
17 in the period of performance because even if you have
18 it in the rule, you still have to figure out what is
19 the proper time period, compliance time period,
20 compliance time period. That's where we're going now.

21 David, are you going to tee this? Are you
22 teeing up for a period of performance?

23 Okay. Great. Thank you. And thank
24 Tison, Lisa, Kevin, for that.

25 MR. ESH: All right. Period of

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1 performance, this is one of my favorites. I'm sure
2 it's a lot of your favorites out there, too.
3 Everybody has strong opinions on it, and it's an
4 important aspect to this problem.

5 I'll go over a little bit of background,
6 what's in 10 CFR Part 61 now; what's in NUREG 1573,
7 which is our Performance Assessment Working Group
8 guidance document for low level waste disposal; look
9 at some other waste programs in the U.S. or NRC
10 regulations, and then we can talk about some key
11 considerations and maybe approach as to period of
12 performance.

13 So a little bit of background. In the
14 development of 10 CFR Part 61, that initially
15 considered a 10,000-year period of performance, but I
16 believe as Chris McKenney indicated earlier this
17 morning, 10 CFR Part 61 does not provide a value for
18 the period of performance.

19 The site and waste characteristics
20 influence timing of projected doses. On the figure on
21 the right here as a plot of the initial activity and
22 later activity of two different source terms, one
23 commercial low level waste and one depleted uranium,
24 this is what I was talking about earlier this morning
25 when we had the table and the ratio of commercial low

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1 level waste to depleted uranium.

2 The commercial low level waste starts out
3 at its highest values because it has a lot of short-
4 lived, high activity material, and it decays very
5 rapidly at, say, very rapidly on a performance
6 assessment framework, of course.

7 By 1,000 years, it's much, much less than
8 one percent of its initial value typically. It does
9 have characteristics that some fraction of a
10 commercial low level waste stream does have a long-
11 lived aspect to it. That's why this curve does not
12 continue to go down, and it does have some in-growth
13 associated with typical commercial low level waste.
14 So some of the materials that are disposed of have
15 some daughter products that come in over time.

16 Depleted uranium, by comparison, it's
17 flat, essentially flat on this sort of chart for a
18 very long period of time, and then maybe in the
19 100,000-year time frame -- and this is a log scale, of
20 course -- you start seeing some change in the
21 activity.

22 This activity ratio, of course, depends on
23 how many daughters you include in the decay chain to
24 represent the activity ratio, but it's just to give
25 you an indication of the type of behavior you get for

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1 the two different types of materials.

2 Oh, I forgot I had animation there.

3 All right. So NUREG 1573 considered a
4 10,000-year period of performance sufficient to
5 capture the risk from the short-lived radionuclides,
6 to assess the risk for more mobile, long-lived
7 radionuclides, and to bound the potential peak doses
8 at longer times. This is something that Chris was
9 just talking about, Chris McKenney was just talking
10 about in the previous discussion.

11 But it did note some exceptions, and the
12 exceptions it noted with respect to having a 10,000-
13 year period of performance is that if you had the in-
14 growth of daughters from large inventories of uranium,
15 maybe 10,000 years would not be sufficient to capture
16 the peak.

17 It also noted a different case, that peak
18 doses at humid sites from large inventories of long-
19 lived transuranics may not be captured in a 10,000-
20 year period, and this is mainly due -- and it notes
21 humid sites because arid sites, even at very extremely
22 long times, the travel times can be very long in some
23 cases, but at a humid site some of these long-lived
24 transuranics that can be very absorptive, they can
25 arrive some time after 10,000 years, and it may not be

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1 reflected in a 10,000-year period of performance.

2 So within the U.S. we have some other
3 disposal programs or activities where a period of
4 performance has been specified. We have geologic
5 disposal. The Yucca Mountain specific regulations, 10
6 CFR Part 60.3, provide a period of performance out to
7 a million years.

8 It does provide for different dose
9 criteria, whether you're in up to a 10,000-year period
10 of time and then between 10,000 to a million years.
11 So there's a lower limit up to 10,000 years and a
12 higher limit after 10,000 years.

13 The WIPP specific standards in 40 CFR 191
14 provided 10,000-year period of performance. The
15 general regulations for high level waste, 10 CFR Part
16 60, which would apply to any geologic disposal in the
17 -- for high level waste in the U.S. outside of Yucca
18 Mountain still has a 10,000-year period of performance
19 associated with it.

20 And then we do have some other near
21 surface disposal activities that aren't low level
22 waste. Decommissioning, 40 CFR Part 20 has a 1,000-
23 year period of performance, and the mill tailings
24 regulations, 40 CFR Part 40, Appendix A, have a 1,000
25 years goal.

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1 And I would also note that internationally
2 there's not really a consensus on this. The different
3 societies and groups do it differently, and they have
4 different considerations that they make.

5 For all of these disposal activities that
6 I've listed here on this page, they all do have some
7 long-lived radioactivity associated with them or they
8 can. So the fact that depleted uranium is long lived
9 is not unique to the low level waste problem but may
10 be what distinguishes it, could be in the
11 concentration quantity compared to some of these other
12 activities.

13 So key considerations that we think we
14 should talk about today and be considered in
15 developing the regulation and the guidance are hazard
16 and longevity of the waste, what's the analysis
17 framework, socioeconomic uncertainties, how you factor
18 those in, how you consider them, and uncertainty in
19 extending models. Those are just some major factors
20 that we thought of when we have discussed this
21 internally.

22 Uncertainty in timing and magnitude of
23 doses. What you have here is what we call horse tail
24 plot. That's what you get when you do a probabilistic
25 analysis for one of these sites, and what you have is

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1 some sort of dose result versus time on both a log,
2 log scale, and what I want to highlight on this figure
3 is that there's uncertainty in the variability.
4 There's uncertainty in variability in the timing and
5 magnitude of the dose, and sometimes when people see
6 these charts they say, "Well, I know uncertainty is
7 increasing with time," but if you look at your
8 calculational results, I'd say the uncertainty is
9 larger earlier, and it gets smaller later. That
10 doesn't make sense. Uncertainty is increasing.
11 What's going on here?

12 Well, part of what's going on here is that
13 in this region of this graph in particular you have
14 uncertainty in both the -- uncertainty and variability
15 in both the timing and magnitude of the impact. So
16 you're uncertain about when it's going to occur, and
17 then when it starts occurring, it increases very
18 rapidly usually as the material arrives at, say, your
19 receptor location.

20 At longer times, you're more certain that
21 the impact will occur, but you're uncertain about the
22 level of the impact that you will get. So that's why
23 you get this sort of shape of the chart. It doesn't
24 mean that the analysis doesn't make sense. It's an
25 artifact of the uncertainty and variability in the

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1 transport of radioactive materials in the environment
2 and how they show up on these sorts of curves.

3 But then to go a little further, I wanted
4 to give some perspective on time scales because it's
5 easy to put them on a chart, and it's much harder to
6 think about them critically, and so what I've done
7 here is I've put a couple of things that are about 40
8 years old. That's my agency, and this is my brother
9 and myself, and since it is my birthday, maybe this is
10 very accurate. I don't know where I put the arrow
11 here.

12 (Laughter.)

13 MR. ESH: And then a couple of things that
14 are more or less 100 years old.

15 (Laughter.)

16 MR. ESH: The State of Utah and this other
17 individual we have sitting over here. Something
18 that's 250 years old, that's our country. Okay? Two
19 hundred and fifty years.

20 Transposing these things from the past and
21 the future on dose analysis like this, you see that
22 for this particular calculation you wouldn't even
23 expect to see impacts until longer than the age of our
24 country.

25 So I know we're concerned about future

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1 generations. We have to be concerned about future
2 generations, but we have to think critically about the
3 problems, too, and think about the context of it.

4 This is something that's a few thousand
5 years old, Great Wall of China, and then something
6 that might be on the order of ten or 20,000 years old,
7 a mastodon, and I had a lot of trouble finding
8 anything that was really accurately dated out here in
9 the later part of the figure.

10 But it's just that we're going to talk
11 about period of performance. It's a kind of esoteric
12 discussion, but we do need to think of the practical
13 implications of period of performance and what it
14 means.

15 So what are some approaches to period of
16 performance? What could we do? Well, NRC could
17 specify a period of performance. We discussed that in
18 the first workshop and a lot of people felt, yes, you
19 should specify a period of performance.

20 Another alternative besides that though is
21 we could specify what factors you consider and the
22 licensee or other people develop the period of
23 performance that they think is appropriate considering
24 those factors. That gives a bit more flexibility, but
25 as we've discussed and for any of you that may be

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1 regulators, you understand that flexibility is a
2 double edged sword.

3 So the factors to consider for either
4 approach, we want to cover those though. What do you
5 think should be the main factors? What should be the
6 considerations and how should this be selected and
7 anything else you can think of.

8 So we're seeking your input on this topic
9 and would like to have a good discussion, and we'll go
10 from there.

11 MR. CAMERON: Thank you, Dave.

12 Okay. That's pretty straightforward with
13 some difficult issues to answer, and let's go to Drew.

14 MR. THATCHER: I guess I'll throw the
15 first bomb out. At least from my standpoint,
16 analyzing out to a million years quantitatively is
17 just dumb. You open up a Pandora's box of so many
18 issues that you're going to have to address
19 potentially that it makes the whole issue meaningless.

20 So I almost think that you need to solve
21 the problem without having to get the time frame
22 making yourself tripped up all over it, and I'm
23 jumping ahead a little bit, but take radon, for
24 instance. We do have UMIL requirements and release
25 limits that's specified in that, and I think in a rule

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1 you could very easily say you need to make sure you've
2 analyzed for a peak dose for radon, and here is your
3 performance limit that you have to meet of 20
4 picocuries per meter squared per second. It's already
5 in the law somewhere else. It's already applied and
6 used.

7 And as you do that, you don't get yourself
8 wrapped around an axle of what happens in a million
9 years. Well, geez, we're going to have 30 floods
10 between now and then or we're going to have a glacier
11 or whatever, and it just tears the whole model apart,
12 and we've only been around for what, 5,000 years or
13 something like that as humans, conscious, I guess, or
14 10,000 maybe?

15 I think beyond 10,000 years you're nuts.
16 So at least that's my view of it.

17 MR. CAMERON: Well, just so we make sure
18 everybody understands what you were suggesting, would
19 you put a specific time frame, like 10,000 years, in
20 or is there another way to handle period of
21 performance?

22 MR. THATCHER: Well, State of Washington
23 already did a performance assessment. We did include
24 10,000 years. We quantitatively analyzed to 100,000
25 because it was just pointless to go beyond 10,000 and

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1 be sure that anything you're doing at that point is
2 meaningful.

3 So in the best world, I'd like to see
4 10,000 years with a way to specify. You know, in this
5 case the million years we're worried about is radon.
6 So there's a way to tackle that without having to say
7 you've got to analyze to a million years. Because I
8 think when you start to do a process for a performance
9 assessment, you're going to get a situation where
10 anybody's opinion about what happens in a climactic
11 event that far down the road is valid, and you're
12 going to get -- I think it will be an all stop. So
13 that's what I'm worried about.

14 MR. CAMERON: Well, that's the piece I
15 want to understand before we go over to Steve, is that
16 there was a 10,000-year performance period with a way
17 to specify, and you gave a number before, to specify
18 what for radon? I'm just trying to understand.

19 MR. THATCHER: Oh, the radon flux
20 emanation limit, in 40 CFR 192. Am I right? It's --

21 PARTICIPANT: One, ninety-one.

22 MR. THATCHER: One, ninety-one. I'm so
23 sorry.

24 It's 20 picocuries per meter squared per
25 second, and that basically is an emanation rate at the

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1 surface, at the top of the cover, whatever that be.

2 MR. CAMERON: Okay. Does everybody --
3 well, we'll find out if everybody is clear.

4 PARTICIPANT: Twenty what?

5 MR. THATCHER: It's just a flux. So
6 you've got 20 picocuries, and then it's per meter
7 squared. So a square meter of area per second. So so
8 much radon can be emitted per second, and that's how
9 we've closed UMILs in the country, several of them.
10 So it gets you on an intruder's standpoint. The dose
11 from that is roughly equivalent to the 500 millirem.
12 It might be a little higher than that, but it's in the
13 ballpark.

14 MR. CAMERON: So that flux limit is a
15 present day -- that's a present day measurement then.

16 MR. THATCHER: Right.

17 MR. CAMERON: Okay, all right. Great.
18 Let's go to Steve and then we'll go to Beatrice.

19 DR. NELSON: I'm going to actually agree
20 with Drew in a minute although you may be surprised
21 with what I'm going to start out with. I ask myself
22 how can the period of performance be less than the
23 time it takes for the activity of depleted uranium to
24 reach its maximum, which is a million years. And I
25 also would say, given that consideration, how can it

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1 not be in the rule. But I agree with you. I don't
2 believe models and I don't want to offend any
3 performance assessment modelers but I'll say it
4 anyway, I don't believe models to 10,000 years.

5 I think models to a million years are
6 absurd, which leads me back to the conclusion we
7 should not even be having this discussion. Depleted
8 uranium, because you can't model it, you can't
9 understand its behavior when it's at its most
10 hazardous, does not belong in an engineered landfill.

11 MR. CAMERON: And, Steve, let me ask you
12 a question about that and Drew also. In order to
13 achieve this flux, this emanation limit, to achieve
14 that would you need to do certain engineering
15 features? I mean I'm wondering how far that gets
16 towards Steve's concern?

17 MR. THATCHER: Well Steve's point of you
18 know you've got to get the peak dose and then what
19 I've suggested kind of accomplishes that peak dose in
20 that you can do your analysis without assuming, okay,
21 you've got assume that the waste essentially stays in
22 place, you're not going to assume a term, you can
23 simply do a quick calculation and figure out what the
24 ingrowth is for your radon at whatever time frame.
25 That's not hard to perform.

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1 Then you take that source term of radon
2 that you have in a million years or whatever it is,
3 that's your source term from time zero, you design
4 and/or place the material at a deep enough depth, have
5 enough cover there, that then allows you with the
6 waste to cover that's in place and you analyze that
7 there, what is your estimated flux that you're going
8 to have?

9 And so you can do that analysis without
10 then saying well what about the 74s or what about
11 everything else that comes into place? And I can't cut
12 you on Steve's point, his point is great, you could
13 still do that but you know this is pointless. You
14 could be so wrong on everything that you're doing that
15 it may not mean anything and I can't answer that
16 question. That's a good point.

17 MR. CAMERON: Is that a proper
18 characterization Steve?

19 DR. NELSON: My answer is one word:
20 salt. Geologic disposal in salt. I mean we're asking
21 all the wrong questions. I know I'm not going to
22 change that, I hope I am, but I'm not deluding myself.

23 Depleted uranium, because of its long-lived nature,
24 it shares a lot of characteristics with high level
25 waste, long-lived nuclides that are mobile under

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1 oxidizing conditions, poorly sorptive, I'm thinking of
2 things like uranium neptunium technetium, it belongs in
3 geologic disposal and there are plenty of places in
4 this country where there are thousands of feet of
5 salt, and if anybody wants to talk about merits of
6 salt I'd be happy to do that but I won't for right
7 now. And that doesn't even play into the site-
8 specific analysis for landfills.

9 MR. CAMERON: Okay. Thank you, Steve.
10 Let's go to Tom and then we'll come over to Beatrice
11 and check in with Chris and Scott.

12 MR. MAGETTE: Thanks Chip. Generally I
13 agree with Drew's proposal, I think it's consistent
14 with some of the points that David made. There is a
15 lot in existing regulations and guidance that talks
16 about this, whether it's 10 CFR Part 60 or 63 or 40
17 CFR 191 or NUREG-1573, this notion of a compliance
18 period of performance of 10,000 years with some sort
19 of acknowledgment that you may have to look farther
20 than that on a
21 qualitative or probabilistic basis to get out to peak
22 dose I think is what makes the most sense because I
23 agree that you can't effectively model out farther
24 than that or potentially there are large uncertainties
25 even modeling out to that.

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1 But the notion of some sort of
2 deterministic quantitative projection of a dose in a
3 million years is simply not something that we can
4 reliably calculate by any stretch of the imagination.

5 But to look out, and the flux is a good
6 way to do it too, I think we could that and we do have
7 disposal sites, as Drew mentioned. We have sites where
8 we do have radon elimination today where there is an
9 equilibrium. It may be a lower concentration but in
10 terms of the behavior of the radon it's not something
11 that we have no analog for or understanding of so
12 there is some meaning to using that flux as a measure.

13 But I think that's the best way and I
14 think it should be in rule, it should be a part of a
15 regulation. It's in guidance today that could be
16 referenced or replied but I think it's appropriate to
17 put it in the rule, and I think the place you put it
18 is not 10 CFR 55, I think you put it in sub-part C.

19 I made a comment earlier today that the
20 rule should be simple, and by that I don't mean that
21 it's a simple problem, I just mean that the language
22 should be simple, but I do think that to effectively
23 regulate this there are some things that have been in
24 guidance for a long that time should be put into the
25 regulations. And I believe sub-part C, the

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1 performance objectives, is where they should be noted.

2 And I believe period of performance is one of them.

3 MR. CAMERON: Okay. Thank you. And
4 we're going to go to Beatrice. One question I'll just
5 lay out there for you is if you have the radon
6 emanation flux limit, what does the 10,000 year
7 compliance period buy you? Drew?

8 MR. THATCHER: Well that would cover
9 everything else hopefully. In most instances I think
10 you're going to see groundwater impacts prior to that,
11 or at least peak near that time frame, so the 10,000
12 years would still cover everything else for the site.

13 I mean even for uranium and DU we've got radon but
14 you also have groundwater transport and you certainly
15 want to cover that. So kind of make sure you catch
16 both things.

17 MR. CAMERON: Okay. Thank you, Drew.
18 Beatrice?

19 MS. BRAILSFORD: And I appreciate Steve's
20 point and I alluded to it this morning when I referred
21 to the ad hoc nature of this process, that there is
22 this elephant in the room that we're going to keep
23 dancing around, is this the appropriate method of
24 disposing of depleted uranium, no matter if it's in
25 rule or guidance.

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1 I understand the 10,000 and then the peak
2 dose and I guess I think the 10,000 does get you a
3 lot. It is a way of testing how robust or not the
4 system is faced with the peril it is to protect us
5 from.

6 Did you say though you do the 10,000 years
7 and then you carry it out to the peak, did I hear you
8 say that even at that peak you were still giving the
9 facility credit for the initial cover?

10 MR. THATCHER: Yeah. Yes. And as far
11 as analysis beyond that I simply made it a construct
12 to go out to a million years, meaning you just simply
13 calculated the ingrowth and that you just assumed
14 through your analysis, okay, I've got it, time zero
15 it's all here. Or wherever you wanted to do that. So
16 that you could at least do the design work to figure
17 out how much cover you need to in order to effectively
18 get the radon emanation rate down to what you need.

19 MS. BRAILSFORD: So the cover was extant
20 at 10,000 and out at a million? Both?

21 MR. THATCHER: In effect, yes. Now
22 whether that's true or not we really have no way of
23 knowing and that's the problem here that you get
24 wrapped around the axle on is that okay we need to
25 make sure that something lasts to a million years.

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1 There's no way for us to ever do that.

2 MS. BRAILSFORD: Well but in this case a
3 million years isn't a number just pulled out of the
4 sky. It matches--

5 MR. THATCHER: Well a million is not even
6 peak though. I mean it's close but it's still a
7 number.

8 MS. BRAILSFORD: Okay.

9 MR. THATCHER: You could use 100,000 and
10 that actually gets you a large part of the way there
11 and I don't know maybe that's more realistic, then
12 you're only talking about six or seven ice ages. I
13 don't know.

14 MS. BRAILSFORD: Well, no, I like the
15 idea of doing that, looking further down the road
16 based on something besides a round number which I
17 think your system does provide.

18 MR. CAMERON: Okay. Let's go to Scott
19 and then Chris McKenney. Scott?

20 MR. KIRK: Yes, I too would agree that a
21 10,000 year time period is plenty long enough time to
22 do the analysis and I think the performance assessment
23 working group recognize that and I think they called
24 it if you started looking at parameters outside of
25 that as being exhaustive speculation, because you get

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1 into looking at things like climate changes that we
2 just can't predict that long into the future. And so
3 we do have limitations on the model itself.

4 But the other thing I would also suggest
5 about a 10,000 year time period as far as putting it
6 into a rule, as I mentioned before and as Susan did,
7 the State of Texas right now has a regulation that
8 requires you look at peak dose. So whatever the NRC
9 chooses to do with putting a time period on it, they
10 need to recognize the existing laws that currently are
11 at play.

12 And we did analyze 10 different waste
13 streams and we did analyze it for peak dose to 36,000
14 years, but we were relying on things like
15 containerization, intruder barriers. You can also have
16 radon barriers, and I think that's the other part that
17 really needs to be considered heavily as part of a
18 rule-making.

19 MR. CAMERON: Okay. Thank you. And at
20 some point maybe we'll ask Susan about the peak dose.

21 In fact let's go to Susan right to follow on that and
22 then we'll go to Chris.

23 MS. JABLONSKI: Well, I think we
24 appreciate all the comments. We went through this very
25 discussion, as Scott will be familiar with, when we

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1 were trying to do our rule making in 2003. And the
2 idea of peak dose is in our rule and so you know one
3 of the things with Drew's comments, the only kind of
4 caution I would take there is you're doing a site-
5 specific analysis and if you have information about
6 things at play you should consider those,
7 understanding the uncertainties and understanding what
8 the analysis is. And it's still a tool though.

9 And for us that's how we looked at it and
10 we were clear with the applicant that's how we looked
11 at it, we were clear with the public that's how we
12 were going to look at it.

13 And so it's not that it's going to be your
14 only definitive tool in making some of these decisions
15 but it was one of the tools that we used that we
16 thought was important to get at. So that it was an
17 open discussion, understanding the uncertainty in some
18 of this modeling going out into the future.

19 And definitely wanting to get as much of
20 those site-specific information that we could get
21 you're not just looking at generic analysis and saying
22 that fits all. We don't want to do that. I mean we
23 are trying in that analysis to bring in as much
24 that's unique about the characteristics and what we do
25 understand about our specific site as possible.

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1 And that's the recognition we would want
2 to be looking at. As Scott said, what we already have
3 in place and really focusing I think what the NRC is
4 trying to do is say, okay, we've done this analysis
5 but the site-specific is what are the important keys
6 here that are going to drive how you make these
7 decisions into the future about a site taking waste.

8 MR. CAMERON: Okay. And Chris is going
9 to give us a process point and I also wanted to ask a
10 question in terms that both of you may want to chime
11 in on is it possible to reconcile a possible NRC
12 approach of 10,000 years and specified in the rule
13 with the Texas approach?

14 MR. MCKENNEY: First to address Scott's
15 approach about this is just remember when we had this
16 discussion a little earlier was that as part of the
17 proposed rule-making development is that the
18 agreements were part of that process. So therefore
19 that would be part of the working through would be (1)
20 how can we make this most beneficial from all sides so
21 that it's a consistent approach across the federal and
22 agreement states, between the NRC and the agreement
23 states who are on the same level of importance here on
24 the regulation, that we can reconcile those changes
25 with those regulators that might have already

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1 requirements similar to what we might want to put into
2 Part 61.

3 So that would be one of those discussions.

4 Now in development of NUREG 1573 we did
5 discuss this compliance period for a 10,000 year
6 compliance period or approximately and then the
7 potential to look beyond that to peak doses to make
8 sure that there aren't processes you aren't
9 understanding. That in the end didn't become that as
10 part of the guidance 1573 but it's not necessarily
11 that that would not necessarily be a way we could go
12 in the future also.

13 So it doesn't mean that any one limit, a
14 compliance limit and a peak dose limit together or
15 evaluation of the peak are not necessarily forces we
16 can consider.

17 MR. CAMERON: Great. Thank you.

18 MR. MCKENNEY: I also have another point.

19 MR. CAMERON: Did you want to make your
20 other?

21 MR. MCKENNEY: If you want to continue
22 this thread, mine's on a different thread so if you
23 want to continue this part. So go on to that thread
24 and come back to me after we're done with this part
25 and then I'll go the other way.

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1 MR. CAMERON: Okay. Drew?

2 MR. THATCHER: I was trying to summarize
3 in my own head what you just said in the last few
4 seconds and I failed. So could you say that again?

5 MR. MCKENNEY: Well, if we had a limit, I
6 mean just because we have in like 1573 we have a
7 single number limit doesn't mean, I mean that's why
8 we're asking you guys, what would be a good approach.

9 Would we want to go to something like either the
10 state of Texas has done with sort of a limit and a
11 peak dose evaluation time period or what the state of
12 Washington has done which has been a limit for
13 compliance of 10,000 years and then an evaluation in
14 the environmental impact statement of a longer time
15 period, which I believe is 100,000 years in the
16 environment impact statement.

17 I mean those are on the table and so we
18 don't want to presuppose how we actually you know word
19 that so saying they're different than what our
20 guidance is is not necessarily a stop.

21 MR. CAMERON: Okay. So you're getting an
22 idea of the range of the way to do things here and
23 let's go to Marty and to Peter and Christopher and
24 Larry wants to say something and I want him to hear
25 comments around the table before he talks. But Marty

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1 go ahead.

2 MR. LETOURNEAU: Yeah, this was another
3 one of those areas where I was kind of resisting
4 saying something but Drew so hit on it that I figured
5 I had to throw our hat in the ring and say well what's
6 DOE doing? When we published 435.1, we went in with
7 a thousand year time of compliance and before we
8 published it we went to the inter-agency steering
9 committee on radiation standards, ISCORS, and the NRC
10 representative there at ISCORS said well you know
11 we've got 1573 and it says 10,000 years. Is there
12 something that we can do? What's a middle ground
13 here?

14 So what we ended up finally with in 435.1
15 was, yes, we use a thousand years for compliance but
16 there's an "and" and the and is and peak dose out to
17 10,000 years. So in effect is the peak is between a
18 thousand and 10,000 we're looking out to that peak.
19 And then we're stopping at 10,000 years.

20 But then beyond 10,000 years we look
21 qualitatively at what else is happening. So when you
22 get to the 10,000 year mark does the curve go like
23 this, does it go like that? Does it go down, because
24 we want to see where the peak is beyond 10,000 years
25 and understand it so that we can then ask questions

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1 about well could you change some of your assumptions?

2 If it's right beyond 10,000 years, are there some
3 critical assumptions that if you changed would pull
4 that back in? And are the assumptions that you're
5 using that are driving that out beyond 10,000 years
6 actually reasonable or not.

7 Now the other part of what we do which
8 Drew hit on is that we don't include the radon in the
9 all pathways dose, and we do in fact do exactly what
10 Drew suggested with one difference. The 20 picocuries
11 per liter per meter squared per second, comes from 192
12 and we use that the same way Drew described it,
13 emanation rate. But we also included the NESHAPS
14 limit from 40 CFR 61 which is 0.5 picocuries per liter
15 of air at the boundary. So for our radon we say you
16 can use either one of those two measures to show
17 compliance.

18 MR. CAMERON: And what did you call that
19 last--

20 MR. LETOURNEAU: NESHAPs.

21 MR. CAMERON: Oh NESHAPs. Okay. Great.
22 All right. Okay. Thanks Marty. Let's go to Peter
23 Burns and then we'll go to Christopher.

24 DR. BURNS: What I want to say I almost
25 forgot because I've been waiting so long so I have to

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1 recollect my thoughts here, reread my notes. The long
2 and the short of it is that, and I said this in
3 Maryland too, I think you do definitely need in the
4 rule a specific time frame and although a million
5 years would probably capture peak dose it's not
6 realistic. So I would favor a 10,000 year time frame
7 for the dose to the public, not just from radon
8 emissions but from uranium release as well, from
9 everything.

10 But I was outside at lunch and I was
11 looking up at that hill over there and being a
12 geologist I could easily figure out what the erosion
13 rate is on that hill and I could figure out okay so
14 we're going to have some climate change and blah blah
15 blah and I could draw some-- and I could bury the
16 depleted uranium in a location where it's fine for
17 10,000 years but at 15,000 years it's exposed and
18 gone. So you absolutely have to have a consideration
19 of peak dose. You can't put it somewhere where you
20 know that in 20,000 years or whatever it will not be
21 there.

22 So I think having the 10,000 year
23 criterion is fine, but the rule has to have some
24 consideration of a prediction of when peak release,
25 peak dose is likely to be and this will prevent,

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1 hopefully, a scenario where somebody puts a landfill
2 on the side of a hill or whatever.

3 I think restricting it to radon release
4 rates is too simple. If I were going to bury depleted
5 uranium I'd want this regulation to be radon emanation
6 at the top of that landfill. That's what I'd want
7 because that's the easy thing for me to control. But
8 that's not where the public, the bulk of the public is
9 most likely to get their dose in my view.

10 As you go out far enough in time it's more
11 likely to come through uranium in groundwater and so
12 it's not the radon percolating out the top that
13 impacts a few people, it's the uranium going
14 downstream that can potentially impact far more
15 people.

16 Oh and one more thing I was going to say.

17 It's kind of funny in a way to listen to people say
18 it's dumb to model a million years. I agree. It's
19 probably almost as dumb to model 10,000 years in
20 reality because the climate change cycles etc. that we
21 talk about in a million years they all happen in
22 10,000 years as well. In 10,000 years we could well be
23 under 1,500 feet of water or some ludicrous thing here
24 as we're in another glacial period and we have a
25 pluvial lake on top of Salt Lake City and who knows?

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1 MR. CAMERON: Peter, let me ask you a
2 question. Given that approach, do you think that
3 there's other ways to deal with this problem other
4 than geologic disposal as suggested by Steve Reynolds?

5 DR. BURNS: Other ways other than
6 geologic disposal, well yes. But first let me expand a
7 little bit on geologic disposal.

8 The key feature about a uranium ore body
9 was that it was stable. There were a lot of uranium
10 ore bodies by the way that were not in stable
11 environments and we're not going to find them because
12 they're gone. And we don't want to put our uranium
13 waste in such an environment because it too will be
14 gone.

15 But we can learn a lot from deposits that
16 are still there and we can put, it'll cost more but we
17 can put the depleted uranium in such deposits. Those
18 don't happen to be in salt although salt is also a
19 good plan, but I'm thinking of any variety of ore
20 deposits up in Northern Saskatchewan or something that
21 have been there for 3 billion years.

22 Anyway, aside from that, is there a
23 solution other than geologic disposal, other than
24 disposal above the surface of the land?

25 MR. CAMERON: And following your-- and

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1 I'm sorry I misspoke, Steve Nelson not Steve Reynolds,
2 you laid out some factors here to consider and I just
3 was wondering does that have to drive you towards
4 geologic disposal or is there some other solution?

5 I mean can you do all the things that you
6 said that you should do, don't put it some place where
7 you know it's going to be danger.

8 DR. BURNS: Okay. So don't put it below
9 layers of rock. When you say geologic disposal you
10 mean below layers of rock versus in a landfill type?

11 MR. CAMERON: Steve what did you mean?
12 When you said geologic disposal in salt?

13 DR. NELSON: Salt is one form and of
14 course welded devitrified tuff at Yucca Mountain that
15 was supposedly dry was another.

16 DR. BURNS: If you're asking me do I think
17 that there's a scenario where a landfill-type deposit,
18 waste disposal site, where uranium is placed in some
19 location and buried by a certain amount of appropriate
20 fill, if that could meet these requirements, I believe
21 it could, but you have to pay a lot of attention to
22 the waste form you're putting in there and the waste
23 forms match to the environment that you're putting it
24 in, as well as the overburden and what you place in
25 that overburden and what other engineered barriers you

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1 need to have.

2 But I think it could be met although I
3 haven't tried to model it. No doubt that disposal in
4 hard rock under reducing conditions would be a better
5 although more costly, a better long term solution.

6 MR. CAMERON: Okay. And waste form gets
7 to Drew's point from this morning, at some point we
8 have to have a discussion about epoxy, etc. etc.
9 Let's go to Christopher and Steve you have your card
10 up again, you want to say something? Okay. Let's go
11 to Christopher and then Steve.

12 MR. THOMAS: First, I want to make a
13 comment which is that I don't believe that uncertainty
14 should be a justification for more permissive
15 activities. In fact, I would tend to go the other way
16 that uncertainty should lead to more restrictive
17 requirements.

18 So when I hear well gee, it's absurd to
19 model even a 10,000 years and beyond that is even more
20 absurd, then I think well the fact that we've got a
21 hazard that persists longer than that means you
22 should do it.

23 I mean I don't tend to do things that I'm
24 very uncertain about you know that have potentially
25 bad consequences typically so that's just my first

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1 comment. I like some of what I've heard. I liked
2 something that Susan said about you know you do need
3 to look at certain, if this is a site-specific
4 analysis it should take into consideration things that
5 will happen at that site.

6 So, for instance, out at the Energy
7 Solutions site, I know you don't like that but it's
8 the one that I'm most familiar with, and there are
9 aspects to it that would lead me to say, look, this
10 could be washed out at certain times over the time
11 that depleted uranium will create hazardous
12 emanations. And so you know because of that I think
13 that does need to be factored in. If that site can
14 be washed away, I just don't think that it's
15 reasonable to say look it's a good way to sequester it
16 away from the environment.

17 And I don't know the best way to write
18 that into the rule. But I think there is a way to
19 capture it and my comment is to make sure that the
20 final rule would require an analysis of those kind of
21 events that could happen that could just destroy the
22 site entirely or totally change the conditions under
23 which it's modeled today.

24 And the other thing I wanted to say is it
25 has to do with something Larry brought up earlier

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1 which was look are there other parts of the
2 regulations that may need to be rewritten and so I
3 guess I want to put this out there and then ask for a
4 response.

5 I want to say this is in federal rules and
6 it talks about institutional control of access to the
7 site is required for up to 100 years. This permits the
8 disposal of Class A and Class B waste without special
9 provisions for intrusion protection since these
10 classes of waste contain types and quantities of radio
11 isotopes that will decay during the 100 year period
12 and will present an acceptable hazard to an intruder.

13 I think this is part of the issues that
14 came up last night at the Radiation Control Board
15 hearing but basically there are times and ways in
16 which it's like oh Class A, well what that means is
17 it's decayed to reasonably hazardous levels within 100
18 years such that an intruder could go onto the site and
19 not really face a hazard.

20 I think what we're talking about here with
21 depleted uranium being class A is part of a catch-all.

22 Totally different considerations. Totally different
23 considerations. I don't think anybody here is
24 claiming that after 100 years depleted uranium would
25 pose an acceptable hazard such that an inadvertent

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1 intruder could go on there.

2 And furthermore you know my understanding
3 is these regulations were set up such that you could
4 have a site, have institutional control for 100 years
5 and then kind of say look, it should perform now. It
6 should not require additional active maintenance.

7 And it's hard for me to imagine a scenario
8 in which you're going to have a site with, let's say
9 you bury it deep enough, okay, but I think somebody's
10 going to have to go out there and keep putting more
11 stuff on it if there's a problem. To me that's active
12 maintenance and the whole reason these rules were set
13 in place was to avoid that situation.

14 And so I want to put that out there and
15 see if anybody will comment, maybe from the NRC or
16 others, because I do think this is a problem.

17 MR. CAMERON: Okay. But I gather from
18 what you're saying that you've heard perhaps some
19 different approaches that could be melded together
20 that may give you more comfort with this?

21 MR. THOMAS: Yes. Yes, I've heard some
22 good things. I don't know where I fall yet on the
23 whole issue of 10,000 years versus 100,000 years. I
24 mean I tend to want to go longer you know but I also
25 like this idea, and I don't know like I said how to

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1 capture it, look if there's going to be natural events
2 and you can predict with some certainty that every
3 10,000 years or every 50,000 years there's going to be
4 some sort of event that will wipe your site off the
5 map, that needs to be taken into consideration even if
6 the performance period is at 10,000.

7 MR. CAMERON: Okay. Thank you. Let's
8 hear from Steve and then let's go to Dave and
9 Christopher and Larry. And then we're going to take
10 the cards on this side of the table.

11 Steve?

12 DR. NELSON: The million-year figure for
13 Yucca Mountain came ultimately from the National
14 Academy of Sciences, a pretty smart group of people.
15 The EPA which writes the dose standard for Yucca
16 Mountain tried to get away with 10,000 years and it
17 was thrown out in court. And EPA was told to go back
18 and try again.

19 So there is certainly legal and
20 intellectual precedent for long-term control of long-
21 lived radio nuclides.

22 Now the problem of modeling to that
23 length, just one more comment on that, I'm pretty
24 confident I know where the canisters in WIPP will be
25 in a million years. I do not know, well I have no

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1 confidence that Barnwell, Clive, Hanford or any other
2 engineered landfill will be in existence in a million
3 years.

4 MR. CAMERON: Okay. Thank you. Let's
5 hear from the NRC and then we have David Kocher and we
6 have Dan, Marty, Scott and I think we'll probably wrap
7 up what's been a pretty good discussion and we need to
8 get on to the other areas. Let me go to Dave and
9 Chris. We'll go to Dave and then we'll go to the
10 division director.

11 MR. ESH: Okay. Regarding the issues
12 about site stability and long term stability, I would
13 point people to sub-part D 61.50 disposal site
14 suitability requirements for land disposal, especially
15 Nos. 9 and 10.

16 Nine, I'll read it for you so everybody
17 knows. "Areas must be avoided where tectonic
18 processes, such as faulting, folding, seismic activity
19 or vulcanization may occur with such frequency and
20 extent to significantly affect the ability of the
21 disposal site to meet the performance objectives of
22 sub-part C of this part or may preclude defensible
23 modeling and prediction of long-term impacts."

24 Item No. 10 says, "Areas must be avoided
25 where surface geologic processes, such as mass

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1 wasting, erosion, slumping, landsliding or weathering
2 occur with such frequency and extent to significantly
3 affect the ability of the disposal site to meet the
4 performance objectives of sub-part C of this part or
5 may preclude defensible modeling and prediction of
6 long-term impacts."

7 In our regulations already we require
8 people to consider the processes that may affect the
9 stability of the disposal site and the dispersion of
10 the materials in the environment. So this discussion
11 about period of performance is very important because
12 then that leads you to say, well, for what period of
13 time do I need to apply these considerations? Do I
14 need to apply them for a thousand years, ten thousand
15 years or a million years because, as we've heard from
16 our experts, it becomes a lot harder if you're doing
17 for this for a thousand years or you're doing it for
18 ten thousand or even longer.

19 But it's in the regulation. So NRC
20 certainly already factors in the need to consider
21 these types of phenomena in a disposal action. And if
22 you have long-lived waste it becomes a bigger
23 challenge.

24 MR. CAMERON: Okay. Thank you. Let's go
25 to Larry.

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1 MR. CAMPER: Two things. One,
2 Christopher I think going back to your point you
3 wanted to hear from the NRC. At the moment the
4 Commission has directed the staff to proceed with a
5 particular rule-making, that being to require site-
6 specific performance assessment near surface disposal.

7 Your comments really get at the question
8 of whether depleted uranium is suitable for near
9 surface disposal. So what we're going to do is any of
10 these kind of comments that we've heard in this
11 workshop we'll summarize those and provide the
12 Commission with awareness because it's not about the
13 technical analysis to support the rule-making that
14 we're here today to discuss, but it is a contrary view
15 that we want to make sure the Commission hears from
16 the panel participants. So it will be summarized and
17 reported to the Commission.

18 The question that I want to ask you is,
19 I've listened to the discussion like I listened to it
20 a couple of weeks ago and many of the same issues that
21 were raised by that panel have been raised again and
22 some new issues have been raised, you know,
23 uncertainty, climatic change, modeling problems, etc.,
24 etc., etc., peak dose considerations. Some period of
25 performance for compliance purposes, ten thousand

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1 years gets talked about a lot.

2 And the question that I asked the panel
3 then and I would ask the panel the same thing here
4 having heard what I've heard, given that the staff has
5 to go away, take all that we've heard and work with it
6 and try to do something that makes some reasonable
7 amount of intelligence in a written word and a
8 proposed rule.

9 And in the SECY, in the technical analysis
10 that accompanied that SECY, the staff said the
11 following. They said considering the technical
12 aspects of the problem, the performance assessment
13 staff recommends a performance period of 10,000 years
14 for the analysis of DU disposal. However, analyses
15 should be performed to peak impact and if those
16 impacts are significantly larger than the impacts
17 realized within 10,000 years, then the longer tem
18 impacts should be included in the site environmental
19 evaluation.

20 That is consistent with the language in
21 NUREG 1573 which is our guidance to performance
22 assessment in low level waste facilities.

23 And my question to the panel is, given all
24 you've heard, is that a reasonable approach?

25 MR. CAMERON: Okay. Thanks Larry. What

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1 we're going to do is we're going to take the cards
2 that are up, which is almost everybody, so how's that
3 for great facilitation. We'll take the cards that are
4 up and we do need to try to get to Exposure Scenarios
5 before we take a break because at some point I know
6 you want to take a little break at any rate.

7 So let's go to Dave and then we'll go down
8 the row and then we'll come back over to Christopher
9 and maybe Larry's question will be if anybody has an
10 answer to Larry's question throw it out. Dave?

11 MR. KOCHER: The problem with Larry's
12 question is a simple one: what do you do with this
13 additional information in making a decision? That's
14 the hard part. I mean it's one thing to calculate
15 this but what are going to do with it?

16 The only thing I'm absolutely certain
17 about on this issue is that you must bring to bear to
18 your decision process the full weight of information
19 that you can generate.

20 EPA got in serious trouble in the 40 CFR
21 191 rule-making for high level waste disposal when
22 they ran their calculations out to 10,000 years and
23 stopped. This was not good. I have no idea what you
24 do with a calculation at a million years except to
25 realize that it's highly stylized and the only

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1 function of that calculation is to hopefully help you
2 make some kind of decision.

3 A comment that has kind of opened my eyes
4 here is that there seems to be an implicit
5 understanding here that we're developing a rule for
6 near surface disposal and I'm pretty convinced from
7 what I've heard that the NRC should open the
8 possibility that near surface disposal may simply not
9 be appropriate for this stuff, for whatever reason. I
10 mean it's conceivable that you might reach such a
11 decision.

12 The one thing that I haven't heard much
13 about here is economics. People in the insurance
14 business have a good horse laugh over what we're doing
15 here because the idea of discounting the future risk
16 is nowhere in evidence. And that's okay, we've decided
17 that this is the way we're going to play the game.

18 But if you're going to weigh the benefits
19 of near surface disposal and the detriments of near
20 surface disposal versus something like a geologic
21 depository, you do have to weigh the economic costs of
22 these different ways of attacking the problem.

23 I was generally in favor of 10,000 years
24 for low level waste and I recognize that that was a
25 problem for uranium to be solved at some later time.

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1 Regulators like definitive rules, that as
2 Dave Esh pointed out these are double edged swords,
3 they lead to problems. You have a problem if you're
4 not definitive, you have a problem if you are
5 definitive. This is a really tough decision and I
6 have nowhere close to the answer but you need to bring
7 the full weight of information to bear on your
8 decision process on things like this.

9 MR. CAMERON: Okay. Thank you David.
10 Let's go to Scott, Marty, Tom and Dan and Drew. And
11 then back over to Christopher. And then we'll move to
12 the next topic.

13 MR. KIRK: I would say once this
14 workshop is over and the NRC staff goes back that they
15 really look hard at how they're going to ensure
16 consistency amongst implementing this rule between all
17 the different states, especially the states that do
18 have a low level waste disposal facility such as
19 Texas, South Carolina, Utah and Washington, because I
20 think it's important to explain to those citizens how
21 this rule does ensure that they are protected against
22 depleted uranium. Depleted uranium gets more
23 radioactive with time as opposed to less for most
24 other low level radio nuclides.

25 And also I would say that the states are

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1 ultimately the custodians of these materials so their
2 viewpoints matter very much. So what I would suggest
3 is when you guys go back to your offices that you
4 think long and hard about how you're going to ensure
5 consistent implementation amongst this rule.

6 MR. CAMERON: Okay. Thank you. And that
7 just sort of underlines the approach that Chris
8 McKenney was talking about, about the state working
9 groups trying to with this type of background of
10 information at their disposal what they need to deal
11 with. Marty?

12 MR. LETOURNEAU: Dave Esh actually
13 captured a large part of what I wanted to say in terms
14 of the siting stability requirements that are already
15 there.

16 But the second part of it that I wanted to
17 add is that we really do need to look closely at site-
18 specific conditions because I've heard a lot of
19 assumptions about you know the caps eroding and going
20 away and yes we need to think about that and account
21 for that. But I know of at least one facility that is
22 in an area of deposition and a thousand or ten
23 thousand years from now it's going to have far more
24 native material on top of it than material taken away
25 from it. And that's something to consider.

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1 MR. CAMERON: Okay. Good point. Tom?

2 MR. MAGETTE: I would like to take a shot
3 at answering Larry's question. The short answer is
4 yes. I would add to that by saying taking off of what
5 David said it falls into the category of using all the
6 information that you have at your disposal. When you
7 start looking out at a million years, whether or not
8 it's a compliance period of any sort of reasonableness
9 or not, it does tell you something. You can make
10 assumptions, to go to Beatrice's question earlier are
11 assuming the cap is there, are you assuming all the
12 overburden is there, are you assuming that you have a
13 functioning clay barrier after that period of time?

14 Well you can ask each of those questions.
15 You don't have to assume them all there were all gone.

16 It goes to David's earlier comment today about the
17 behavior in the natural environment, you don't get
18 necessarily to assume away part of the problem, or
19 assume away part of the site.

20 That's why we talk about a qualitative or
21 probabilistic application in that time frame is that
22 you probe a certain set of questions and it can be
23 illuminating even if it's not something that has a lot
24 of deterministic value.

25 The other thing that I would say, and I

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1 made this comment in Maryland in the next section but
2 I just can't wait any longer, regarding the scenarios.

3 And the performance assessment isn't the only thing
4 we have here, it's not all we do. This also goes to
5 the application of sub-part D that David mentioned a
6 while ago. We site these facilities in places that in
7 fact do provide inherent protection. There is a
8 siting process. There's an engineered process.

9 There's a lot that goes into it besides a
10 probabilistic assessment. That's merely a tool that
11 measures the effectiveness of some of these things.
12 But it's not the only measure of protection for the
13 public health and safety of the environment so we have
14 to be careful talking about this one tool in extreme
15 isolation from this overall process, much of which is
16 codified in part 61.

17 So, yes, I do think it's reasonable to
18 have a compliance period and an informed period at
19 the peak dose that tells you something about what
20 might happen under certain scenario and what those
21 results might be.

22 MR. CAMERON: Thanks Tom.

23 MR. LETOURNEAU: Chip, I was going to
24 answer Larry's question too and my answer is yes and I
25 consider what I described as what the Department of

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1 Energy does to be completely compliant with what Larry
2 read.

3 MR. CAMERON: With that? Okay. Thank
4 you, Marty. Dan?

5 MR. SHRUM: I would just like to go on
6 the record as simply stating that for the purposes of
7 this roundtable discussion I would like to propose a
8 quantitative evaluation out to 10,000 years and a
9 qualitative evaluation to peak dose.

10 We've all kind of talked about that and I
11 would just like to formally propose that and suggest
12 it. I think we have justification for that in the
13 NUREG documents 1573 and 1854 that have also been
14 discussed, but I think that's a fair and reasonable
15 way for us as an operator of a facility to proceed.

16 I would like to just throw in an aside.
17 It's very simple. Don't know if that's the best thing
18 to do but it's a reasonable thing to do, and as far as
19 deep geologic deposits or repositories, I'd like
20 people to consider we had a great presentation down in
21 Vegas a couple of weeks ago on a facility in Germany
22 that's a deep geologic repository and the question was
23 asked of the operator, so how are you going to get the
24 waste back out? And he said I have no idea, because
25 they're having problems too.

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1 So there's risk in everything we do and
2 this is a reasonable approach.

3 MR. CAMERON: And under the approach that
4 you just gave us a shorthand for, would that
5 quantitative and qualitative analysis take into
6 account some of the concerns that Christopher had,
7 some of the issues that Peter thought you should look
8 at?

9 MR. SHRUM: Well, they would have to
10 answer that. I believe that it would but you know
11 that's just my opinion.

12 MR. CAMERON: All right. And Drew and
13 then we'll go to Christopher and then I think we'll
14 have to move on. Oh and Steve, yes. Got to hear from
15 Steve.

16 MR. THATCHER: I'm going to be as quick
17 as I can. One was and I'll say Mr. Thomas only
18 because there's too many Christophers in the room
19 right now.

20 I'm sorry if you took from what I said
21 that I was being flippant about exposures or scenarios
22 beyond ten thousand years. I simply was using what I
23 suggested as a construct to try and solve a problem
24 out to a million years without getting yourself
25 wrapped around an axle yet still solving it.

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1 Other issues that we haven't brought up
2 we'll probably talk about tomorrow that I think I have
3 to be more at that, you know, we're talking about a
4 powder form of uranium dioxide and I think we really
5 need to look at how we can get that into a more stable
6 waste form such that you don't have so much surface
7 area versus mass.

8 And the final point, the other point I
9 wanted to make and Dave Kocher kind of hit on this as
10 well, was that I mean the reality is folks that this
11 stuff has to be disposed. We don't have the option to
12 leave it in the UF6 form forever, we do have to
13 dispose of it. So we could make this process so hard
14 and so onerous that we'll never ever get it disposed,
15 and that's not really going to solve us any problems
16 is it?

17 So I think we need to keep in mind that
18 there are economics involved and there are processes.
19 We've got to make this process worked so that this can
20 be disposed, not so that we can set this up so that
21 it's impossible to be disposed and then we won't solve
22 our problem.

23 MR. CAMERON: Okay. Thank you Drew. And
24 Steve Cowne?

25 MR. COWNE: Yes, really quickly, David

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1 brought up the concept of economics and Drew's touched
2 on it here a little bit too and I think everyone knows
3 that the cost of disposal of DU is borne ultimately by
4 the people who use the electricity and others that
5 reap the benefits of it.

6 But one of the things that the enrichment
7 industry has to do, as you're well aware, is they must
8 factor in costs into their decommissioning plans for
9 the DU and the types of decisions that are made here
10 ultimately for the disposal of that will affect those
11 decommissioning costs.

12 And there are regulations under Part 70,
13 specifically 70.76, that deal with cost benefit
14 analyses that must be done and the back-fitting issues
15 and I just would ask the Commission staff to take that
16 into consideration, whatever decisions we make here,
17 that we look at 70.76.

18 MR. CAMERON: Okay. Thanks. Steve, more
19 on economics and cost. Christopher?

20 MR. THOMAS: I feel like I want to know
21 more about what Texas has done. I mean I don't feel
22 like I fully understand it and I think I need to go
23 back and really consider and then provide final
24 written comments on what I think would be actually the
25 best proactive way to go forward.

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1 I do want to address something that Drew
2 said. I don't agree with the statement that we have
3 to dispose of this material now. I do acknowledge that
4 there is a current problem with the cylinders but that
5 material can be de-converted and then stored on site.

6 And I think at that point you've eliminated the
7 immediate concerns and I think then you have the time
8 to really find the best way to dispose of it.

9 And I like that you talked about the cost
10 considerations because I keep hearing about you know
11 cheap nuclear power and well there's ways to keep it
12 cheap and one of the ways to do it is in my opinion to
13 not pay for the correct best protective disposal
14 available.

15 Anyway, I guess those are my thoughts
16 about that and I would welcome any other comments
17 about the idea that you know we have an immediate
18 problem that we have to solve right now with disposing
19 of this material, because I just don't think we do.

20 MR. CAMERON: Okay. And we're going to
21 do the tee up here. Steve?

22 DR. NELSON: One sentence. The need for
23 disposal is not an excuse for improper disposal.

24 MR. CAMERON: Okay. All right. Thank
25 you Steve and we're going to tee up the exposure

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1 scenarios, see how far we get on that. We're going to
2 then see if there's any public comments on these two
3 specific issues and we'll take a break and come back
4 and see what time it is. Dave are you doing the
5 exposure scenarios or is that someone else?

6 MR. ESH: Okay. Exposure Scenarios for a
7 Site-Specific Analysis. This is one of those items
8 that is somewhat intertwined that it's difficult to
9 separate but we're going to talk about it and I'm glad
10 a number of you who are probably experts in this area
11 are here to give your insights in this year.

12 I'll do a little background of 10 CFR Part
13 61, what's done with exposure scenarios there. What
14 are maybe some key considerations and what do we mean
15 by site-specific exposure scenarios.

16 So a little bit of background in the
17 development of 10 CFR Part 61 as documented in NUREG
18 0782 and 0945. They basically looked at potential
19 residential, agricultural or other activities near the
20 disposal area and they considered inadvertent
21 intrusion on the disposal area.

22 On the right hand side of this figure is
23 basically a snapshot out of one of those documents
24 that provides a scenario, accident, acute effects,
25 intruder construction, acute effects, intruder

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1 construction, acute effects, intruder agriculture,
2 chronic effects. Various scenarios, various locations
3 where that scenario may take place and then the uptake
4 pathways associated with those scenarios. And these
5 were broken down into pathway dose conversion factors,
6 PDCFs, that were used in the analysis.

7 But overall for scenarios and the original
8 analyses, these were the types of scenarios that were
9 applied.

10 And I would note that this is an area that
11 we get a lot of comment on because the facilities as
12 located today for the most part do not have that
13 activities occurring near them or on them certainly
14 but even near them. But for a lot of what we do as a
15 regulatory construct to try to assess a problem and
16 make a decision, so in this case we're applying
17 scenarios that may not be relevant today in year zero
18 but, based on what people do today, could be
19 reasonably foreseeable some time in the not too
20 distant future.

21 But it is a regulatory construct to try to
22 assess a problem. We don't make any expectations that
23 anybody can accurately assess exactly what humans are
24 going to do but in the regulatory analysis we pick
25 something that we think is reasonably conservative,

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1 use that to calculate impacts.

2 A little bit more background here. Just a
3 picture version of what I talked about in the other
4 slide and have talked about previously. This is a
5 resident or resident farmer, in this case it says
6 resident farmer, of course I don't see any animals
7 here so maybe the farmer should be dropped, but this
8 is somebody who lives near the disposal facility.
9 They get a potential dose from using water, in this
10 case we have an old-fashioned well here. I don't see
11 too many of those any more although my grandfather had
12 one growing up in Pennsylvania. Most of us don't have
13 them any more. I know they still exist.

14 The potential dose from ingestion of
15 vegetables from using contaminated water, people do
16 all sorts of normal domestic activities. They spend
17 time on site and off site, exposure outdoor and
18 exposure indoor.

19 The chronic intruder is somebody that
20 could potentially build a house on the disposal
21 facility. There may be an engineered barrier present,
22 depending on the depth of that barrier the house could
23 disrupt or defeat it. But in the case of depleted
24 uranium, as we've talked about and we'll talk about I
25 think tomorrow, you can get diffusion of radon into

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1 the house just like you do in the natural environment
2 from uranium in the natural environment.

3 You also, as Dr. Burns has talked about
4 in detail, you potentially have leaching of the
5 depleted uranium into the water pathways, which is
6 part of the assessment to evaluate the safety.

7 So that's a little bit of background about
8 what was done in the original part 61 analyses, what
9 we did in our screening analyses and it's open to the
10 workshop to discuss whether that sort of construct is
11 appropriate for future analyses.

12 I've already talked about this on the
13 previous slide; historical approach, off site
14 resident, on site intruder, both acute and chronic, so
15 the people that build the house, you calculate the
16 dose to them and then you calculate the dose to the
17 people that live in the house after somebody has built
18 it.

19 But there is a relationship of the
20 receptor scenarios to the characteristics of the
21 waste. We use in say decommissioning right now where
22 we have decommissioning sites that may have very
23 short-lived waste, the area where the facility is
24 being decommissioned is being used in an industrial
25 manner. We allow people to consider future use of

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1 that area in an industrial manner which then defines
2 different types of receptors and scenarios than you
3 would otherwise do for the residential type scenario.

4 There is an issue in scenarios whether you
5 include radon and at what limit you include it because
6 in the previous analysis that we did, NRC did for Part
7 61, there wasn't a need to have radon because we
8 didn't have any material that was generating a lot of
9 it in the source term. So that's an area open to
10 discussion for this group.

11 And then something we talked about the
12 previous workshop and the general message we got was
13 don't define the scenario in the regulation. We can
14 talk about scenarios in guidance if anything. But an
15 option is whether we should define the scenario or
16 whether we allow people to make some sort of site-
17 specific considerations about the scenarios they
18 choose in the assessment that they do.

19 So we're seeking your input on those
20 things.

21 MR. CAMERON: Great. Thanks Dave.
22 Anybody want to open up on exposure scenarios for us?

23 And again regulation versus guidance and we will have
24 a reprise of all of that at some point. Steve?

25 DR. NELSON: I'm going to have to pick on

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1 Clive as a case study for the types of site-specific
2 scenarios you might encounter for Clive as well as
3 other facilities.

4 I have a colleague who has modeled, we put
5 it together in a letter that I'm going to distribute
6 at the end of this meeting to NRC and if there are
7 enough copies anybody else that's interested.

8 She's done a mass energy balance model for
9 the Great Salt Lake and her calculation implied, or
10 the result of her calculation was that you need three
11 to six millimeters of increased precipitation, that's
12 not very much even in a dry place like the west
13 desert, for one thousand years to raise the level of
14 the Great Salt Lake to the elevation of Clive. Okay?
15 That's not very much.

16 I could talk about the history of Lake
17 Bonneville, I could talk about the history of pre-lake
18 Bonneville Lakes. I could talk about Owens Lake as
19 another analog in the Great Basin. My point that I
20 would like to make for any of the non-geologists in
21 the audience who may be a little bit surprised, or
22 maybe not, I think if you polled geologists,
23 atmospheric scientists, geomorphologists, folks that
24 work in the Bonneville basin and work on its
25 quaternary history, the probability that that site

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1 will be inundated over time frame of interest by
2 rising lake levels is probably something, the
3 probability is something like one in the next 100,000
4 years.

5 So I think you have to consider site-
6 specific scenarios that are effectively disruptive.
7 We know from prior Lake Bonneville shorelines that you
8 can cut several meters into bedrock in a few hundred
9 years. So I think you've got to worry about those
10 sorts of things.

11 I think some sort of human intrusion,
12 inadvertent intrusion, under this kind of process
13 pales in comparison with respect to importance. I
14 don't see that site surviving a flooding event. I
15 think the pile's eroded, I think it's gone. I think
16 you need to look at that, or the state if it comes to
17 that, and I think you need to consider other geologic
18 processes and that might include climate, it might
19 include tectonics, that will be operative at other
20 sites.

21 I notice that Indian mounds were mentioned
22 for instance. Well, okay, and maybe they've survived
23 intact. So you take a 1,000 year old Native American
24 burial mound in the mid-West somewhere, that is one-
25 tenth of one percent of the time to peak activity of

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1 depleted uranium. It's nothing.

2 The site specific considerations are
3 critically important. I think they need to be in the
4 regulations. I don't think you can write a regulation
5 that'll cover every disruptive scenario at every site
6 but they need to be comprehensive enough that they can
7 be implicitly recognized and a licensee's feet held to
8 the fire.

9 MR. CAMERON: Okay. Thanks Steve.
10 Let's go to Tom, Tom Magette.

11 MR. MAGETTE: Thanks Chip. I would make
12 one comment in general on this topic which is that I
13 think that anything having to do with scenario
14 development appropriately belongs in guidance, doesn't
15 belong in regulation. I guess there's just been a
16 suggestion made that somehow there's some notion that
17 that's a better way to keep a licensee's feet to the
18 fire.

19 I don't agree with that. This is
20 something that's been traditionally dealt with in
21 guidance. You certainly aren't going to have a Lake
22 Bonneville at Barnwell, for example, so the notion
23 that somehow you're going to prescribe scenarios and a
24 regulation way suitable to sites that exist and have
25 not yet even been sited, to me just doesn't make

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1 sense. I don't think that's the appropriate nature of
2 a regulation.

3 We've heard a lot of comments already
4 today about keeping regulations at a top level or a
5 first order. You've heard comments like that from
6 Larry about how voluminous they can become.

7 If you look at some of these guidance
8 documents you heard Jim Lieberman mention that as
9 well, they can be pretty voluminous and I think that's
10 appropriate. But I think that this is a matter for
11 guidance because it will vary greatly from site to
12 site and I don't think that you have to put it in
13 regulation to get the proper level of control. Nor,
14 frankly, do I think that you can put it in any
15 rational way in a regulation.

16 MR. CAMERON: And Steve, let me just make
17 sure that we read what you said right because you sort
18 of broadened it out at the end. Were you saying that
19 the specific scenarios should be in the regulation or
20 were you saying that there should be a requirement
21 that all scenarios, and I'm just saying it really
22 sloppy now, that all scenarios should be considered in
23 a regulation?

24 DR. NELSON: Well, I don't think you'll
25 have to have-- it's maybe impractical or impossible to

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1 that extent I might agree that you can't list every
2 possible event for every site because some might not
3 even have been thought of yet. Right?

4 But we can certainly anticipate and write
5 general language about disruptive events.

6 MR. CAMERON: So general language about--

7 DR. NELSON: I would have some general
8 language. I think, well maybe I'd better not say
9 this, well let me back off for a minute. There is
10 some, so maybe somebody who knows the regulations
11 better than I do can speak to it but I don't think
12 that the one times 10 the minus 8 disruptive cut off
13 for consideration in a performance assessment is in
14 guidance, that is in a regulation.

15 There have to be things that are in the
16 regulations.

17 MR. CAMERON: Okay. Chris, did you want
18 to respond to that and then we'll go to--

19 MR. MCKENNEY: Just as a point of
20 clarification. The ten to the negative eight which is
21 in regulation is actually in the EPA and the NRC's
22 Yucca Mountain's specific regulations. That's where
23 that one exists. We don't have a cut off right now at
24 all in Part 61. I just wanted to clarify that, make
25 sure that that wasn't implied.

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1 DR. NELSON: But I'm confident you will
2 have the appropriate controls.

3 MR. CAMERON: Okay. Drew and then let's
4 go to Steve Cowne and then over to Beatrice.

5 MR. THATCHER: All right. Just from the
6 state of Washington standpoint, we like the fact that
7 the rules don't specify the exposure scenarios.
8 That's where the guidance document is and honestly
9 from a state standpoint we obviously follow the
10 guidance documents pretty darn religiously. But it's
11 just too complex to try and put all that in a rule so
12 that's just my point.

13 MR. CAMERON: Thanks Drew and Steve?

14 DR. NELSON: Yes, and I'm sort of a
15 broken record too but I don't believe that it's
16 appropriate to put the scenarios into the regulation
17 itself. I don't know of any other precedents where we
18 get into the scenarios and specify those actually in
19 10 CFR. I recommend that they be put into the
20 regulatory guidance.

21 And actually, as a licensee, I can see a
22 concern that I would have would be if you start
23 putting the scenarios into the regulations, because
24 you cannot possibly identify all of them, over a
25 period of time as institutional knowledge of the

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1 regulation maybe is lost or the intent is lost, you
2 could end up with a situation where it actually has
3 the opposite effect and the licensees or others
4 believe that whatever is in the regulation is all they
5 have to look at and not other things. And I don't
6 think we want to create a situation where it's an
7 inclusive type of list of scenarios.

8 MR. CAMERON: So that would be sort of an
9 unintended consequence.

10 MR. THATCHER: I've got a classic example
11 follow up on that. In the state of Washington we
12 included sweat lodges as a possible exposure scenario.

13 I could never see the day where you would see the NRC
14 regs or something like that specifying in rules that
15 this is something you had to do. We recognized that
16 at the state level and we included that and if you had
17 been specific we probably would have said oh don't
18 include that, so we're good. And we would have missed
19 a big component of exposure at least for a given
20 scenario.

21 MR. CAMERON: Okay. Thank you both.
22 Before we go to Beatrice let's hear from David.

23 MR. KOCHER: Yeah, one more vote for
24 don't get too specific in the regs. I mean an issue
25 with that that's not been mentioned is that you don't

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1 want to provide disincentives for seeking good sites,
2 and that's what can happen if you get too
3 prescriptive.

4 And I presume that even if you relegate
5 the scenario business to guidance, that a licensing
6 procedure is the place where basically any scenario
7 can be raised and has to be dealt with in some fashion
8 or other. And to me that's where you handle the
9 things that you forgot to write down. The unusual
10 flood or 50 feet of ice and all of that.

11 It's up to the NRC to define the goal line
12 but don't tell the licensee how to call the plays.

13 MR. CAMERON: Okay. And Beatrice?

14 MS. BRAILSFORD: I think though that the
15 intent of the scenarios, which is to acknowledge the
16 certainty that human beings will continue to be on or
17 near the site. I think that that has to be somewhere
18 acknowledged in a very enforceable, I know an
19 acknowledgment isn't an enforceable thing, but I think
20 that's the intent. And I heard you, I heard a little
21 bit of skepticism about the current scenarios, you
22 know, the subsistence farmer and da-da-da-da and by
23 the way I heard connected with that an assumption that
24 the current low level waste sites will be the disposal
25 sites for depleted uranium which goes back to the

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1 concern that we've started this process backwards and
2 we will be writing rules to meet currently operating
3 sites, rather than writing very good rules and seeing
4 if new or old sites meet those rules.

5 So again the intent of the exposure
6 scenarios I think has to be captured in some very
7 robust fashion.

8 The issues that Steve brought up, and I
9 recognize that some of these would be perhaps dealt
10 with in the licensing stage, but I think we've also
11 acknowledged that we're dealing with facilities that
12 already have licenses. But some of those big, big,
13 the waste will be exposed through erosion. Does that
14 go back to the period of performance discussion? I
15 mean would that be dealt with there rather than
16 specifically in an exposure scenarios?

17 MR. CAMERON: Let's go to both of you,
18 Chris?

19 MR. MCKENNEY: On your last point was
20 where I was coming from earlier from a couple of
21 comments which is that in general our guidance
22 currently is as part of your licensing documentation
23 for an applicant or for what we think is good
24 practices, is that you need to evaluate all the
25 features, events and processes that can occur at your

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1 site over the time period of compliance or interest,
2 whether it's you know other things.

3 From that do you model it on a day to day
4 basis, you know, does the model include how the thing
5 actually erodes? Or do you just do stylized
6 calculations of different scenarios? That's different
7 options you can do. But you need to, at least as a
8 base, be able to describe that you have looked at all
9 feature events and processes that can happen during
10 that time period that you need to look at to make sure
11 that the licensee or applicant can provide
12 justification that they do meet and will meet
13 compliance, and that the regulatory authority then can
14 make a determination that there is reasonable
15 assurance they will meet compliance.

16 And so to do that you have to evaluate
17 everything and say we looked at this, it's either
18 going to do this or that or we've analyzed this which
19 covers that also. And from there generate scenarios
20 in various ways.

21 MR. CAMERON: Okay. Thank you Chris.
22 Dave?

23 MR. ESH: Yes and to your point about if
24 I gave the impression that the rule would be made to
25 fit the sites that are currently existing and may

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1 possibly accept depleted uranium, that's absolutely
2 not the case.

3 The rule will be made based on what we
4 think is needed for this type of problem and if those
5 sites can meet those requirements then they will be able
6 to dispose of the material.

7 MR. CAMERON: Okay. Good clarification.
8 Let's go to this side and then we'll go to Vanessa and
9 Christopher, Scott, and then Tom. Scott?

10 MR. KIRK: Just to comment on the
11 guidance. I know NRC has a ton of experience in
12 developing the consolidated guidance for
13 decommissioning on exposure pathways and I'm sure
14 there's a lot of lessons learned that could be applied
15 to the new guidance that you guys are developing, and
16 I would encourage you folks to look at an acceptance
17 criteria because that tells the license reviewer and
18 the licensee what's generally acceptable and what's
19 generally not acceptable.

20 And if you use that approach, as you've
21 done in the past, it's really transparent also to the
22 members of the public that are also looking at license
23 applications and the development of exposure pathways
24 and those sorts of things to making sure that the
25 guidance that has been developed based on experience

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1 is well suited for the application for the site.

2 MR. CAMERON: Okay. Thanks Scott. Tom?

3 MR. MAGETTE: I would echo what Scott
4 just said. The other thing I'd like to point is the
5 over-arching requirement is to satisfy the performance
6 objectives. That's that's protective of public health
7 and safety. And how you demonstrate that you satisfy
8 the performance objectives is something that's going
9 to be accomplished by selecting the appropriate
10 scenarios and then you're going to be subject to the
11 regulatory oversight of that process. So whether it's
12 the NRC or an agreement state, it's not as if there's
13 some book of scenarios that we pick a few from, or
14 some other licensee picks a few from, and once we've
15 done that we're good to go.

16 As Scott was just saying, we're going to
17 be looking at exposure pathways and we're going to
18 have to demonstrate that we comply with the
19 performance objectives. There's certainly nothing
20 about the notion that scenario development being in
21 guidance prohibits or in any way limits the regulatory
22 agency from coming back and saying no, we're not
23 satisfied that you have demonstrated that you meet the
24 performance objectives.

25 So the notion that this is somehow not

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1 protective or that we get to check a bunch of boxes
2 that we have more control over, I think kind of misses
3 the point of the first order of nature of the
4 regulation. I think it's really important to remember
5 that you stay tied to that demonstration of satisfying
6 the performance objectives and the notion that
7 scenarios are in guidance somehow limits the
8 regulator's authority to ensure that that's been
9 appropriately done I don't think is correct.

10 MR. CAMERON: So that that may go to
11 Beatrice's concern about enforceability.

12 MR. MAGETTE: Exactly.

13 MR. CAMERON: Okay. Great. Vanessa and
14 then we'll go to Christopher.

15 MS. PIERCE: I guess two quick points.
16 One just in response to what Tom just said. I think
17 going back to this notion of performance objectives
18 kind of gets at the heart of both what Bea had just
19 said in our discussion earlier about how sensible it
20 is to model out beyond 10,000 years of the performance
21 objective is to protect human health and the
22 environment from this material to the limited peak
23 dose. And we agree that it's silly to be talking
24 about modeling that goes out beyond 10,000 years.
25 That's kind of the crux of the problem and I think

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1 that speaks to Bea's earlier point, which is not to
2 say that David was being flippant about how seriously
3 the NRC is considering this process but rather the
4 starting assumption that near surface disposal of
5 depleted uranium is the right place to start.

6 And I think our concern is that you know
7 we probably should have taken a step back and
8 questioned whether that is truly the best way to
9 dispose of this waste stream.

10 The other point that I wanted to make was
11 just about the question about inclusion of radon and
12 regulatory limits. I want to state the obvious to me
13 which is that we do think that radon limits should be
14 set forth probably in rule rather than in guidance
15 because it is one of the primary health and safety
16 concerns. So I just wanted to get that on the record.

17 MR. CAMERON: Okay. Thank you Vanessa.
18 Christopher?

19 MR. THOMAS: Yes, thank you. I also
20 wanted to go back to the comment that Tom made. I
21 mean I think that's all well and good that the
22 ultimate objective is to satisfy the performance
23 objectives. But the system that you just outlined, in
24 my view, has failed Utah. I mean it has failed the
25 citizens of Utah because what we're talking about here

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1 is a waste stream, significant quantities of depleted
2 uranium the NRC admits was not looked at in the
3 original classification and also was not looked at in
4 any of the performance analyses that has been done to
5 this point.

6 So to me that current system has failed
7 and that's why I'm interested in having more of this
8 put in regulation so that it has to be complied with.

9 And along those lines I think the bar for disallowing
10 an onsite intruder scenario should be very, very high
11 and I'll tell you why -- because the way I read
12 current regulations, both federal and state of Utah,
13 that is a protection that is guaranteed. It is
14 guaranteed that an inadvertent intruder will be
15 protected.

16 So to me the bar for removing that
17 scenario should be almost impossible to meet. And I
18 don't understand how, I mean yes you can make
19 arguments about well maybe somebody won't go out there
20 and build a house, as you've identified, but there are
21 other onsite scenarios that I think are very
22 realistic, that should be. So to just wholesale say
23 we're not going to look at onsite exposures, I mean
24 that shouldn't fly and unfortunately I think that's
25 what we have currently in Utah.

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1 MR. CAMERON: And Tom? And then we'll go
2 to Steve and take it from there.

3 MR. MAGETTE: I don't think we've ever
4 suggested that they be eliminated entirely. There are
5 certainly scenarios that we suggest should be
6 eliminated, for example groundwater consumption. So
7 if you want to have an inadvertent intruder who's
8 residential and consuming groundwater at Clive where
9 the groundwater is simply not potable, it's more
10 saline than the ocean, that no we don't think that's
11 reasonable and we think if you look at the guidance in
12 NUREG 1573 it talks about even as you look many years
13 into the future, that you have to use as a basis for
14 that a perpetuation of current conditions and societal
15 practices that you can't get to a place that makes
16 that reasonable.

17 And we discussed that in Maryland, Dr.
18 Makhijani agreed that that was unreasonable and nobody
19 suggested that it wasn't unreasonable.

20 So yes we see that there are certain
21 scenarios that simply don't apply to suggest somehow
22 we get a by on inadvertent intruder or that you can't
23 think of a scenario that involves an inadvertent
24 intruder, you know, people have used the sportsmen
25 applications, whether they're hunters or bikers or

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1 whatever, I don't think we'll ever succeed in clearing
2 a bar that says there are no inadvertent intruder
3 scenarios.

4 Some of them we would suggest, I think
5 with strong technical rationale, do in fact not apply.

6 MR. CAMERON: Okay. Let's go to Steve
7 and see if anybody in the audience has questions on or
8 comments on these last two topics. Steve?

9 DR. NELSON: Yes, my first question is
10 for Christopher McKenney. I want to make sure that I
11 understand how the requirement to adequately
12 characterize and evaluate the relevant FEPs, I like
13 to speak acronymese, I've done FEPs screening, it's
14 Features, Events and Processes, is that a requirement
15 that is or will be in a rule?

16 MR. MCKENNEY: I don't want to predicate
17 whether we'd put that in the rule as such the way it's
18 written, for example, in Part 63. I mean that is
19 pretty much, I don't know if they even call them FEPs
20 there but they actually might call them FEPs Part 63.

21 Consensus is by nods of heads I think we do.

22 But between what we talked about on the
23 stability and stuff that we talked about in sub-part D
24 and then you couple in performance, that's about the
25 most transparent method there is to be able to tell

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1 anybody else that, yes, you looked at everything is to
2 be going through and documenting that, yes, I looked
3 at this. And we will take into consideration whether
4 we need to include that in the rule or whether we
5 think there's enough in the rule already that doesn't
6 require us to say you must do a FEP analysis.

7 MR. ESH: And I would add please take a
8 look at sub-part D, see what's in there and see
9 whether you think that there are major processes
10 related to this sort of decision that aren't reflected
11 in there. That would be a good input for us to get.

12 DR. NELSON: Sure and my point was not
13 that there should be a laundry list of FEPs in a
14 regulation but that the requirement that these types
15 of features, events and processes that could be
16 disruptive are adequately considered. That needs to be
17 in a rule.

18 Okay, the other last thing I wanted to say
19 is I just wanted to briefly echo something that
20 Christopher Thomas said and that's about the state of
21 Utah being let down. I'm thinking about 49,000 tons
22 that may be in a site and now we've even had some
23 acknowledgment from multiple individuals that maybe,
24 gee, engineered disposal isn't the way to go.

25 I'm wondering, you know, if that turns out

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1 to be the case, how do we fix that? And why didn't we
2 prevent reaching this state in the first place? And
3 that's maybe just a rhetorical question.

4 MR. CAMERON: I knew it was going to be.
5 Thank you Steve. Vanessa?

6 MS. PIERCE: I am not going to answer
7 that question.

8 I guess I just wanted to get back to the
9 sub-part D that was mentioned and I guess I just have
10 a clarification question. My understanding is that
11 criteria for sub-part D have already been addressed
12 for the three existing low level waste sites as they
13 were originally licensed and when that process
14 happened they were envisioned to be sites that had to,
15 you know, the performance analysis was done for a 500-
16 year time span, but now we're talking about a waste
17 stream where we have to look out ten thousand years, a
18 hundred thousand years, and so I guess my question is
19 I don't see how the questions that Steve Nelson has
20 brought up are going to be addressed in sub-part D
21 with the existing licensees that have already been
22 licensed.

23 MR. ESH: I'm not sure if I can answer
24 that now at this time but I understand your question
25 and I tried to at least comment on that earlier. The

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1 items that in sub-part D would be influenced by the
2 period of performance that you needed to choose for
3 your analyses.

4 So right now the regulation is silent on
5 the period of performance but it gives you basically a
6 laundry list of the types of major technical things
7 you need to consider when you do one of these siting
8 actions.

9 Now if you go from 1,000 to 10,000 or
10 10,000 to 100,000 you can say that maybe that laundry
11 list is incomplete, that's a potential outcome. Or
12 that what you need to do to address some of those
13 things on that list is much more difficult. I can't
14 say at this time. I understand your comment, I think
15 we're on the same page but I don't have an answer for
16 you at this time.

17 MR. CAMERON: And Vanessa maybe bring
18 that up when we get to the other considerations agenda
19 item tomorrow because I think that may fit there.

20 Any public questions, comments on period
21 of performance or the exposure scenarios at this
22 point? Yes? And please introduce yourself.

23 MR. ESSER: Dave Esser civil engineer. I
24 was just wondering, I'd just like to throw out there
25 best available technology and is a million years even

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1 on the table? You look at Texas, they've shown what
2 they can do. I'll just throw that out there.

3 MR. CAMERON: Okay. Best available
4 technology. All right. Be right back there, we're
5 going to go to Dirk first and then we're going over to
6 that gentleman.

7 MR. DUNNING: Dirk Dunning, state of
8 Oregon. Period of performance I think you guys pretty
9 much talked through most of those issues. I think one
10 other that came up that Drew did mention a couple of
11 times today I would ask in the form of a question is
12 there's a lot of folks who are not in the room.
13 Obviously we have a self-selected group of people as
14 well as those you've chosen yourselves. How do you
15 assure in this process that their voices are also
16 heard and their concerns are addressed and, in
17 particular, I'm thinking about Tribal Nations issues
18 which comes up a lot in the Northwest.

19 MR. CAMERON: And I would just note that
20 the Yakima Nation was invited to both workshops and
21 for some reason did not attend but may submit written
22 comments.

23 Does anybody want to lay out the whole
24 public participation process? I think that Andrew
25 did a pretty good job, Andrew Carrera, of talking

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1 about all the opportunities for public comment on the
2 rule and of course that means getting to people and
3 not just through publishing a Federal Register notice.

4 Okay?

5 And I know that Larry and company are
6 considering doing other types of workshops like this
7 and possibly town hall meetings that at least get you
8 usually a broader spectrum. But it's a point well
9 taken and I think that Larry and his people are going
10 to consider the way to get the broadest impact out
11 there because it's the most helpful think to do. Yes?

12 DR. STALEY: I listened intently to the
13 contractor to my right this morning that you gave an
14 opportunity to talk. I wanted to have equal time. My
15 name is Kent Staley. I'm a physician, I have three
16 degrees, one from BYU, one from Utah and one from
17 Harvard, the latter being in the public health.

18 I can't help but be seriously concerned
19 about the public health issue of this situation.

20 It's very complex. I sat here and
21 listened. It's over my head but I can express my
22 feelings about the impact of having all of this
23 material a few miles from a major metropolitan area.

24 This problem extends for probably hundreds
25 of years, even thousands, and the public health of

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1 our grandchildren and our great-grandchildren can be
2 seriously jeopardized.

3 I work as a volunteer for the Emergency
4 Preparedness Program and we talk about terrorist
5 attacks, we talk about earthquakes, we know that this
6 area is overdue for an earthquake and it's not a far
7 stretch of the imagination to have that earthquake and
8 have the fissure extend to the north south area.
9 Contaminated groundwater from an earthquake fissure or
10 a terrorist bomb that disperses radioactive material
11 to a nearby metropolitan area downwind is a distinct
12 possibility.

13 I adore this state, I'm going to live
14 here. I live here, I don't come from Oregon or
15 Washington as many of you people who have testified
16 have, I intend to have my grandchildren and great-
17 grandchildren here for many years. But I can't help
18 but think about the public health aspects of this
19 problem, and I think that any individual who votes for
20 this in our state in close proximity to this great
21 city of Salt Lake is going to be held responsible for
22 their decision and their vote. Thanks.

23 MR. CAMERON: And doctor, could we just
24 make sure that we have your name?

25 DR. STALEY: My name is Kent Staley.

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1 MR. CAMERON: Okay. Thank you. Comments
2 on period of performance or scenarios? Is this on one
3 of those or is this a general comment sir?

4 MR. FRUIN: On the scenarios.

5 MR. CAMERON: Yes, sir?

6 MR. FRUIN: Good afternoon. My name is
7 John Fruin. I was a safety manager for a trucking
8 company for 21 years as a safety supervisor. One of
9 our drivers rolled over a Class X explosive trailer in
10 the middle of Idaho and I would love to share my
11 pictures with you all. I'll stay afterwards if you'd
12 like to come and see them.

13 I don't know how many of you have been to
14 a spill but it's intense. And I'd like to share that
15 with you.

16 MR. CAMERON: Great. Thank you. And
17 it's John?

18 MR. FRUIN: John Fruin.

19 MR. CAMERON: And could you spell it?

20 MR. FRUIN: John F-r-u-i-n.

21 MR. CAMERON: Okay. And John has a box
22 of very interesting pictures here that people may
23 want to look at afterwards. And I think this is a
24 good time to take a break. I have about 26 after
25 four. Could we back at 20 to five and then we'll

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1 regroup and see what we can do profitably for the rest
2 of the day. Thank you.

3 (A SHORT RECESS WAS TAKEN)

4 MR. CAMERON: Okay. Just an agenda check
5 with you. We were going to try to get through the
6 last item on the agenda which is Source Term Issues
7 and a lot of the nature of that discussion, at least
8 at the last workshop, dealt with things like the
9 powder grout epoxy waste form issue and Christopher
10 Grossman is going to tee it up for us and then we'll
11 go out for discussion. And if we're going on too late
12 we'll all go home and Beatrice keeps reminding me of
13 the time. How perfect is that? Okay Chris.

14 MR. GROSSMAN: Okay. Thank you, Chip.
15 I'm teeing up here or we're getting into the source
16 term issues for a site-specific analysis and I'll talk
17 a little bit about what was discussed at the Maryland
18 meeting, try to interject that here as I'm going
19 through some of the background on the issue and then
20 some of the key considerations that we would ask for
21 your input on today.

22 Let's see if I can figure out how to do
23 this. Here we go. The source term in performance
24 assessment estimates the amount of radio nuclides that
25 are released from the waste into the environment over

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1 time. I know one of the points of confusion from the
2 last meeting was some of the terminology that may have
3 been used. We may not have been entirely consistent so
4 I'll try and clear some of that up here in case I
5 overstep some of those bounds.

6 The waste we were talking about this
7 morning and this afternoon so far is depleted uranium
8 waste form which kind of gets to the second point is
9 the physical chemical form that you may dispose of
10 that waste in a disposal facility.

11 And so the release of radio nuclides from
12 a facility is a function of both the inventory of the
13 radio nuclides that are present as well as the
14 chemical and physical form of that material. And the
15 last point here is that we consider performance
16 assessments living documents that should be updated as
17 new inventory is added to a disposal system to keep
18 current.

19 We'll talk a little bit about the form of
20 uranium to be disposed and some background here. From
21 enrichment facilities the depleted uranium is commonly
22 stored as uranium hexafluoride. This reacts with
23 water to form a corrosive hydrofluoric acid and is
24 probably not appropriate for disposal because of this.

25

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1 The NRC screening analysis that we
2 performed to present options to the Commission we
3 assumed that the uranium hexafluoride was de-converted
4 to a more stable oxide form.

5 And we also looked at the potential of
6 adding some stabilizing materials such as grout which
7 could affect the release from the waste from itself.

8 So in modeling the source terms some
9 important characteristics are the physical
10 configuration of the disposal facility as well as the
11 inventory, influence of the chemical form of uranium
12 on release, for example the issue of the hexafluoride
13 versus an oxide form and there are other forms that
14 exist that we may want to discuss today and bring some
15 of those up.

16 Also the effects of any stabilizing
17 materials, whether these be engineered barriers or
18 parts of the configuration of the waste form itself
19 and the long term performance of those stabilizing
20 materials.

21 So what we're asking the panel today is to
22 provide us some feedback on specifying criteria in the
23 regulation or developing guidance related to the
24 source term issues including the inventory, any
25 physical or chemical forms as well as stabilizing

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1 materials.

2 So with that I'll turn it over to Chip.

3 MR. CAMERON: Thank you, Chris. Drew
4 you've brought up the issue of the powder, grout,
5 epoxy, that seems to fit into this section, do you
6 want to expand on that?

7 MR. THATCHER: It's probably close
8 enough. At least from the big picture standpoint as I
9 look at the source term where you have by all measures
10 a huge quantity of material right? And you've got it
11 essentially in a powder form. And essentially in its
12 current form it's insoluble but, of course, things can
13 change. And the only way I know that makes things
14 worse is that of course if you've got a powder there's
15 just way too much surface area so there's got to be a
16 mechanism or least you want to look at a mechanism by
17 which you limit that in some way.

18 I mean if you say you're putting this in a
19 55-gallon drum which is generally stainless steel or
20 something like that, well we know that rusts so even
21 something as a simple as aluminum drum that's sealed
22 or something like that in smaller, I don't know, I'm
23 just trying to think. And epoxies are known to last
24 quite well, they're expensive, but I mean I don't know
25 about their performance over the really long terms.

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1 But I just was thinking big picture. We
2 know grouting and with the PH you know situation over
3 years, that's really not going to be of benefit so I
4 was just trying to think of what's another mechanism
5 by which we could put this in a form, because you're
6 not going to meld it, right, we can't make it a
7 uranium ingot I don't think. So I was just trying to
8 think of another way where we could stabilize it such
9 that we don't have as big an issue.

10 MR. CAMERON: Okay. Great. Thank you.

11 And it does raise a general issue that the NRC
12 perhaps could shed some light on for us. Can you put
13 the concern, the issues that Drew raised, can you put
14 that in the context, how does that fit in, how would
15 that fit into this proposed rule making? How would
16 using epoxy, for example, how would that come into
17 site-specific performance assessment?

18 MR. GROSSMAN: I don't remember the exact
19 section of the regulation but I know that there are
20 some requirements for site stability and it could play
21 into one of those requirements potentially.

22 But I think along those lines is any
23 materials that you may introduce to stabilize, you
24 would want to consider what effects as well they may
25 have on the release-ability of the waste form, whether

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1 it be leaching or other synergistic effects, etc.

2 MR. THATCHER: And this could very well
3 be a site-specific thing. I mean if you've got a site
4 where you do your initial first pass analysis and
5 you're like not good, what can we do to make this a
6 more viable product. At least that's how I usually
7 approach an analysis. You do your first cut. Is the
8 first cut good? And it more than passes? Then you
9 don't need to keep doing further analyses or further
10 work to try and see if it will work.

11 So I guess that's my second pass is that
12 okay now I'll take a second pass, you didn't pass
13 initially. Can you for the long term stabilize this
14 in a manner such, and several of you have alluded to
15 this, you know, making sure this gets into an
16 environment such that reducing conditions prevail.
17 Perhaps that's the other means of achieving the same
18 thing.

19 MR. CAMERON: Okay. And let's go to
20 Chris and then we'll go to Peter. Chris? Okay. I'm
21 not sure if Peter, go ahead we'll go to Peter.

22 DR. BURNS: I think I'm responding. And I
23 wanted to make roughly the same point I made in
24 Maryland that the waste form is a very important part
25 of keeping the waste where you want it. The waste

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1 form must match, within some reasonable boundary
2 constraints, the geology and the engineering barriers
3 that you use to prevent the mobility of uranium.

4 There are certain scenarios that would be
5 truly terrible, uranium hexafluoride as a waste form
6 for example as an extreme case. U308 is better but
7 are there better things, and I'm confident that there
8 are and I mean there are definitely uranium phases
9 that are less soluble in oxidizing groundwater than
10 U308. Although U308 is fairly low solubility there are
11 definitely phases that are lower solubility and if
12 you're going to de-convert from, by the way I only
13 learned that word in the last meeting the de-convert
14 word, I never heard that before, I would just say
15 convert, you have six through something for disposal
16 why not, assuming it doesn't add a tremendous expense,
17 why not convert to something that is highly stable in
18 the environment you wish to put it in.

19 Of course you have to know the
20 environment, there has to be that marriage between the
21 waste form and the environment. But I think that the
22 regulations should include some specific language on
23 the is it stability, is it durability, or just
24 appropriateness of the waste form for that
25 environment. But I think that should be there.

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1 And I don't really buy is it good enough
2 so much as could it be significantly better without
3 tremendous cost? Because the probability of the
4 uranium being released into the groundwater is 100
5 percent over time. We can all agree, whether we have
6 to go to 10,000 or whatever. So to the extent that we
7 can slow that process down we should.

8 MR. CAMERON: Okay. Thank you Peter and
9 let's go to Chris and then--

10 MR. MCKENNEY: And part of the cost that
11 Peter was talking about is that when you're looking at
12 waste volume, waste form changes and from this powder
13 and everything else and adding a matrix of any type
14 whether it be whatever type of thing, if you just do
15 it through U308 with a matrix or you change that form,
16 I mean it has an interplay with other things such as
17 it will change the total volumes and the actual
18 concentrations of the material, the effective
19 concentrations of the material on a specific basis
20 that could play heavily into levels of performance
21 that would have to be taken into account.

22 And also as the gentleman mentioned, one
23 of the things from an operating point of view is the
24 larger volumes do entail corresponding risks to people
25 today of larger numbers of shipments of different

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1 types which also have to be weighed.

2 MR. CAMERON: Okay. Thanks Chris and
3 Steve?

4 DR. NELSON: Just very briefly, there is
5 not just uranium to be considered but all of its
6 progeny in the waste form.

7 MR. CAMERON: And could you expand a
8 little bit more on the implications of what you just
9 said?

10 DR. NELSON: Well, as the activity
11 increases, radioactivity of depleted uranium increases
12 by the ingrowth of all the daughter nuclides, each one
13 of those daughter nuclides will have a different
14 geochemical behavior from the parent uranium.

15 MR. CAMERON: So that one waste form
16 might be suitable for early on but not for the
17 daughters?

18 DR. NELSON: Yeah. After a million
19 years, every nuclide in that waste will have the same
20 activity as uranium 238. So you have to worry just as
21 much about every one of the daughters.

22 MR. CAMERON: Steve?

23 MR. COWNE: I have a question for
24 Christopher. I missed your point as far as operation
25 and transportation, you were seeming to make a point

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1 about the safety aspect of transporting of what you
2 have six uranium oxide or what?

3 MR. MCKENNEY: It's more of a general
4 comment. It's not about uranium specific. It's just
5 that when you start changing volumes and start
6 changing concentrations and adding matrices and
7 dropping waste in a canister and therefore resulting
8 in more canisters to ship, do you start to get
9 transportation risks and other things that have to be
10 weighed against the other benefits of doing that? In
11 evaluating the change in operations of that facility,
12 those all have to be played into it.

13 In our old, well it's ancient now,
14 standard review plan for a license application for a
15 Part 61 facility, we have the evaluation of
16 transportation risks, including accidents and stuff
17 like that. Sometimes waste form is even beneficial in
18 that way because the waste form results in if there's
19 an accident there's less chance of a release.
20 Obviously a powder you've got more extensive release
21 if it rains right after the powder gets out and
22 everything else.

23 But those all have to be taken into
24 effect, there's no one solution that doesn't push
25 another side of the balance there that, you know, for

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1 example, saying well if concentration is the problem
2 we'll just put only 10 percent as much in each
3 canister and fill it 90 percent with sort of matrix
4 and drop the concentration by effectively a factor of
5 10. Well that just increased your volume by a huge
6 amount and you have not only volume in your site space
7 issues but you also have wherever this goes from one
8 place to another, those risks are also being incurred.

9 And I mean we've seen that heavily in de-
10 commissioning space where, you know, we've had
11 accidents from transportation.

12 MR. COWNE: Well, I guess I brought that
13 question up because uranium hexafluoride in that form
14 has been transported in this country in large volumes
15 for decades now. The fuel fabrication facilities like
16 Areva and Richland, Washington; Columbia, South
17 Carolina; Westinghouse; GE, North Carolina and etc.,
18 etc, they make fuel pallets for nuclear power plants
19 from UF6 that come from the older DOE facilities or
20 from overseas and Department of Transportation
21 regulations allow them to ship the UF6 cylinders, 48-
22 inch cylinders, on open bed flat bed trucks. And the
23 reason why is that solid UF6 doesn't really pose a
24 problem to the public if there is an accident, a
25 highway accident, and if you put it in a more stable

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1 form like an oxide, sure if you leave it on the open
2 ground as a powder for years and let water rain on it
3 and dissolve, etc. it becomes a problem but it's not
4 something that's going to create an immediate hazard
5 to the surrounding public. That's my point.

6 MR. CAMERON: Okay. I don't know whether
7 it's worth pursuing this or not but I'll throw it out
8 there anyway. Drew when he was bringing up the use
9 of the different waste forms was talking about well
10 this could be a way to improve the suitability of a
11 site that was going to not be an acceptable place for
12 disposal, and Peter brought up the philosophy, and I'm
13 not saying that Drew would not agree with what Peter
14 said about you should be looking to make the site as
15 effective and controlling release as possible.

16 Is there something in terms of the
17 philosophy, is there a distinction in this regulatory
18 philosophy that would pose a challenge, or not a
19 challenge but is it a choice for the NRC rule makers?

20 Marty? I'm getting blank stares from a lot of
21 people.

22 MR. LETOURNEAU: I think it's late in the
23 day and we're all tired but the question that we're
24 dealing with respect to the waste form and the nature
25 of the source term for DU is really, in many respects,

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1 not any different than we deal with for any other
2 waste.

3 Yes, you have to have a marriage between
4 the waste form and the site, you need to look at the
5 geochemistry, you have to consider the tradeoffs. You
6 use your iterative performance assessment to help
7 inform that process and help you figure out what the
8 right forms are to perform the way you need to.

9 I'm not sure that there's much more that
10 we all have to say on it and I think Steve's point is
11 a fantastic about how the progeny change geochemically
12 and the need to account for that.

13 MR. CAMERON: Great. Thank you. And
14 let's go to Christopher and then Steve. Christopher?

15 MR. THOMAS: I just wanted to know from
16 Peter what other forms there possibly could be,
17 because I just don't know enough about it to know what
18 the possible forms are and what the advantages are of
19 each in different conditions.

20 DR. BURNS: Well, some of the lowest
21 solubility forms of hexavalent uranium are urinal
22 phosphates and urinal-- and we see these in nature
23 holding back uranium in ore deposits and so on.

24 If one is fortunate enough to have a waste
25 storage systems that's in a reducing environment, then

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1 as long as it's reducing uranium to oxide is
2 effectively insoluble. So it depends on the geology
3 but U308 would not be the best choice. It may be the
4 best choice from the perspective of all the different
5 factors, cost, volume, etc., but from the point of
6 view of performance in itself it would not be the best
7 choice. But it would certainly be better than UF6.

8 MR. CAMERON: Does that answer your
9 question Christopher? And Beatrice? Oh Steve, go
10 ahead.

11 DR. BURNS: No.

12 MR. CAMERON: Okay. Beatrice.

13 MS. BRAILSFORD: And this is what form
14 is it going to come out of DOE's de-conversion, and I
15 did know that word before. But it is weird isn't it.
16 What form is DOE going to put out from its de-
17 conversion plans?

18 MR. LETOURNEAU: I think the reason why
19 everybody is talking about the powdered U308 is
20 because that's the product that the de-conversion
21 plants are creating.

22 The next question is what happens from
23 there? And that's the subject of some of the analyses
24 that are still ongoing and decisions that have not
25 been made yet.

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1 MS. BRAILSFORD: And these are decisions
2 of the DOE?

3 MR. LETOURNEAU: Yes.

4 MR. CAMERON: Okay. Go ahead
5 Christopher.

6 MR. THOMAS: I just wanted to ask a
7 procedural question in terms of the DOE's decisions of
8 their stockpile of depleted uranium. I mean I was
9 expecting that there was a record of decision document
10 that was being prepared and would be released kind of
11 imminently. I'm also aware that Utah Congressman Jim
12 Matheson has asked Secretary Chu to put those
13 decisions on hold, and in fact depleted uranium
14 disposal on hold, and I just wonder if you could
15 comment on that?

16 MR. LETOURNEAU: Yes, you're right on
17 both counts. The record of decision is being
18 prepared, it's under review. I'm not sure what the
19 timing is, when it is coming out. There's still a lot
20 of senior level discussion about that that is going
21 on.

22 The Matheson letter was dated September
23 16th so it's literally just a week old. We didn't get
24 it on the 16th, it was several days later. So people
25 are really still just talking about that and no

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1 decision has been made on what position to take on
2 that yet.

3 I'm sure in the coming weeks as we discuss
4 it and vet it and work with our senior managers that's
5 going to all come together but I have no idea at this
6 point where we are.

7 MR. CAMERON: Thank you. And let's go to
8 David and then we'll go back to Beatrice. David?

9 MR. KOCHER: On this issue of selecting a
10 waste form, Marty you still have an ALARA requirement
11 in your order don't you?

12 MR. LETOURNEAU: Yes, we do.

13 MR. KOCHER: Well that's where you do this
14 I think. You evaluate the costs and benefits of
15 alternative waste forms that you can use for this
16 stuff and see where it leads you.

17 MR. LETOURNEAU: I know that is the type
18 of analysis that was done in the supplement analysis
19 and the question now is left up to the decision
20 makers.

21 MR. KOCHER: And I don't know how NRC
22 handles ALARA in waste space. I mean in operations
23 you certainly do it, but I don't think there's
24 anything about ALARA in Part 61 is there?

25 MR. CAMERON: Well that's a good

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1 question. How does this ALARA concept in terms of
2 what we're talking about come into play? Chris?

3 MR. MCKENNEY: ALARA is actually in the
4 performance objective for 61.41, it's also implied in
5 the work of protection 1. So while it's not stated
6 for all the performance objectives, it has to be
7 considered through most of them so it is included in
8 our consideration that you do balance what the
9 benefits are and, of course, this has led to what you
10 have stated previously about you know previous
11 discussions about discounting and stuff and currently
12 the NRC doesn't really suggest discounting for multi-
13 generational protection to be the same today as what
14 we'd want to protect generations well into the future.

15 MR. CAMERON: Okay. Thanks for raising
16 that, David. Beatrice and we'll go over to Dan.

17 MS. BRAILSFORD: I guess, Marty, I don't
18 know what RODs you and Christopher are talking about.

19 MR. LETOURNEAU: It's the record of
20 decision for the supplement analysis that the
21 Department was preparing to identify locations for
22 disposal and I believe that that record of decision
23 was also supposed to address final waste form.

24 MR. CAMERON: And it's a NEPA document?

25 MR. LETOURNEAU: Yes, it's a NEPA

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1 document, I'm sorry.

2 MS. BRAILSFORD: So this is for all the
3 material that's coming out of the--

4 MR. LETOURNEAU: Portsmouth and Paducah
5 de-conversion plant material.

6 MR. CAMERON: And there was comment on
7 the draftee I guess. I mean I'm just thinking if
8 Beatrice wanted to get more information on what was
9 said, there are documents out there?

10 MR. LETOURNEAU: Oh yeah, and the
11 supplement analysis was issued for comment, yes.

12 MR. CAMERON: Okay. Dan?

13 MR. SHRUM: Just we have to remember
14 that there are some people in the audience that may
15 not understand some of our acronyms so ALARA is As Low
16 As Reasonably Achievable. We need to be mindful of
17 that. I think it got brought up at the other meeting
18 but maybe not.

19 MR. CAMERON: I think this is the first
20 time we heard ALARA.

21 MR. SHRUM: Okay. I have an SNM story
22 I'd like to tell you at a later time.

23 MR. CAMERON: An SNM you'd better spell
24 that out as it's late in the day. All right. Thank
25 you, Dan.

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1 I think this is probably an appropriate
2 time to end this subject -- if not this meeting. But
3 we are going to go out to the audience, to the public,
4 to see if any comments, questions on this last topic
5 on source term or anything else? John? John Greeves?

6 MR. GREEVES: Yes. Just to kind of
7 punctuate this last discussion on source term. Bring
8 back to what's in the rule versus guidance? And lots
9 of what was discussed here I think is quite
10 appropriate for guidance not rule. So I think it
11 would be useful to hear people's views, including the
12 staff, on calling for adequate source term issues to
13 be defined in a site-specific analysis but not putting
14 in the rule specifics like the type of waste form, the
15 matter, etc. I think just calling for source term
16 issues to be defined in a site-specific analysis and
17 all the material you've been talking about here is
18 quite appropriate for a guidance document.

19 MR. CAMERON: Okay. Thank you John.
20 Drew, do you have anything on that particular point?

21 MR. THATCHER: I was just trying to make a
22 clarification probably to Dr. Burns and Marty here.
23 Isn't the conversion or de-conversion, however you
24 want to say that, isn't it a uranium octaoxide form
25 that it's mostly going into with a small part being

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1 just a uranium trioxide or is that not true? And I
2 think the stability of the two are basically the same.

3 MR. LETOURNEAU: I believe that's correct.

4 But Drew right now I think you know more about it
5 than I do.

6 MR. CAMERON: Okay. That says a lot.
7 Okay. And did you want to respond to John Greeves'
8 point or did you have something separate? Okay. Yes
9 sir and George please introduce yourself.

10 MR. CHAPMAN: I'm George Chapman. I'm
11 interested in the perpetual care fund that it supposed
12 to be set up by the State of Utah to care for Energy
13 Solutions dump if Energy Solutions goes bankrupt or
14 declares bankruptcy. Right now it's around \$3 million
15 dollars. It's set up because the NRC set depleted
16 uranium as Class A which is supposed to be safer
17 within a couple of hundred years.

18 But depleted uranium obviously is going to
19 last a lot longer and if you do continue, if the NRC
20 continues to set depleted uranium as Class A they
21 should also make sure that the states that have these
22 dumps prepare for not just hundreds of years but
23 thousands of years. And therefore let's say Energy
24 Solutions went bankrupt tomorrow, there wouldn't be
25 enough to take care of the dump obviously and that's

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1 because you've classified it as Class A without going
2 one step further and saying it should be Class A but
3 the care fund should be much more.

4 MR. CAMERON: Okay. Thanks George.
5 Let's back that up to a generic issue you mentioned a
6 much broader application than just Utah. Larry, do
7 you have something on that?

8 MR. CAMPER: I mean we talked about this
9 briefly before the breaks but just a couple of quick
10 thoughts. I mean the situation with the Clive is
11 unusual because you have a private set up as opposed
12 to a federal or state assuming responsibility for a
13 site at the end of the 100 year institutional control
14 period. So you have an unusual situation there.

15 And I guess I would defer to the State of
16 Utah or Energy Solutions to talk more about that.

17 But the second thing is in their license
18 and in any of these commercial low level waste
19 facilities, any time there's a modification to the
20 license there's also a re-examination of financial
21 assurance. If I recall what was said yesterday
22 afternoon at the Board meeting and the fact that
23 Energy Solutions has already engaged the state
24 regulator in some discussions about commitments that
25 they're prepared to make regarding disposal of DU, I

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1 would imagine there would be some modification of that
2 license at some point based upon those discussions and
3 the State of Utah would look at that but, again, I
4 would defer to the State of Utah on that.

5 And then thirdly, as I understand, what
6 you have there is you have a long running escrow fund
7 and it continues basically stating it the most
8 simplest. But I think beyond that I would defer to
9 either Tom from Energy Solutions or Dane from the
10 state.

11 MR. CAMERON: Okay. And Steve did you
12 have something on that?

13 DR. NELSON: Yeah, but I'm going to
14 resist the temptation.

15 MR. CAMERON: It must be horrible though.

16 DR. NELSON: It's a little snarky.

17 MR. CAMERON: I thought it would be so
18 thank you. And I would just refer Dane, the Utah
19 staff, anybody in Energy Solutions to talk to George
20 after we're done right now about that particular
21 issue. So thank you for that question.

22 Anybody else? Oh Dirk, I'm sorry. And did
23 we ever answer the question about the KDs? Are we
24 going to discuss that at some point?

25 DR. NELSON: That's tomorrow Chip.

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1 MR. CAMERON: That's tomorrow? Thank
2 you. All right. This is Dirk.

3 MR. DUNNING: Two points. One, I would
4 hope you would learn a lot from the lessons DOE has
5 learned over the years about balancing cost versus
6 performance, about a lot of times trying to over
7 emphasize the cost up front ends up degrading the
8 performance enough that they regret it and it costs
9 more later. That's happened a lot of times.

10 Performance needs to be given much more
11 weight in the evaluations.

12 The second one, and I don't know the
13 answer to this one, Marty you have may some idea out
14 of the EIS analysis, have you considered looking at
15 using massive uranium metal embedded in copper buried
16 in deep reducing environments as another way of
17 looking at the disposal?

18 MR. LETOURNEAU: Say that again?

19 MR. DUNNING: The basic idea would be
20 normally you think of building a container and putting
21 things in it. This is a little different. It's
22 solid metal uranium or uranium alloy, perhaps a
23 corrosion-resisting alloy, embedded like the Swedes
24 are planning to do with their repository in solid
25 copper placed in a geologic setting where the copper

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1 doesn't want to go away so that you have two layers of
2 protection within the environment and getting it out
3 of the sensible environment.

4 MR. CAMERON: Okay. Marty.

5 MR. LETOURNEAU: By way of explanation I
6 also want to say, Beatrice, I wasn't trying to be flip
7 with Drew but our office has two divisions, one that
8 is the waste processing division and one that is the
9 compliance division and I'm the performance assessment
10 side of things on compliance and our waste processing
11 person was not able to be here. And that is the
12 person who would really need to answer both Drew's
13 question and Dirk's question because I honestly just--
14 I have not dealt enough with the EIS to be able to
15 answer that question.

16 So I can take those questions back though
17 and we'll find out.

18 MR. CAMERON: Okay. Thank you and thank
19 you, Dirk, for that question.

20 I think we're at the end of the day and
21 it's been a really good discussion, a lot of good
22 points brought up, a lot of potential commonalities
23 perhaps. And tomorrow we're going to start at 8:30
24 again and I'll try to do a review of the parking lot
25 issues that remain for us.

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1 And before we go to modeling, and I just
2 will check with NRC staff on this, we just want to do
3 a little reprise on regulations versus guidance,
4 that's what we said we would do, and see if there's
5 anything there. But we'll start with modeling and
6 we'll go through the rest of the issues. So thank you
7 and I think we're adjourned unless anybody has
8 anything else to say right now. Okay. Thank you.

9 (Whereupon, the proceedings of Day 1 in
10 the matter went off the record at 5:22 p.m.)

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