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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON NUCLEAR WASTE

April 10, 2007

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)

5 178th MEETING

6 + + + + +

7 TUESDAY,

8 APRIL 10, 2007

9 + + + + +

10 The meeting was convened in Room T-2B3

11 of Two White Flint North, 11545 Rockville Pike,

12 Rockville, Maryland, at 10:30 a.m., Dr. Michael T.

13 Ryan, Chairman, presiding.

14 MEMBERS PRESENT:

15 MICHAEL T. RYAN Chair

16 ALLEN G. CROFF Vice Chair

17 JAMES H. CLARKE Member

18 WILLIAM J. HINZE Member

19 RUTH F. WEINER Member

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1 NRC STAFF PRESENT:
2 FRANK P. GILLESPIE
3 MICHAEL LEE
4 DEREK WIDMAYER
5 CHRISTOPHER L. BROWN
6 ANTONIO DIAS
7 LATIF S. HAMDAN
8 NEIL M. COLEMAN
9 TIM McCARTIN
10 DONALD COOL
11 SHEENA WHALEY
12 JEAN-CLAUDE DEHMEL
13
14 ALSO PRESENT:
15 EDWARD F. SPROAT, III
16 ALEX McDONOUGH (via telephone)
17 ALI SIMPKINS
18
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I-N-D-E-X

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

2 10:26 a.m.

3 CHAIR RYAN: On the record. The meeting
4 will come to order please. This is the first day of
5 the 178th meeting of Advisory Committee on Nuclear
6 Waste. During today's meeting, the Committee will
7 consider the following: the Status of Overall
8 Geologic Repository Programming at Yucca Mountain:
9 Views of the Director of the U.S. Department of
10 Energy's Office of Civilian Radioactive Waste
11 Management; The Staff Briefing on International Atomic
12 Energy Requirements WS-R-4, Design and Operation of
13 Facilities for Geological Disposal of Radioactive
14 Waste; Interim Staff Guidance-3, Preclosure Safety
15 Analysis - Dose Performance Objectives and Radiation
16 Protection Program to Supplement the Yucca Mountain
17 Review Plan; Proposed Review to Standard Review Plan
18 Chapters 11.3 and 11.4 for New Reactor Licensing and
19 Discussion of ACNW Letters and Reports.
20 Antonio Diaz is the Designated Federal
21 Official for today's session. We have received no
22 written comments or requests for time to make oral
23 statements from members of the public regarding
24 today's sessions. Should anyone wish to address the
25 Committee please make your wishes known to one of the

1 Committee staff.

2 It is requested that speakers use one of
3 the microphones, identify themselves clearly and speak
4 with sufficient clarity and volume so they can be
5 readily heard. It's also requested that if you have
6 cell phones or pagers that you kindly turn them off.
7 We also request that visitors sign in on one of the
8 two log sheets for NRC visitors and for others. So
9 please sign in.

10 Theron, we have a bridge phone line to set
11 up on now.

12 PARTICIPANT (THERON): No, it's open.

13 CHAIR RYAN: It's open and do we have
14 anybody on the bridge line?

15 MR. McDONOUGH: Hello, this is Alex
16 McDonough from Senate Majority Leader Harry Reid's
17 office.

18 CHAIR RYAN: Thank you, Alex. I just
19 wanted to make sure you could hear us and we could
20 hear you.

21 MR. McDONOUGH: I hear you fine. Thank
22 you much.

23 CHAIR RYAN: All right. Great. Thanks
24 for being with us this morning.

25 Without further adieu, I will turn to the

1 meeting to Dr. Weiner who is going to take care of
2 this first presentation. Ruth.
3 DR. WEINER: Thank you very much, Mr.
4 Chairman. It's my great pleasure to introduce to the
5 Committee Mr. Edward Sproat who is the new Director of
6 the Office of Civilian Radioactive Waste Management.
7 He was confirmed by the Senate on May 26, 2006 and he
8 was nominated following the resignation of Dr.
9 Margaret Chu and we're very pleased to have Mr. Sproat
10 report.
11 Before you get started, I'd like to tell
12 you and inform the audience that the lead member on
13 the Yucca Mountain Project is Dr. William Hinze and he
14 will probably be asking most of the questions and be
15 very interested in what you have to say. So without
16 further adieu, please.
17 MR. SPROAT: Good morning, everybody, and
18 thank you very much for your invitation to come and
19 speak to the Committee this morning. My name is Ward
20 Sproat and I have been with the program for just about
21 ten months. Before I get started, let me just kind of
22 give you a little bit of my background so you
23 understand the experience that I'm bringing to this
24 program.
25 I retired from Exelon Generation at the

1 end of 2002 as Vice President of International
2 Projects for Exelon Generation. I spent 29 years with
3 Exelon or its predecessor Philadelphia Electric, PECO
4 Energy, and held various positions in that company
5 including Director of Engineering under which I had
6 responsibility for the entire fleet of PECO nuclear
7 plants before we merged with Commonwealth Edison to
8 form Exelon.
9 Early in my career, I was in charge of the
10 electrical design and licensing of our Limerick
11 Nuclear Plant through the design, licensing and
12 construction process. I was also Director of
13 Maintenance at Limerick, Director of Outages at
14 Limerick, Director Engineering at Limerick prior to
15 becoming Director of Engineering for the entire PECO
16 nuclear fleet. So I have a lot of experience in
17 licensing and construction and design of nuclear power
18 plants.
19 During my tenure at PECO, my real only
20 involvement with spent nuclear fuel was that one of my
21 jobs I was given by our CEO was to see if I could
22 negotiate a settlement agreement with the Department
23 of Energy for our spent fuel contracts at Peach
24 Bottom, our Peach Bottom Nuclear Plant, and we did.
25 So I was the lead negotiator for the first settlement

1 between the industry and DOE on the spent fuel
2 standard contract's nonperformance. So I'm very
3 familiar with the issues of spent fuel liability and
4 the settlements that we've reached and was also
5 involved with some design of our interim spent fuel
6 storage facility. So that's the limit of my spent
7 nuclear fuel experience.
8 My last job at PECO, at Exelon, just
9 before I retired is I spent all of 2002 in
10 Johannesburg, South Africa as the Chief Operating
11 Officer of the Pebble Bed Modular Reactor
12 International Joint Venture. I was on the board of
13 directors of that joint venture for three years
14 representing PECO first and then Exelon after the
15 merger and was asked by the South Africans to come
16 down and run that venture for a year to try to get it
17 to the point where the investors could make a decision
18 on whether or not to proceed with the program.
19 I have some international experience with
20 high temperature gas reactors also. So it's that
21 experience base that I'm bringing into this program to
22 give a little bit more of an understanding of some of
23 the mindset and direction that I'd like to bring into
24 the Yucca Mountain Program with the Department of
25 Energy for the remaining year and a half that I have

1 in this position until the end of 2008.

2 As I go through this, I have two hours on

3 the agenda. I will not talk for two hours. I

4 promise. Probably for about 30 to 35 minutes and feel

5 free to stop and ask questions as we go through and

6 I'll have plenty of time to talk and answer whatever

7 questions you might have after we go through this.

8 I have two main purposes for this program.

9 One is I want to give you my perspective on the status

10 of the program and the project key issues and

11 secondly, I want to give you an overview of where I'm

12 spending my time as the director of the program and

13 what are the key issues that I'm focused on as we move

14 this program forward. I'm sure as we go through this

15 you'll get a number of -- It will trigger a number of

16 ideas, a number of questions, that you'll want to talk

17 about.

18 The first is so what's the schedule for

19 this repository program and when I got here last June

20 and started to talk to the folks in the program and

21 understand where everything was, it was pretty clear

22 to me that we needed to put a stake in the sand and

23 say this is what this program needs to achieve. So we

24 spent a lot of time looking at the critical path in

25 the program, where we stood with the design in terms

1 of shift from dry handling and large amount of fuel
2 handling to the TAD concept which I'm sure you'll have
3 some questions about and took a look at what was the
4 best achievable schedule we could actually pull off on
5 Yucca. This is that set of milestones that I
6 presented to the House of Representatives Energy
7 Subcommittee last July. There are several key dates
8 on here that I want to talk about.
9 One is, and I'm going to talk about this
10 some more obviously, this one right here, Licensing
11 Application Submittal to the NRC by the end of June
12 2008. That's no later than Monday, June 30, 2008. I
13 know exactly when that date is and everybody working
14 on this program right now knows exactly when that date
15 is. This is essentially the same presentation I gave
16 at the Regulatory Information Conference (RIC) about
17 a month ago and at that conference, this date was
18 referred to referenced by a number of people both from
19 the industry and the state and some others and the NRC
20 and everybody except me said we've heard dates from
21 DoE before and we'll have to see if they meet this.
22 I'm telling you. We are going to meet or beat this
23 date. There are no ifs, ands or buts about it.
24 We have a very detailed schedule of all of
25 the engineering deliverables, all of the science

1 deliverables and all of the drafting deliverables of
2 the license application itself that are together in a
3 couple thousand activity schedule that are integrated
4 together that we as the senior management team are
5 reviewing on a biweekly basis to make sure that we
6 understand what's exactly ahead of schedule and what's
7 behind schedule and what the recovery plans are for
8 those things that are behind schedule and what we're
9 going to do to make sure that we make this date.
10 I want to emphasize that this is not just
11 about delivering a lot of paper to the NRC on this
12 date. This is about making sure that we have a
13 license application that is defendable, is high
14 quality and can be docketed by the staff when they
15 review it. So this is not just about putting paper
16 out. This is about getting it right. That is one of
17 our key dates. I'll talk a little bit later about the
18 financial aspects of the program and the
19 susceptibility of that date to FY 2008 funding but
20 I'll save that for a little bit later.
21 The only other date I want to talk about
22 here is begin receipt in March 2017. That is our best
23 achievable date and what I mean by that is we've
24 looked at as we've put this schedule together shortest
25 critical path on all of the major milestones. That's

1 the best date we can meet. What I told the House
2 Appropriations Committee two weeks ago was more money
3 is not going to make that date happen any sooner.
4 Less money will make that date happen later, but more
5 money is not going to advance that date. That's our
6 best achievable date.
7 Now when I put that date out last July, I
8 got a lot of criticism from a number of different
9 quarters, people saying that's not achievable. It's
10 really not a believable date. It is a make-able date,
11 but there are some key assumptions that are in that
12 schedule that support that 2017 that if those
13 assumptions don't come to pass because some of them
14 are outside of the control of the department, that
15 date is going to slip.
16 One of the key assumptions is how long
17 will it take between the time we submit the license
18 application and the time we get a construction
19 authorization from the Commission. This date assumes
20 three years and the reason it assumes three years is
21 because of the Nuclear Waste Policy Act. That's what
22 the Act gives the Commission, three years to make that
23 decision.
24 Now it allows them a fourth if they ask
25 for it. I personally believe they're going to need a

1 fourth year given some of the issues we're going to be
2 covering in that license application. And then, of
3 course, there's likely to be litigation and if there's
4 an injunction placed against the Commission on issuing
5 a construction authorization until those issues are
6 litigated, that three-year window for getting
7 construction authorization could stretch out to four,
8 five, six or seven.
9 If people ask me what do you think your
10 most reasonable date is, your most probable date of
11 opening the repository, I say it's somewhere between
12 2020 and 2021, about a three to four year slip in that
13 date based on how long it's really going to take to
14 get a construction authorization from the Commission.
15 That's my take on the schedule. But those are the key
16 program milestones. That's what we have re-baselined
17 the program to.
18 At the House Appropriations Committee
19 hearing two weeks ago, I presented to the Committee
20 the revised cash flows needed, budget authority cash
21 flows needed, to execute to this program and what I've
22 told them is here is the best achievable date, here is
23 the money that's needed to do that, here's how the
24 nuclear waste fund is set up to provide those funds to
25 meet that schedule and if you give us the authority to

1 have access to the waste fund and the waste fund
2 receipts and waste fund interest, we can meet these
3 dates and fully fund this program without touching the
4 corpus of the waste fund and I'll talk a little bit
5 more about that in a few minutes even though it's
6 probably not something that the Committee's fully
7 interested in. I think you'll find it will be an
8 interesting discussion.
9 So that's our best achievable milestone
10 schedule for the program, but as I said, its best
11 achievable, most probable is three to four years after
12 that based on how long the licensing proceeding in
13 front of the NRC actually takes and whatever
14 litigation may occur after that.
15 When I got here, I took a look at and
16 actually before I got here because I was waiting to be
17 confirmed for about eight months and while I was
18 sitting at home doing a lot of reading and I started
19 to understand the history of the program and some of
20 the problems with the program and took a look at
21 really what was going to be needed to make this
22 program successful, I recognized that I needed to lay
23 out four strategic objectives for this program to get
24 my organization and its contractors focused on what is
25 going to be needed to execute this program

1 successfully. These are the four strategic objectives
2 now that have been propagated through the program and
3 everybody understands these are the strategic
4 objectives that we need to achieve:
5 1. Total priority, assembling high
6 quality, docketable license application to the NRC no
7 later than Monday, June 30, 2008. I'll tell you we're
8 working internal schedules that are months ahead of
9 that. Whether or not, how much I bet that date by
10 remains to be seen yet and it has some aspects to it
11 associated with the FY'08 funding. But suffice it to
12 say, the schedules we're working to internally are to
13 beat that date by an order of several months and we'll
14 see how I do in actually making that happen.
15 2. The second strategic objective is
16 about my organization. It's about the Department of
17 Energy and its ability to not only execute this
18 project from a design, licensing and construction
19 standpoint, but to be a credible NRC licensee in
20 operating the repository.
21 The overall deal we've approached this
22 program so far has been what I call the standard DoE
23 approach. Go out and hire a management and operations
24 contractor and pay them money and have them go and do
25 everything for you and then we'll sit back and provide

1 some oversight and pay the bills and yell at them
2 every once and awhile. I don't subscribe to that
3 management philosophy. It didn't work in designing
4 and building and running nuclear power plants and it
5 won't work for a repository.
6 I'm a very strong believer in that the
7 licensee, in this case DoE, needs to have a core set
8 of competencies, skill sets and business processes as
9 well as a culture that allows it to be an effective
10 NRC licensee and that's what this second strategic
11 objective is all about. It's recognizing that as of
12 today, the DoE organization that I run is not set up
13 for long term success to be a successful NRC licensee
14 and it's to figure out how it needs to be structured,
15 how you bring the skill sets in that it needs and the
16 technical competencies that it needs, how you build
17 the culture that it needs and how you put the business
18 processes in place that it needs to be an effective
19 NRC licensee and that's what this second strategic
20 objective is all about and it's probably where I'm
21 spending about 50 percent of my time and where I'll be
22 spending about 50 percent of my time between now and
23 the rest of my time. It's focusing in on that and
24 making that occur.
25 3. The third strategic area is around

1 liability. At the House hearing two weeks ago, I
2 talked pretty extensively with the Committee about
3 this issue and right now, if we open the repository on
4 the March 20, 2017 date, we expect that our liability
5 is going to be the Federal Government's taxpayer
6 liability associated with late performance on the
7 standard contracts, picking up fuel and taking it to
8 the repository. That liability is going to total
9 about $7 billion. If we delay the repository opening
10 by, I believe, on the chart which I didn't bring with
11 me is three years, to 2020. That liability goes from
12 $7 billion to $11 billion. So there is big money, big
13 taxpayer money associated with each year of delay
14 associated with opening the repository, on the order
15 of about $0.5 billion.
16 So what we can do to try and help minimize
17 that growing liability and there are a range of
18 solutions from settlements like we did with PECO with
19 DoE and now Exelon and Duke and several others have
20 settled to some other things that we're still
21 exploring to see whether or not we have legislative
22 authority to do or not. But there are things we can
23 do, we believe, to help minimize the continued growth
24 of that potential liability of the taxpayer until we
25 get Yucca open. But the point being is that liability

1 will continue to grow until we have a repository that
2 we can actually take that spent fuel to and pick it up
3 and dispose of it.
4 4. Then finally, the fourth strategic
5 objective is about transportation and this is an area
6 where quite frankly has not gotten a lot of attention
7 from this program in the past, but it is absolutely as
8 vital to its success as any other part of the program.
9 We can have a repository built and open, but if we
10 can't get the spent fuel and high level waste there,
11 what have we accomplished. What I've learned in my
12 short time here regarding transportation is this is
13 not -- It looks easy on paper but the logistics and
14 the involvement that has to occur from both
15 stakeholder involvement and state and local government
16 involvement and tribal involvement in terms of route
17 planning, emergency planning, security, all of the
18 aspects and logistics as well as building a railroad
19 spur in the State of Nevada to get the railcars to the
20 nuclear test site. This is a major project and
21 program in and of itself.
22 What I realized when I got here was I was
23 not happy with what DoE had done so far in this area.
24 I mean I just couldn't understand the game plan and
25 where it was going. So we will produce and put out

1 for public review and comment later this summer the
2 first draft of the real strategic plan for the overall
3 approach for transportation for the repository
4 program.
5 If you go back, I found some document on
6 the DoE website while I was still waiting for
7 confirmation and it talks about, I think, it was even
8 called, Strategic Plan for Transportation or
9 something. I said this is great. So I opened it up
10 and read it. It was -- What a waste. I wasn't worth
11 the paper it was printed on.
12 What you're going to see this summer is
13 something that I think is a much more comprehensive
14 and thorough approach to describing all the various
15 aspects that have to come together to put together a
16 bona fide national transportation plan for the
17 repository and I think with the overall objective of
18 first of all letting everybody know what we're
19 planning on doing, giving everybody a chance to
20 comment on it and give us some direction and guidance
21 on where is it appropriate for various public
22 interactions and state and local interactions to occur
23 as we put this plan together over a number of years
24 because it's not something that's just going to be
25 produced in a couple weeks and put on the shelf. It's

1 a much more comprehensive set of issues.

2 Anyway, those are the four strategic

3 objectives and it's those four strategic objectives

4 now that are forming the focus on the business plans

5 that we're putting together for the program to focus

6 it as it goes forward both while I'm here and after I

7 leave. Let me talk about the key issues associated

8 with this program in a couple of different areas.

9 1. One is legislation and I talked a

10 little bit about it. When I talked about the best

11 achievable schedule, I talked about things that were

12 in our control and outside of our control.

13 One of the things that is outside of our

14 control, the Department's control, is there is certain

15 legislative authorities that are needed to execute

16 that program. For example, the first one is access to

17 the waste fund. So the nuclear waste fund, you may or

18 may not be aware, you probably are, but let me just

19 talk about it, is funded by all the nuclear utilities

20 with a 1 mil per kilowatt-hour tax or fee associated

21 with all the nuclear generation and the Nuclear Waste

22 Policy Act requires that people who generate nuclear

23 waste and spent fuel pay for its disposal. It makes

24 sense.

25 Those fees come into the Federal

1 Government at a rate of about $750 million a year.
2 That's a lot of money. It comes to my office and we
3 invest it in Treasury instruments and zero coupon
4 bonds, basically U.S. Government securities, and we
5 have a laddered portfolio of Treasury instruments for
6 that fund. That fund currently totals about $19
7 billion. That's with a "b." $19 billion.
8 Now I've been a rate payer into that waste
9 fund since like th 1970s. So I have a vested interest
10 in getting that money spent for what it was intended
11 to be spent for. So I have basically a corpus of the
12 nuclear waste fund worth $19 billion. An additional
13 $750 million a year comes in from the industry plus it
14 earns a return of about -- We're managing that to
15 about 5.25 to 5.5 percent return annually on that.
16 Now what's interesting is when you take a
17 look at the dollars being generated by both the
18 incoming fees and the interest I can build Yucca
19 Mountain and operate it for its first 20 some years
20 without touching the corpus of the waste fund.
21 There's enough cash flow there to go fully fund the
22 design, building and initial operation of this
23 repository including buying the railroad cars and the
24 casks and building the railroad and all that king of
25 stuff.

1 Right now, because of the way the
2 appropriations are scored in the House and the Senate
3 Appropriations Committees, they're scored as deficit
4 spending. They don't recognize that this income from
5 the utilities and the interest on the fund exist and
6 as a result, it's all scored as deficit spending. As
7 a result, the Committees are constrained within their
8 budget caps on how much they can appropriate.
9 What they've been appropriating on an
10 annual basis from the program over its most recent
11 varies between $350 and $500 million a year plus or
12 minus. This repository will never get built, never
13 get built, with funding at between $350 million and
14 $500 million a year. It just won't. The cash flows
15 that we've come up with and generated that meet that
16 best achievable schedule, we need over $1 billion in
17 2009 and it peaks during peak construction years
18 around 2013, 2014, 2015 to close to $2 billion.
19 The money is there. We just can't tap it.
20 So one of the pieces of our legislation that we've
21 sent up to Capitol Hill last year and we've sent it up
22 again this year to this Congress is fixing that issue
23 and giving us access to the waste fund to actually
24 build the repository.
25 2. The second issue that's key is land

1 withdrawal. Even though the Federal Government owns
2 the nuclear test site where the repository is, the
3 geological repository area operations area, the NRC
4 requires quite appropriately that the Secretary of
5 Energy have permanent control of that land before they
6 give us a construction authorization to build the
7 repository there. We don't have that. It is still
8 publicly -- It's still in the public domain and the
9 only way you can get land or the Federal Government
10 can get land withdrawal is through legislation. So we
11 need legislation to withdraw the GROA so the NRC can
12 give us the construction authority.
13 3. The third piece -- And there are some
14 other things in the legislation that are nice-to-
15 haves. I won't talk about those now. But the third
16 one is the 70,000 metric ton cap on the repository's
17 capacity. The Nuclear Waste Policy Act established
18 that 70,000 metric ton limit and it established that
19 limit and I think a lot of people don't recognize
20 this, this group probably does, but that 70,000 metric
21 tons is not like the weight of the spent fuel that
22 you're putting in there. It refers to the content,
23 the heavy metal content, of the front end of the fuel
24 and the high level waste that existed when the various
25 manufacturing or processes for either the weapons or

1 the fuel began with.

2 As a result, that 70,000 metric ton limit

3 in two and a half years from now, we will -- the

4 existing nuclear fleet will have generated enough

5 spent fuel that Yucca Mountain will be fully

6 subscribed at that 70,000 metric ton limit and we will

7 need a second repository for the country.

8 Now the Nuclear Waste Policy Act requires

9 me that between now and 2010 to submit a report to

10 Congress on the need for a second repository. Our '08

11 budget has a nominal amount of money in there to do

12 that study and we are going to do that study in '08

13 and submit it to the Congress in '08 that says if that

14 70,000 metric ton limit is not raised we're going to

15 need a second repository.

16 What we're proposing in the legislation is

17 we think pretty reasonable that we believe the

18 mountain can hold more than that. The environmental

19 impact studies that were done were done at 120,000

20 metric ton and we would like the NRC to have the

21 authority to make a decision on what that license

22 capacity of that repository should be based on the

23 technical review of the license application and not on

24 the 70,000 metric ton limit that's in the Nuclear

25 Waste Policy Act.

1 So those are three key issues that are
2 covered by our proposed legislation, all of which are
3 very important to the future of the repository and how
4 fast we can build it and how big it's going to be.
5 Our '08 budget request which is the
6 request right now that's going through the various --
7 We've had hearings now from both the Senate
8 Appropriations Committee and the House Appropriations
9 Committee. The President has asked for $494.5
10 million. That is enough if we get it all to produce
11 that license application by the middle of June 2008.
12 I need all that money to do that.
13 One of the key reasons I need all of the
14 money to do that is because of what happened in this
15 fiscal year, FY'07. FY '07 we were in continuing
16 resolution for the first five months of the year when
17 the appropriations finally got passed. The program
18 received $444.5 million which is a lot of money. It
19 is however $100 million less than what the President
20 asked for '07.
21 As a result, five months into the year I
22 and my management team were faced with $100 million
23 shortfall over what we had expected to get. Now the
24 reason we were able to manage our schedule with a $100
25 million shortfall in the budget was because we just

1 happened to have $100 million of carryover from the
2 previous fiscal year, from '06. So essentially this
3 year in '07 we're spending at a $544.5 million burn
4 rate in FY '06. That's why we're able to maintain
5 this license application schedule, the design and the
6 science work that needed to support the license
7 application.
8 If I get less money than $494.5 million --
9 I should say at the end of '07 I'll have zero
10 carryover. So I need all $494.5 million to finish
11 that license application on time and even with that,
12 the program will be downsized because I'm spending at
13 a burn rate right now of total employment on the
14 program through both DoE and all its contractors and
15 the national labs about $50 million over what we've
16 asked for '08. That's just the fiscal realities of
17 the program as they are currently set up.
18 The last item is the EPA standard which I
19 know this group is familiar with. Obviously, I can't
20 speak for the EPA. We had fully expected that draft
21 or that revised standard to be issued in the December.
22 I know EPA was working with internal schedules to do
23 that. The standard went into interagency review and
24 as I understand it, they are still resolving certain
25 intergovernmental agency comments on that and I don't

1 have an updated date as to when it's going to come
2 out, but I don't believe it's going to be a lot
3 longer. But exactly what it's going to say when it
4 comes out and when it's going to be issued, I don't
5 have any really good information to share with you
6 other than I expect it to happen sometime this spring.
7 But I expected it to happen in December also and
8 obviously it didn't.
9 Those are key issues on the program as I
10 see them right now and I'll be glad to talk in any
11 more detail about any of those when we come to
12 questions and answers.
13 My last slide is "So what am I paying
14 attention to?" What does senior management, me and my
15 senior management team, really focused in on at this
16 stage of the program? Well, the first one clearly is
17 the license application. It's our top priority.
18 If you were to ask me what's different now
19 than the last time DoE was working on its license
20 application and said they were going to put something
21 in, what's different now, it's about senior management
22 involvement and oversight. That's what's different.
23 1. We've instituted monthly senior
24 management program reviews where the third Tuesday
25 every month the entire management team from DoE,

1 Sandia, our major contractor BSC as well as USGS and
2 a few others, we come together as a senior management
3 team and we review for about a four hour period not
4 only all the major projects that we have going on,
5 the major projects that we review are not only the
6 license application itself, but the supplemental
7 environmental impact statement for the repository, the
8 supplemental environmental impact statement for
9 evaluating the minor rail route for the Nevada rail
10 line, the licensing support network certification that
11 we're getting ready to do. So we're looking at all of
12 those projects in detail at that monthly meeting with
13 the senior management team and resolving issues as we
14 need to resolve them there on the spot. That's one
15 thing that's different.
16 2. The second thing that's different is
17 around strategic licensing decisions and this is
18 something this group is probably going to be
19 interested in and will get involved with as we get
20 down the road. With my background in engineering and
21 design and licensing, I've decided that one of the
22 problems this program had in the past is that there
23 are lot of people lower down in the organization who
24 are making decisions about strategies and strategic
25 direction the program should take and the licensing

1 positions the program will take that really didn't
2 have a lot of experience in making those decisions and
3 a lot of those decisions never got surfaced up to
4 senior management level for review and concurrence.
5 Well, we've changed that. When I got onto
6 the program in June, four weeks later, I took the top
7 50 people in this program from across all of the parts
8 of the program out to Pahrump, Nevada for three days
9 and we did a senior management design review where we
10 had people get up and talk about the current design of
11 the repository and I did that for two reasons. One is
12 I wanted to learn and second is I wanted to see what
13 my management team really knew and understood about
14 how this repository was being designed and what the
15 decisions were that they had made or were not aware of
16 regarding how it would be designed.
17 That was a major eyeopener just not for me
18 but for the entire management team because there were
19 a lot of things going on in this design that people at
20 the senior management level were not aware of or were
21 surprised by. We came out of that meeting with a list
22 of probably about 60 some issues that needed to be
23 followed up in detail where I wanted to hear along
24 with my senior management team what the issue was,
25 what the recommended approach was and make a conscious

1 decision, a strategic decision, of how we were going
2 to address that issue in the license application. In
3 some cases, we had options. Some cases we didn't have
4 options.
5 What we've done is we've put together a
6 licensing strategy team which I chair. It meets every
7 two weeks and we cover between two and three topics at
8 each of those meetings and that committee is made up
9 of both folks on the program, the senior licensing
10 folks on the program, the senior engineering folks and
11 science folks, but also people from the outside,
12 people with NRC licensing experience, some former NRC
13 senior executives and some outside academics who have
14 a pretty good understanding and involvement with risk-
15 informed, performance-based regulation.
16 So we've come together and we review these
17 issues and we come to consensus on what the approach
18 is we're going to take in the license application on
19 these strategic issues. So far, it's worked out very
20 well. We've been able to come to consensus and every
21 once and a while where there might be some
22 disagreement or whatever, the ultimate decision is
23 mine because I'm signing the license application. The
24 decision-making map is very clear. The authority map
25 is very clear, but so far, we've been able to do very

1 well with consensus building on that team in terms of
2 our strategic direction. That's pretty different from
3 what's ever been done in the past in this program and
4 based on my past experience, it's what needed to make
5 intelligent decisions that we believe will be
6 defendable during the license application review.
7 The second area I'm spending a lot of time
8 on is as I've talked about before is the organization
9 itself. One is the business processes. This program
10 didn't have basic business planning processes where it
11 set out goals and objectives for each year ahead of
12 time with resources allocated for them. I mean this
13 is basic stuff and so we've started that. We did a
14 mini-business process activity for '07. We had that
15 in place and we're in the process of putting our
16 Fiscal Year '08 business plans together now.
17 Staffing: this is not just about number
18 of people, but it's about the skill sets and the
19 competencies of the people that need to be inside the
20 DoE program. I have already started to make changes
21 in the senior management team.
22 We've brought in a new Director of Quality
23 Assurance and for those of you who aren't familiar
24 with this program, Quality Assurance has had a long
25 sordid history on Yucca Mountain. We brought in

1 somebody who has a lot of senior nuclear plant quality
2 assurance and operations experience. He's not just a
3 career QA guy. He's somebody who held senior reactor
4 operating licenses of both PWRs and BWRs, Larry
5 Newman, who really has the right mindset to turn this
6 program around and it's other senior folks that I'm
7 bringing in to augment and increase the bench strength
8 on the senior management team. That's objective no.
9 1 in this area.
10 But besides that, building the technical
11 competency base in the engineering and science area is
12 absolutely critical. Just to give you an idea, the
13 total staffing for the DoE OCRWM organization right
14 now is about 180 some people. The total authorized
15 full-time equivalent staffing is about 220. Right
16 now, I'm estimating and I'm still working on these
17 numbers, but I expect to double the size of that
18 organization.
19 Now I'm certainly not going to be able to
20 do it in the remaining year and a half that I'm here.
21 But looking at what that organization needs to look
22 like and what competencies and skill sets it needs to
23 have to actually build and run this repository, I
24 guess it needs to be about twice the size of what it
25 currently is and it needs to have a different skill

1 set mix. So this is a major area that we're focused
2 on.
3 Third is management development. When we
4 -- I was heavily involved with the cultural turnaround
5 at PECO Energy when we went from being basically the
6 laughing stocks of the nuclear industry because we had
7 sleeping operators at our Peach Bottom Plant to being
8 the top nuclear plant owner/operator in the country
9 where we were doing refueling outages in 17 and 18
10 days with 92 to 93 percent capacity factors.
11 Well, how do you get from doing 120-day
12 outages with 65 percent capacity factors to 17- and
13 18-day refueling outages with 92 percent capacity
14 factors? One of the things you do is you really focus
15 and invest in developing your supervision and
16 management. That needs to happen here and so we're
17 just starting that effort and I hope to have that much
18 better in place by the time I leave than where it is
19 right now. But it has a long way to go.
20 Finally, the culture and the whole concept
21 of continuous improvement, focus on safety, the focus
22 on quality and quality assurance, doing things right
23 the first time, not always fully ingrained in the
24 federal mindset, at least not on this program up until
25 now. So it's an area that we're focused a lot on and

1 one of the areas that had a problem with this program,
2 the Corrective Action Program, which is really your
3 key process for not only identifying things that are
4 wrong but figuring out why they're wrong and how you
5 fit them so they stay fixed. That program has had a
6 lot of problems in the past mainly because either it
7 wasn't owned by senior management, senior management
8 just saw it as a necessary evil, or people used it to
9 play Gotcha with people they didn't like. That's all
10 changing and is changed. That focus on culture and
11 the focus on continuous improvement and the lessons
12 learned that I'm bringing with me from my PECO days
13 are something that we're bringing into the program and
14 really want to have embedded in there certainly before
15 the time I leave.
16 And then finally the last area is
17 Congress. I think from the areas I've talked to you
18 about I hope you've gotten a sense of how important
19 some of these areas are that we're trying to address
20 with the legislation, whether it's access to the waste
21 fund, the land withdrawal, some of those other issues
22 that are in our legislation. Educating Congress about
23 the issues of taxpayer liability and the access to the
24 nuclear waste fund is a very key piece for us because
25 when I go up and I talk at hearings to these

1 committees and I show them the charts, their eyes just
2 get wide. They go "We don't understand this. You
3 mean you have $19 billion sitting in the Treasury and
4 you can't spend it to go build this repository." So
5 there is a real education process that has to occur
6 there and I own some of that responsibility to help
7 make that happen. That's what we're trying to do.
8 But the last piece of going up to the Hill
9 is not just about education but it's about building
10 credibility. This program does not have a lot of
11 credibility on the Hill based on a number of missed
12 milestones in the past. So going up there and trying
13 to show the committee members and the staff members
14 that we're serious about making this happen, we're
15 committed to making it happen and we have a game plan
16 to go make it happen so that they're willing to go and
17 stick their necks out a little bit to go address some
18 of these key legislative issues is very important for
19 us.
20 Those are the areas where I as the senior
21 person on the program am focusing my activities at
22 this stage of the game and it's enough to keep my busy
23 full time. With that, I'm going to open the floor to
24 questions and be glad to have a good discussion and
25 dialogue with you.

1 DR. WEINER: Dr. Hinze.

2 DR. HINZE: Thank you Ruth. Mr. Sproat,
3 Ruth introduced you as new, but after listening to
4 you, you're not new and certainly after ten months in
5 the position, I'm sure you don't feel like you're new.

6 MR. SPROAT: No, I don't.

7 DR. HINZE: You've obviously put a great
8 deal of work into this.

9 Let me start off with a nontechnical
10 question. You have stressed some of the activities
11 that you and your senior management are doing and
12 involved with. We all know that this program is a
13 technical program, but it's also very much a public
14 and a political problem or challenge should I say. Is
15 there a role for your directorship to be involved in
16 outreach to the other governmental units other than
17 Congress, to the public at large, to help them
18 understand the need and the safety that one can build
19 into Yucca Mountain?

20 MR. SPROAT: Yes, it is. You're
21 absolutely correct. Let me just talk a little bit
22 briefly about another area that I think we're doing
23 differently now than we were doing before I got here
24 and it's around this issue of public outreach
25 particularly with both the State of Nevada and the

1 counties, the effected units of local government.

2 My assessment of the Department of

3 Energy's approach to the State of Nevada in the past

4 has been let's-see-how-many-times-we-can-stick-them-

5 in-the-eye-with-the-sharp-stick approach and I'm the

6 first director of this program that met with the

7 governor, the ex-governor, Governor Gibbons, I'm

8 sorry. Yes. I just met with the ex-governor in

9 November. I have instituted quarterly meetings with

10 the effected units of local government in Nevada where

11 before those would occur once or twice a year and it

12 was basically a DoE download. It was like we'll tell

13 you what we want you to know and here's what it is.

14 Those programs now, they've asked for, the

15 county governments have asked for some basic

16 information on the repository design, the approaches

17 of everything from TADS to transportation into the

18 repository. We did a full day workshop with them

19 three weeks ago where essentially we spent the day

20 with the counties and the representatives educating

21 them on some of the basics per their request and it

22 was very well received.

23 So we are trying to be proactive in

24 improving our relationships and our dialogue with not

25 only the State of Nevada, but the effected units of

1 the local government and the counties and the tribes
2 and we have been active to some extent with other
3 government entities associated with transportation,
4 say, in the Midwestern States and the Northeastern
5 States, but we have a lot more to do.
6 We do conduct tours of the repository site
7 itself in the mountain and those are very well
8 received. We take surveys of people who go through
9 that and it's been very well received and it's very
10 much worth the time and cost for us to do that because
11 people are very impressed by what they see and the
12 approach that we're taking.
13 A long answer to your short question was
14 yes. We do need to be very proactive in outreach to
15 the counties, to the state and continue to do that in
16 a very proactive way.
17 DR. HINZE: Let me move to a little more
18 technical question or concern. Certainly, writing a
19 license application must be a challenge when you don't
20 have all the boundary conditions. In other words, 197
21 isn't in place. There is a possibility of increasing
22 the 70,000 metric tons. How robust will this
23 application be in terms of satisfying those conditions
24 or preparing for contingencies?
25 MR. SPROAT: In terms of those specifics,

1 the license application will only be written for the
2 70,000 metric ton limit because that's what the law
3 requires. Now the environmental impact statement --
4 DR. HINZE: Excuse me. As you design the
5 GROA and as you lay out the footprint, there must be
6 efficiency in building that for the possibility of
7 having more than 70,000 metric tons. Is that being --
8 Is it robust enough to handle that?
9 MR. SPROAT: That issue has almost no
10 effect on the surface facility design. It's primarily
11 the subsurface facility design and there are
12 conceptual designs that -- The design that gets
13 submitted with the license application sub-surfacely
14 based on 70,000 metric tons, but we have ideas if it
15 was to expand to 120,000 or 130,000 where those
16 tunnels would be and how we would expand that
17 facility. But the license application itself would
18 only be for 70,000 metric tons because that's what the
19 law requires right now or allows.
20 The issue of the EPA standard, this is
21 very clear that even after standards gets issued, say
22 if it gets issued this year, it will again be
23 litigated. There's no doubt about it. Your guess is
24 as good as mine as to how long that's going to take
25 and what the final outcome of that litigation is going

1 to be. It will certainly -- The NRC staff won't be
2 able to make a final determination as to whether or
3 not the post-closure repository performance meets
4 those EPA standards until they're finalized and fully
5 litigated. But that's down the road three or four or
6 five years.
7 I don't need to have that all done in
8 order to put a license application in that says here's
9 what the repository performance is forecasted to be
10 and how we expect it to perform over various time
11 horizons. We can do that and that's how we're going
12 to put the application in. So whatever the final time
13 horizon turns out to be, you stick your finger on the
14 chart and you say that's what it looks like it's going
15 to be with the uncertainty bands around it at that
16 time frame. Is that adequate enough or not?
17 I don't see any difficulty in putting a
18 good robust application together even given those
19 uncertainties because they only need to be finalized
20 when the Commission is ready to make their final
21 decision on whether or not to grant the application
22 and that's three or four or five years down the road
23 and there's no reason to wait that long.
24 DR. HINZE: Let me ask a question related
25 to the possibility of extending out to several hundred

1 thousand years or a million years. One of the
2 lingering thoughts is related to the drift stability
3 over that period of time.
4 MR. SPROAT: Sure.
5 DR. HINZE: Particularly in view of the
6 seismic activity, the low-level seismic activity. Our
7 Committee and the NRC are interested in that problem
8 and the extension out and we are looking forward to
9 holding a RIC meeting with the cooperation of the NMSS
10 staff. It would be very helpful if you could take
11 back to your organization that it would be great to
12 have some interaction at that time in the working
13 group on the drift stability and the related low-level
14 seismic activity.
15 MR. SPROAT: Okay. I know that's an area
16 that is currently being worked because I've had
17 discussions with folks working on that work about so
18 what's the maximum credible rock fall size and what's
19 the probability of distribution. As you're well aware
20 being a risk-informed, performance-based regulation
21 trying to come up with a probabilistic approach to
22 maximum rock fall size, frequency of seismic events,
23 it's a challenge, but that's the way the regulation is
24 written and that's the way we're designing the
25 repository and doing the analyses. That work is being

1 done and we should be in the position to at least have
2 that set of discussions and dialogue with you when
3 you're ready.
4 DR. HINZE: Great. Thanks. I'll pass it.
5 DR. WEINER: Allen.
6 VICE CHAIR CROFF: Thanks. On the order
7 of a year ago, Sandia was named as, I think, it was
8 called the Yucca Mountain Lead Laboratory.
9 MR. SPROAT: Right.
10 VICE CHAIR CROFF: But after sort of
11 watching for the last year, I guess I've not seen a
12 lot publicly. Can you elaborate a little bit on sort
13 of what they're doing as a lead laboratory and what
14 their function is?
15 MR. SPROAT: Sure. I can't take any
16 credit for this decision. It was made by Paul Golan
17 who is my Principal Deputy Director who was Acting
18 Director before I got here. I think it was an
19 excellent decision.
20 Sandia, this is probably going to get me
21 in trouble, but that's okay. Coming in here from the
22 private sector, I think a lot of the National Labs in
23 terms of their intellectual capability and ability to
24 come up with and do really good science work, but in
25 terms of engineering deliverables and project

1 orientation, I've never been impressed by the National
2 Lab's ability to deliver what they said they were
3 going to deliver when they were supposed to deliver
4 it.
5 Sandia has a different reputation. I
6 spent a couple of days out there in Albuquerque. I
7 met with all the senior Sandia management team. They
8 are very much focused on being deliverable-oriented
9 organization and the senior management team for Sandia
10 that's on this program now, I have high confidence in
11 their ability to deliver what they said they're going
12 to deliver.
13 They have essentially taken responsibility
14 for all of the science that's been done to date
15 whether it's been by them or others and bring it into
16 the Sandia, not all into their organization, but into
17 their processes and they will be fully responsible for
18 presenting and defending all of that science work and
19 analytic work associated with it during the license
20 application writing and defense.
21 They're going back through all the stuff
22 that's been done in the past. They've been going
23 through all of the various corrective action reports
24 and QA audits and taking a look at all of the AMRs,
25 the analytic modeling reports, and the various

1 computer codes and all that kind of stuff and they're
2 getting it all together so that it's consistent,
3 traceable and transparent to support the license
4 application both writing and defense.
5 In a lot of cases, they are redoing some
6 of the analysis that's been done in the past. The
7 TSPA, they are basically redoing that set of analyses
8 and the various runs, all that analyses that needs to
9 be done. They're doing that. So they have -- And
10 essentially wherever they need some help from another
11 national lab to augment a data gap, they give
12 direction to that national lab. The national lab, say
13 Berkeley or somebody else, presents that back to
14 Sandia. Sandia has the integration responsibility.
15 When we put this license application in,
16 the three main parties that will be in front of the
17 NRC will be DoE as the licensee, BSC as the designer
18 of the repository and Sandia as the chief science lab
19 that has responsibility for all the science and the
20 analytical work that goes into the post-closure
21 performance analysis.
22 VICE CHAIR CROFF: Thanks. You used the
23 word "integrator" and what you described sounds like
24 a science integrator organization. That's a little
25 bit clunky. But I know that OCRWM has had for at

1 least a few years some kind of a science program run
2 out of Headquarters and as I understand the budget,
3 it's being ended this fiscal year. Is there any
4 intention to resurrect that at some point in the
5 future to provide advances or even during the
6 licensing process?
7 MR. SPROAT: Yes. I'm not sure if the
8 budget is being totally zeroed out. I don't think
9 that's quite right. But it's severely restrictive.
10 The program has had over the past five, six, seven
11 years a separate what they call "Science and
12 Technology Program" and it's essentially money that's
13 been set aside in the $5 million to $6 million to $7
14 million range for various labs to do work that may not
15 be germane today to the repository but could be
16 applicable in the future whether it was future welding
17 technologies or cement technologies or things like
18 that and there's been some very, very good work there.
19 But when your budget gets cut $100 million halfway
20 through the fiscal year, you have to make some
21 decisions about where that money is going to come from
22 and without impacting the critical path and the
23 license application is on the critical path and S&T is
24 not. So that's one of the areas where the money is
25 coming out.

1 Now having said that, this program has a
2 component to it, long term, that's both -- That is a
3 science program. It's the performance confirmation
4 process for the long-term performance monitoring of
5 the repository and confirming that the repository and
6 the geological system is operating the way it was
7 predicted to operate. That's clearly a part of the
8 program. That will be funded and continue to be
9 funded as part of the long-term program going forward.
10 The quick answer is yes, it will be funded
11 in the future. But the funding during this period of
12 time where we're in constrained funding and it's not
13 directly supportive of the critical path, the funding
14 is going to be cut back.
15 VICE CHAIR CROFF: Okay. On a different
16 subject, we've had a number of briefings that this
17 Committee has on the Global Nuclear Energy Partnership
18 (GNEP) and obviously if that were to go ahead as
19 presently envisioned in very broad terms, it would
20 profoundly affect the kind of material that would be
21 coming into a repository and it would seem that there
22 is some relationship between that program and the
23 document you have to submit on the need for a second
24 repository here in the next few years.
25 MR. SPROAT: Sure.

1 VICE CHAIR CROFF: Can you talk a little
2 bit about is there a relationship or are you thinking
3 about this GNEP thing? Are there any provisions,
4 let's say, built in that either of those, the LA or
5 that second repository thing or is that just too far
6 out?
7 MR. SPROAT: Let me try and answer it this
8 way because there are several aspects of your
9 question. First, regarding the need for a second
10 repository and the impact on GNEP for the need of a
11 second repository, do you remember the point I made
12 when I was talking about legislation about the 70,000
13 metric ton limit and its being based on the 70,000
14 metric tons of heavy metal at the front end of the
15 process? That doesn't get changed.
16 GNEP, we can have as many reprocessing
17 plants as we want. We're still going to need more
18 repositories. We have to change the 70,000 metric ton
19 limit. We have to change the definition of 70,000
20 metric ton heavy metal. Otherwise, we're going to
21 need a second and a third or a fourth repository.
22 That's one part of your question.
23 In terms of what goes into the repository
24 as a result of GNEP, we don't know what the waste form
25 is going to look like coming out of the tail end of

1 the reprocessing cycle and we don't know when it's
2 going to occur or what it's going to look like and
3 quite frankly, we don't need to know that now. What
4 we need to know for this license application is that
5 there are going to be future high level nuclear waste
6 forms that are currently undefined and that in a
7 license application what we need to be able to license
8 is a process and approach for evaluating and getting
9 approval of putting those future waste forms in the
10 repository when they are defined in the future.
11 What you'll see when the license
12 application goes in is you're going to see an
13 inventory of currently identified waste forms that an
14 analysis of them that says here's where the waste
15 forms are going in and here's why they're okay. But
16 what you'll also see is the methodology for evaluating
17 waste forms and what we're be looking for is NRC
18 approval of that methodology. So that methodology
19 then becomes licensed and can be used in the future to
20 evaluate whatever future waste forms may go in there
21 and that's the way you do it.
22 VICE CHAIR CROFF: And the LA that you're
23 currently envisioning, the list that you mentioned,
24 that's basically commercial spent fuel, DoE spent
25 fuel, and glass logs.

1 MR. SPROAT: Yes, with a few other things
2 thrown in there which I'm not very -- I'm not smart
3 enough to talk about in detail, but yes.
4 VICE CHAIR CROFF: Okay. Thanks.
5 DR. WEINER: Dr. Ryan.
6 CHAIR RYAN: That's great. It sounded
7 like a 50.59 review.
8 MR. SPROAT: It is except it has its own
9 part under Part 63 which I don't remember the number
10 of. But that's exactly what it is or a license
11 amendment.
12 CHAIR RYAN: Let me take a minute if I
13 may, Ward, and tell you a little bit about the
14 Committee's position in all of this. We advise the
15 Commission in the formal letters and reports and I
16 think with regard to Yucca Mountain, our focus is is
17 the staff prepared to review an LA particularly on the
18 risk-significant issues. That's kind of our focus
19 and orientation.
20 In my tenure on the Committee and I'm sure
21 Professor Hinze from his previous service on the Yucca
22 Mountain issue, we've had lots and lots of
23 presentations from DoE which have been very, very
24 helpful, alas identifying things to sort of give the
25 staff a heads-up on, this is an area where we'll set,

1 we're prepared and we seem to have good understanding
2 or this is an area that needs some attention, whatever
3 it might be.
4 Since, I don't know, six or eight months,
5 we've had a gap and I think probably over your tenure.
6 It would be really worthwhile if we could catch up on
7 a few topics. I think Professor Hinze mentioned one,
8 seismic activity and what your current thinking there
9 is.
10 Last month, we had Paul Harrington, was
11 it, who gave us kind of a top level review of the
12 design changes which to me frankly was pretty
13 exciting. It looked like great simplifications of
14 what was otherwise going to be a pretty complicated
15 system and we've asked him to come back and said, "Can
16 you bore in a little bit and give us some more of the
17 detail of that design?" That helps us do two things.
18 One is to identify areas that we have previously
19 identified as risk significant and advise the
20 Commission on is the staff prepared and so forth.
21 A couple others to think about are the
22 TSPA, the calculational tool you're using to make
23 performance assessments. I think we would be
24 particularly interested in how you're dealing with ten
25 thousand years on out including the statistical

1 analysis that goes with it. And then I think with the
2 TAD there are some significant changes to the near
3 field, near field chemistry and some of those kinds of
4 issues. So if we could prevail on you to give us some
5 updates on those topics, boy, that would be a real
6 nice way to get us up to date with your changes.
7 MR. SPROAT: Okay.
8 MR. DIAS: Chris Kouts is coming here in
9 July to talk about that.
10 CHAIR RYAN: Yes, we have a couple of
11 these on the agenda, but I would stress, too, that
12 it's helpful to hear as much technical detail as you
13 think we can stand because it really helps us and I
14 think it helps everybody in the audience to understand
15 what your current thinking is. That would be a great
16 benefit.
17 I guess that's really about it for me at
18 this point. I think some of the other questions I was
19 thinking about have been asked. So I'll pass.
20 DR. WEINER: Dr. Clarke.
21 MR. CLARKE: Thanks, Ruth. If I
22 understood you correctly, the fact that you don't have
23 a final standard now can be managed by doing a
24 performance assessment and so that you have what you
25 need once a standard is determined, you go to the time

1 and you look at the dose and I think that was a good
2 answer. It brings me to a question that your design
3 will be complete by November 2007.
4 MR. SPROAT: Can I just say that's a
5 design to a level of detail needed to support the
6 license application. That's certainly not the final
7 design.
8 MR. CLARKE: No, I realize that. But my
9 question is centered around is that design complete
10 enough that you can do a performance assessment for
11 post closure and rely upon it. In other words, it
12 seems like there are things that have gone back and
13 forth. Dr. Hinze mentioned drift stability. Does
14 that mean backfill? Does that mean something else?
15 Will those kinds of things be nailed down, in other
16 words, design changes that could have an effect on
17 post closure performance?
18 MR. SPROAT: The quick answer is yes.
19 There is a more thorough answer though that I think
20 this Committee needs to understand and discuss and
21 debate not necessarily here today. It's very clear to
22 me when I started to get into doing all the reading
23 that I was doing on this position, I read Part 63 and
24 NUREG 1804, that the regulation fully recognizes that
25 when you are trying to design a license of a

1 repository for extremely long periods of regulatory
2 interest which is what we're trying to do here that
3 you will always know more tomorrow than you do today
4 and that the uncertainties associated with analysis,
5 long-term, post-closure performance analysis over
6 extremely long periods of time, how you manage the
7 uncertainties in those various analyses particularly
8 as you take the uncertainties and say an infiltration
9 model and the uncertainties in a corrosion model and
10 the uncertainties in a rock fracture model and then
11 you start to convolve them together to come up with
12 how this thing performs long term, it's not an exact
13 science. But you do need to have a consistent
14 approach for managing uncertainties and a rationale
15 for why you're handling the uncertainties the way you
16 are.
17 It's very clear to me the regulations
18 don't expect and don't demand final answers on all
19 these issues because if they did it wouldn't require,
20 you know, the regulations require that you have this
21 hundred year period of performance confirmation that
22 once the thing is opened that you are gathering data
23 to see whether or not you have appropriately
24 characterized the uncertainties on that analysis and
25 whether or not those uncertainties are starting to

1 narrow or are they starting to widen? And you have
2 all that data before the Commission makes its decision
3 to close the repository and that repository closure
4 decision is a minimum of 50 years from the time it
5 opens, probably closer to 100 years after it opens.
6 So it's very clear to me that this is not
7 a licensing proceeding like a Part 52 proceeding of a
8 nuclear plant which is here's the final certified
9 design, go build it this way. It's here's the current
10 state of our design, the analysis of post-closure
11 performance, what our pre-closure analysis is and from
12 a probabilistic, a risk-informed performance-based
13 regulation we have adequate assurance and adequate
14 expectation that this repository will perform long
15 term as we are predicting it today at this stage and
16 that's the standard we have to meet and we will have
17 enough at this stage of the game, we think, to meet
18 that standard of reasonable expectation of long-term
19 post-closure performance. That's the best answer I
20 can give you.
21 MR. CLARKE: That's a good answer. Thank
22 you.
23 DR. WEINER: Thank you. Most of my
24 questions have already been asked. I'll just repeat
25 Dr. Ryan's request that we would like to be updated on

1 technical questions. It's been awhile since we had
2 in-depth, a series of in-depth, technical discussions
3 with the Department of Energy.
4 You mentioned the public interactions that
5 the Department has undertaken and continues to
6 undertake. How do you judge your success in those
7 interactions?
8 MR. SPROAT: Too early to tell yet is the
9 way I would say it. I mean, realistically I've had
10 now three meetings with the effected units of local
11 government out in Nevada and I've gotten very positive
12 feedback from them that those meetings are meeting
13 their expectations and their needs and it's a step
14 change in terms of the openness and exchange of
15 information between the Department and the counties
16 than has existed before. So from that standpoint, I
17 think we're on the right track. We still have more
18 interactional work to go with that group and with the
19 state as we go forward into the licensing process.
20 One of the areas that I'm not happy with
21 so far is just the overall approach of DoE in terms of
22 laying out its strategic communications plan, not only
23 just about the repository but the transportation
24 aspects also. When you take a look at what we're
25 trying to do on a national basis between the

1 repository and transportation, what the target
2 audiences are at the state, county and local levels,
3 tribal levels, it's a huge effort which really the
4 Department has not done a very good job at all in
5 terms of identifying the key messages, the key target
6 audiences, and how they're going to deliver those
7 messages and that's something in terms of putting
8 together a strategic communications plan that we're
9 working on now. So we have a long way to go.
10 DR. WEINER: So you're not prepared at
11 this point to be specific about what changes you see
12 are needed in that communications plan?
13 MR. SPROAT: Not yet. No.
14 DR. WEINER: The other question relates
15 really to the beginning of the Nuclear Waste Policy
16 Act and when the 1982 Act was passed it was generally
17 supported not only by Congress itself and by the
18 utilities. It was also supported by most of the
19 environmental groups. It had a great deal of
20 acceptance.
21 That acceptance has eroded with time as
22 I'm sure you're aware. How would you see regaining
23 that sort of acceptance? Do you think it's possible?
24 MR. SPROAT: I'm trying to come up with a
25 good ensuring answer to that one. I think, first of

1 all, people start to regaining confidence when they're
2 interested in the issue. I mean, people are getting
3 hit by so much information today that it's very hard
4 to focus in on anything. So No. 1, they have to be
5 interested and focus in on the issue. I don't think
6 that's going to happen until we actually put the
7 license application in and start the NRC review
8 process. That will start to pique folks' interest and
9 start to get them focused in on the issue.
10 Once you have that focus, then it's a
11 matter of the messages you're communicating, how you
12 communicate them, do you give them an opportunity to
13 have dialogue. It's not just -- This requires two-way
14 communication, just not one-way downloads from DoE.
15 Exactly how all that's going to happen is not clear to
16 me. Just don't know yet.
17 DR. WEINER: But that's actually a very
18 interesting answer. Thank you for shedding that light
19 on it.
20 Finally, do you see if you look at the
21 repository program at the repository itself -- What
22 would you identify as the technical weaknesses in
23 putting spent fuel into Yucca Mountain? Do you see
24 any -- What are the really critical weak points?
25 MR. SPROAT: I wouldn't -- When you say

1 "weak points," I view them as uncertainties. In other
2 words, where are your greatest uncertainties in terms
3 of your long-term performance analysis of how these
4 waste packages and how this repository is going to
5 operate over extended period of times? And I'm not
6 close enough to the technical analyses to be able to
7 give you a quantitative answer to that.
8 But what is clear to me is that as I've
9 started trying to get myself educated that as you move
10 into a risk-informed, performance-based regulatory
11 space like we're in with this and you start to take a
12 look at very low probability events, people lose
13 perspective on the event that's being analyzed. For
14 example, I know I'm going to get in trouble with this,
15 but that's okay, what's the probability of an
16 intrusive volcanic event at Yucca Mountain and we have
17 expert elicitation. We've already done one expert
18 elicitation on that and we're doing another one.
19 I'm sure when we go through the licensing
20 process it's going to be one of those issues where
21 there are going to be competing Ph.D.s on both sides
22 of the table arguing is it 10^{-6}, is it 10^{-7}, or is it
23 10^{-8}. What people are going to hear out of that is
24 there is going to be volcanic explosions at Yucca
25 Mountain. What people don't understand or what even

1 a lot of people on the program have difficulty
2 comprehending is when you're talking about
3 probabilities down at those levels what are the
4 competitive risks? What are the competitive events
5 that have the same probabilities that people can
6 relate to? When you get down to 10^{-7}, 10^{-8}, you're
7 talking about events like mass extinction of life on
8 the earth due to a meteorite hit. Is that something
9 that most people worry about? Probably not.
10 We're probably going to get tied up in our
11 shorts about worrying about have we fully calculated
12 the dose consequences from dust getting kicked up
13 after this intrusive volcanic event that has the
14 probably of occurrence of a meteorite hitting the
15 earth. I think that's a weakness that we have lost
16 sight of what we are trying to do.
17 Now I'm sure there are going to a lot of
18 competing Ph.D.s on this who think I'm full of baloney
19 for even worrying about this, that it's a really big
20 issue. I don't buy it. But we'll see what happens
21 when we get into licensing space.
22 DR. WEINER: So how would you move the
23 focus to a more realistic one? Do you have any ideas
24 about it? Because I hear what you're saying. You get
25 these very low probability events and it's really

1 difficult to conceive, to build a conceptual picture.

2 MR. SPROAT: Yes.

3 DR. WEINER: How would you change that?

4 MR. SPROAT: It's all about getting folks

5 to understand comparative risks. It's about

6 understanding the risk of the probability of this

7 event occurring and the risk that it has if it were to

8 occur 200,000, 300,000, 400,000 years in the future

9 assuming there are any people around 400,000 years

10 versus the realities of today and what we're facing

11 today in terms of comparative risks. That's what you

12 have to do and part of that is an educational process

13 that I think we as the licensee have a role in trying

14 to educate folks to understand that.

15 DR. WEINER: Thank you. Staff, questions?

16 Dr. Hinze.

17 DR. HINZE: If I might a couple of

18 questions since we have a few moments. In terms of

19 this 100 year performance from a geological standpoint

20 I have some problems with thinking that we're going to

21 do anything significant in terms of decreasing the

22 uncertainty with regard to the conceptual models or

23 the parameters and the fact of the matter is new

24 information may even broaden them out in some ways.

25 MR. SPROAT: Sure. I agree.

1 DR. HINZE: I think we have to be a little
2 concerned about holding that as a hope. Let me ask
3 you a question related to the design of the
4 repository. The design of the repository backfill,
5 the drip shields, the thermal loading, etc., these
6 were largely done in the draft 197 years. They were
7 10,000 year time of compliance.
8 MR. SPROAT: Yes.
9 DR. HINZE: As you and your staff look at
10 this and come in with a license application, are we
11 likely to have any surprises with regard to the basic
12 design taking into account the fact that we may be
13 extending this to greater periods of time?
14 MR. SPROAT: Since I don't know what
15 you've seen in the past, I can't tell you whether you
16 are going to be surprised or not.
17 DR. HINZE: Drip shields, for example, or
18 backfill or thermal loading?
19 MR. SPROAT: I think what you will see and
20 the approach you're going to see in the license
21 application broadly. I can't speak about drip shields
22 or backfill because I'm just not expert enough to tell
23 you about -- drip shields are still in the reference
24 design. But what you're going to see is an analytic
25 approach that says here's what the drip shields buy

1 you based on our analysis today. Now 75 years from
2 now, we may have much better analytic tools and much
3 better information and narrower uncertainties to say,
4 "Guess what? We don't need to put those drip shields
5 in" and I think that's a realistic recognition that as
6 you learn more about the repository system before you
7 make that final closure decision you make the
8 decisions about do I need a drip shield or not. But
9 right now, that is in the license design and it's in
10 the analytic models that are being analyzed.
11 Backfill is not. Might backfill become
12 the reference design down the road prior to closure?
13 It might, but it's not today.
14 You asked about thermal management. There
15 is an area that -- Remember when I talked about our
16 senior management review with Pahrump. That was one
17 of the issues that I focused in on right away because
18 what we had was what I call the compliance model. We
19 said we analyzed a single point compliance case of --
20 Now I forget the number of kilowatts per meter of
21 whatever the line load, heat load was. I said that
22 sounds great from doing an analysis for TSPA but does
23 nothing for me in terms of actually being able to
24 operate a repository. I need to have a range of
25 thermal limits to be able to actually put waste in.

1 What are my technical specifications going to say
2 regarding my lower and upper limits in terms of
3 thermal loadings in the repository for each drift? It
4 makes sense.
5 Well, not all the scientists fully grasped
6 that concept. They do now. We're doing those thermal
7 and what you'll see in the license application is
8 you'll see the compliance case single point line load,
9 but then you're going to see the analysis for the
10 bounding conditions upper and lower that say here's
11 what we think the thermal operating range of the
12 repository should be and how the loading of the drifts
13 in terms of thermal limits should be analyzed and
14 designed when you actually load the drifts. So that
15 will be in the license documentation.
16 DR. HINZE: And that will have to cascade
17 down to the environment in the near area and so forth.
18 MR. SPROAT: Yes.
19 DR. HINZE: Thank you very much. Ruth.
20 DR. WEINER: I have one further question
21 following up on Allen Croff's question. You mentioned
22 that the funding for the research arm is cut back but
23 not gone and you hope to revive it. How do you hope
24 to sustain the researchers in that interim? People
25 go. When they're not funded, they go and do something

1 else.

2 MR. SPROAT: I understand. I bet though

3 if we get the funding in the future that we're asking

4 for and get access to that waste fund and this program

5 gets the $1 to $2 billion per year it's asking for, I

6 bet they'll come back. That's my answer. It's the

7 best I can tell you. I know it's government, but it's

8 kind of like business reality. The money needs to go

9 to maintain the critical path and quite frankly, I've

10 said this before, I said it in front of the Nuclear

11 Waste Technical Review Board, his has been primarily

12 a science program for the last 20 some years and I'm

13 moving it to an engineering program. We're here to go

14 design and build this thing, not to study rocks and

15 dirt to death. So the message has gotten clear to the

16 entire program that's what we're doing and, for better

17 or worse, that's where we're heading.

18 DR. WEINER: Thank you. Any questions

19 from staff?

20 MR. WIDMAYER: I had one.

21 DR. WEINER: Derek.

22 MR. WIDMAYER: Ward, you --

23 CHAIR RYAN: Tell us who you are please

24 for the record.

25 MR. WIDMAYER: Derek Widmayer, ACNW staff.

1 The third program strategic objective you talked about
2 was addressing the government's mounting liability and
3 you mentioned settlements and stuff like that as far
4 as a contractual obligation. Is there anything going
5 on about a centralized, away-from-reactor storage
6 facility or something like that?
7 MR. SPROAT: There is a lot going on but
8 not in DoE. There is a lot of interest in Congress on
9 that and they have, in every hearing I've been in,
10 both the House and Senate, asked about that and my
11 answer to them has been fairly consistent that (1)
12 right now DoE does not have regulatory or, sorry,
13 statutory authority from the Congress to actually
14 implement interim standardized storage. We did at one
15 time, but that has expired and we can't take title of
16 the fuel and move it until the repository actually
17 opens. So right now, we don't have statutory
18 authority to do interim, centralized storage.
19 Now in terms of is it a potential solution
20 to this issue of the mounting taxpayer liability, it
21 would be if we could do it substantially faster than
22 that schedule that I showed you for opening Yucca
23 Mountain and I think the reality is we can't do it
24 faster than what we showed you for that schedule on
25 Yucca Mountain.

1 I mean if I was doing interim storage at
2 one of my plant sights I could probably open that PAD
3 in about three years and start taking stuff out of the
4 spent fuel pool and putting on that PAD in about 36
5 months. To do a green field site as a Federal
6 Government for a centralized storage facility, while
7 the NRC licensing piece might take 36 months getting
8 a site selected, working through all litigation, the
9 environmental impact statement, going through the
10 litigation, easily a decade. Easily. So I would
11 argue that centralized interim storage as a solution
12 to the taxpayer liability issue would only make sense
13 if Yucca was to not become an option at all and
14 something else had to be done in an interim storage
15 kind of vein and even then we'd still need
16 legislation. We'd need to get site picked. You would
17 work through the environmental impact studies, work
18 through the litigation. You're not going to save a
19 lot of time and you're not going to save any money.
20 DR. WEINER: Other questions?
21 (No response.)
22 DR. WEINER: Hearing none, I want to thank
23 you very much for taking the time to come here and for
24 a very excellent presentation and informative
25 presentation. It was great. I turn it back over to

1 the Chairman.

2 CHAIR RYAN: All right. Thanks for your

3 time. We really appreciate your generous time this

4 morning.

5 MR. SPROAT: You're welcome.

6 CHAIR RYAN: And we'll adjourn for the

7 lunch hour a little bit early from our schedule, but

8 we'll reconvene promptly at 1:30 p.m. Thanks again

9 for being with us.

10 MR. SPROAT: You're welcome. Thank you.

11 CHAIR RYAN: Great. Off the record.

12 (Whereupon, at 11:53 a.m., the above-

13 entitled matter recessed to reconvene at 1:31 p.m. the

14 same day.)

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25 A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:31 p.m.

CHAIR RYAN: On the record. We will reconvene please. We'll hear now from Tim McCartin on the International Atomic Energy Agency Requirements Document WS-R-4: Design and Operation of Facilities for Geological Disposal of Radioactive Waste. Tim, it's been a long time. Welcome back.

MR. McCARTIN: Yes, a month. Today I'll be talking about the IAEA disposal standard that was finalized in 2006 and it was approximately, I'll say about, four or five years in the development and the discussions with the member countries to ratification. It was published and finalized, like I said, in '06. I'll give a synopsis of what's in the standards and some idea of what some of the thinking behind the standards are.

CHAIR RYAN: Are you going to touch on how or if this flows into any U.S. regulations or is that an easy answer?

MR. McCARTIN: I can. Currently I think in a broad sense, I'll try to point to some things, the Part 63 regulations in the United States are probably more stringent than the international standard and I'll point to those areas where there are slight differences and where I think I would say the

1 U.S. regulations are a little more stringent.

2 CHAIR RYAN: Thank you.

3 MR. McCARTIN: And briefly, I'll go

4 through some background on the IAEA process and where

5 this sits with their documents. I'll talk about their

6 safety fundamentals, the objectives for geologic

7 disposal and the requirements for geologic disposal

8 which are really the body of the IAEA standards.

9 And very briefly in terms of background,

10 IAEA has a waste standards program that there are

11 principles and requirements that they set out. There

12 are guidelines for the implementation and today I'll

13 be talking principally about the requirements

14 document, the standards. The guidelines in terms of

15 guidance documents are being developed and that is in

16 the draft stage. There is a draft guidance document

17 for this standard that is currently being reviewed by

18 the member countries and I guess if I had to put a

19 date on it, I'd say one to two years I would expect

20 the guidance document to be finalized.

21 In general, the U.S. supports the IAEA

22 program in the sense that internationally agreed upon

23 safety standards provide a reference point for

24 national standards and requirements and it was a good

25 suggestion and I'll try to point out the similarities

1 and differences between requirements in 63 and the
2 IAEA standards. However, differences in this context
3 means Part 63 is more stringent.
4 As I said, there are three documents that
5 you'll see with respect to waste disposal. There are
6 the fundamentals that give basic objectives, concepts
7 and principles for waste management. There is safety
8 requirements that that's what basically the safety
9 standard is the requirements document. That's what
10 I'll be talking about today. And then there are
11 guidance documents that provide recommended actions
12 for meeting the requirements.
13 The safety fundamentals are at a very high
14 order, high level. They set principles that apply to
15 all radioactive waste management activities and if I
16 had to sum them up in a just a couple bullets, it's
17 these: protect human health and the environment now
18 and in the future and to not impose undue burdens on
19 future generations, so at a very high level.
20 I'll say that's an interesting aspect. To
21 not impose undue burdens on future generations,
22 there's always a lot of discussion what exactly does
23 that mean. Clearly, you saw that in the Part 63
24 regulations in terms of do you apply say 15 millirem
25 out to a million years now or is there a tiered

1 approach? What constitutes this? I think there's a
2 lot of discussion going on right now and there is some
3 discussion in the requirements document that alludes
4 to what the IAEA was intending.
5 CHAIR RYAN: Tim, just at this level of
6 safety fundamentals, they are basically silent on any
7 details. Is that right?
8 MR. McCARTIN: It's more yes. There are
9 qualitative upper, high-arching principles that should
10 be adhered to and the requirements document gives you
11 the more specific requirements to meet those
12 fundamentals.
13 CHAIR RYAN: Right.
14 MR. McCARTIN: And then the guidance, how
15 to implement and achieve the requirements.
16 In terms of the requirements for geologic
17 disposal, once again, they'll give specific objectives
18 for protection of human health and the environment
19 including quantitative criteria, a strategy for
20 achieving safety and there is discussion about all the
21 phases: development, operation and closure of a
22 repository and that really is the essence of the
23 requirements document.
24 For operations, it's a limit for radiation
25 doses to workers in the public. For the worker, it's

1 5 rem. It's the ICRP concept, 5 rem in any one year,
2 and no more than 2 rem per year averaged over five
3 years. The U.S. regulations are slightly different
4 than this. They do not include the 2 rem per year
5 averaged over five years. It's just 5 rem in any
6 year. That's a slight difference.
7 CHAIR RYAN: Under OSHA rules, you can
8 make the argument that somebody that was restricted to
9 less than 5 rem in a given year or any number in a
10 given year was occupationally injured. So if he was
11 high for four years and had to be restricted in the
12 year 5, hire a new worker or that person could claim
13 occupational injury. I've never seen it tested, but
14 it's an interesting theory.
15 MR. McCARTIN: Yes. I will say there is
16 discussion about the operational phase in the
17 requirements document, but the requirements document
18 is really tailored primarily to post-closure. You
19 won't see a lot with respect to operations, but there
20 are these limits. For the public, it's an average
21 dose to the relevant critical group of 100 millirems
22 and certainly the ALARA principle is there taking into
23 account the social and economic factors.
24 CHAIR RYAN: Any words on how you get the
25 average of how wide the range can be?

1 MR. McCARTIN: No. That would be more
2 appropriate to guidance documents.
3 CHAIR RYAN: Okay.
4 MR. McCARTIN: But in general, once again,
5 there isn't a lot with respect to the operational
6 phase. The focus is primarily with respect to the
7 post-closure aspect.
8 CHAIR RYAN: Gotcha.
9 MR. McCARTIN: With respect to post-
10 closure, the broad objective of limit radiation dose
11 to the public to 100 millirems from all sources and
12 there you then get for any particular disposal
13 facility have a dose limit of around 30 millirems per
14 year. That is approximately a 10^{-4} risk constraint
15 and there you can see a quantitative number relative
16 to the 15 millirem for the first 10,000 years for
17 Yucca Mountain.
18 CHAIR RYAN: You said four, but it says
19 five. I just want to be clear which one you mean. Is
20 it 10^{-4} or 10^{-5}?
21 MR. McCARTIN: I meant 10^{-5}.
22 CHAIR RYAN: Okay. You said 4.
23 MR. McCARTIN: My apologies. Yes.
24 CHAIR RYAN: No problem. I just wanted to
25 make sure.

1 MR. McCARTIN: That was a misspeak rather
2 than a typo. Yes. 10^{-5} is approximately on the order
3 of 22 millirem if you take the EPA conversion factors.
4 Yes. And like I said, this is slightly higher than
5 what the current regulations for the first 10,000
6 years.
7 More importantly, there is discussion
8 about how do you apply these at very long time periods
9 in the future. This gets to part of that how do you
10 do no undue burdens to future generations and there is
11 a lot of this caution in the document about applying
12 these numerical criteria just out to longer and longer
13 time periods.
14 At some point, it becomes those criteria
15 are not useful and they suggested such things as the
16 dose from naturally occurring radionuclides in the
17 environment already, somewhat similar to background.
18 So there is no particular time that at some point you
19 shouldn't apply it. But they're leaving that for
20 member countries to consider. But there certainly is
21 this caution and there is some discussion about
22 relevant time periods that I have in some subsequent
23 slides.
24 DR. HINZE: What is "very long"? Is that
25 hundreds of thousands?

1 MR. McCARTIN: Let me get that. I have a
2 couple other slides about that. There was a desire to
3 not specifically say what very long was in a very
4 strict quantitative way, but there are indications in
5 the report that they provide and that will get to
6 that.
7 In terms of the requirements, there's a
8 requirement for planning for geologic disposal. There
9 is a lot of discussion there that once again this is
10 a document for countries that may be just starting out
11 in the waste management area for developing a
12 repository and there's a need for a legal, an
13 organizational, framework that sets responsibilities
14 for the government, the regulator, the operator,
15 covering a spectrum of things that you have to make
16 sure, the cost, that money is set aside for doing
17 this, spreading an operator and a regulator. But
18 there is discussion that it doesn't always have to be
19 the government that is the operator as in the U.S.
20 case. So there is discussion on how to plan for the
21 geologic disposal facility.
22 There's also what's the safety approach
23 and what we would call a stepwise approach, a phased
24 approach, the consideration of safety at major
25 decision points recognizing that in a program similar

1 to -- I will point to the U.S. It doesn't have to be
2 that, but there are major decision points, say, at
3 construction, receipt and possession of waste and
4 closure. Those are major decision points that those
5 major decision points need to consider safety and
6 you're updating your safety analyses. You're updating
7 your understanding of safety and you would consider
8 that at these major decision points, certainly the
9 passive safety. The geologic disposal is looked on as
10 a very -- That you are not going to rely on active
11 controls to maintain the safe site. And you have to
12 develop an adequate understanding and confidence of
13 the safety of the site.
14 Here is something that also is a little
15 different from the U.S. program. In the document,
16 there is a discussion of would a low probability event
17 completely result in a widespread loss of safety. So
18 it's more of a less quantitative look than, say, the
19 U.S. program that has a very specific probability
20 limit, 10^{-8} per year, that is compared. Those kinds
21 of events are compared to the overall standard. The
22 suggestion here -- Certainly, that's appropriate but
23 you can see the idea of the approach is you're going
24 to look at these events, the low probability events,
25 and you at least want to look at whether these events

1 would cause widespread loss of safety, much different
2 than comparing the two of 15 millirem dose limit.
3 There are certainly safety design
4 principles that are outlined in the report. And
5 multiple safety functions, multiple barriers, are both
6 geologic and engineered barriers are there. There is
7 discussion of time frames at this point that
8 containment, you would have containment of
9 radionuclides for hundreds to thousands of years.
10 Isolation, inevitably regardless of how
11 good the containment is you could have isolation and
12 an inevitable release radionuclides after thousands of
13 years. There is discussion at one point in terms of
14 long time periods is on the order of thousands of
15 years. So it's not -- They weren't looking at
16 hundreds of thousands of years and that's where I
17 would maintain the U.S. program of applying
18 quantitative limits for a million years is more
19 stringent than this other look where you would look
20 for awhile for quantitative limits, but then you would
21 look at other measures, possibly qualitative
22 comparison to background levels. So it's quite a bit
23 different in that sense.
24 There's a framework for the geologic
25 disposal. As I said, there's this step-by-step

1 development, the process of you're moving along in
2 progression and you're evaluating safety, you're doing
3 this in a stepwise approach where you are preparing a
4 safety case and safety assessment at each of these
5 steps and safety should be a primary aspect of that
6 decision at the various steps of whether to move on.
7 They do talk a little bit -- Like I said,
8 we have not in the U.S. separated safety case and
9 safety assessment as much and it gets to at least in
10 this document and it seems most of the member
11 countries prefer to think of the safety assessment as
12 the TSPA or the TPA. Here I do a calculation and
13 that's the safety -- and I will count nothing else.
14 Whereas the safety case, I've done my
15 calculation but now a safety case would include things
16 of once again multiple barriers. What are the
17 different barriers that I have? What's the science
18 behind these different barriers? How robust are they
19 to different types of low probability events? You
20 might bring in all these other things that we still
21 maintain are part of a safety assessment, but that's
22 the difference between if you want to narrowly cast
23 the safety assessment as just the calculation. The
24 safety case looks at these other things like the
25 number and diversity of barriers as part of the safety

1 case that may give you additional confidence in the
2 safety of the site.
3 CHAIR RYAN: I tend to think about it as
4 something that's done more with a detailed conceptual
5 design versus, say, a facility-specific design. Is
6 that a fair way to think about it a little bit or am
7 I off-track there? If I'm off-track, tell me.
8 MR. McCARTIN: Well, what? That the
9 safety case is -- I mean both the safety case and the
10 safety assessment are using the same design.
11 CHAIR RYAN: Right. The one's at a finer
12 level of detail than the other.
13 MR. McCARTIN: Okay. Sure. Yes, the
14 safety assessment being --
15 CHAIR RYAN: One is done earlier on in the
16 licensing process and the other is to kind of say
17 nothing went wrong between starting of the process and
18 let's give a license or let's authorize operation.
19 MR. McCARTIN: Yes. Certainly a strong
20 recognition that the preparation is developed
21 throughout the steps of the licensing process.
22 Certainly, what Ward talked a little bit about, the
23 performance confirmation program, you're always going
24 to be smarter tomorrow than you are today and given
25 the long development time for a repository you're

1 improving that understanding and there's a sense that
2 you're updating as needed the safety assessment/safety
3 case.
4 Certainly early on, you're looking at
5 design feasibility with the safety assessment and
6 you're certainly looking at uncertainties. There is
7 discussion of documentation that you want to make it
8 clear the justification for the assumptions, what the
9 assumptions are, how it relates to the overall results
10 and what you're relying on for safety, all that is
11 part of that safety case and there is a fair amount of
12 discussion about that.
13 Steps in the development of a geologic
14 disposal, not too surprising. One starts with site
15 characterization. A design that is based on that site
16 characterization, clearly you want to optimize your
17 design to the site. A clear example in the U.S. is
18 the titanium drip shield, the Alloy-22 for the waste
19 container. They're all tailored to a particular
20 environment.
21 Construction. There is discussion of the
22 flexibility in the underground. Engineering
23 recognized that once you get underground you may have
24 to make changes, but the emphasis is always on the
25 post-closure safety, operations and then closure and

1 discussion that whatever -- Early on in the process,
2 it's articulated that your plan for closure should be
3 well-defined and practicable and somehow you need to
4 have that early on prior to construction so that you
5 know how you intend to do this, close the facility,
6 and there was some discussion of sealing of bore holes
7 and shafts that are more of a saturated zone issue
8 than an unsaturated zone. But once again, this is
9 meant for a variety of countries and approaches.
10 In terms of assurance of safety and
11 security, there is waste acceptance. There should be
12 some discussions between whoever is operating the
13 repository and who is sending them the waste. I'll
14 look at an example in the U.S. with the TAD. You want
15 to make sure the understanding of the people who are
16 going to construct TAD, load the TAD, know what
17 requirements are when it gets to Yucca Mountain.
18 Those discussions are important.
19 Monitoring. There is the understanding
20 that whatever is going on is going to monitored
21 certainly during this performance confirmation period,
22 but there is also a recognition that there will be
23 post-closure institutional controls, some of which
24 will include monitoring. And so that is while you
25 don't rely on post-closure institutional controls and

1 monitoring after the post-closure period, there is
2 discussion that some of that may be helpful in terms
3 of public acceptance. It's not like people once the
4 repository is closed are going to walk away from it.
5 It will be continued to be monitored and there will be
6 controls including safeguards that can be a source of
7 additional confidence that safety is achieved.
8 And there is discussion about what they
9 term "management systems." That's a terminology that
10 has come up, I would say, in the last two or three
11 years at IAEA and really gets a lot to -- it includes
12 quality assurance/quality control. They have a
13 slightly different terminology for it. I can honestly
14 say I don't know why they switched to this and not
15 quality control/quality assurance, but that is
16 primarily what that is about.
17 In summary, you may have remembered a
18 couple years ago when we were in the draft stage I
19 presented this as DS-1-54. Once it's finalized, it
20 gets a whole other -- There is no DS-1-54. It's WS-R-
21 4 and it was finalized on May 26th. All of the member
22 countries ratified it.
23 It certainly talks to the planning,
24 designing, operating and closing of a facility. It
25 gives the safety strategy and the development,

1 developing adequate understanding and confidence in
2 safety and it talks a lot of whatever the information
3 needs and what you're doing. It should be
4 commensurate with the safety significance.
5 As I said, I think in general Part 63 is
6 consistent with all that's in this document. In some
7 areas, like I said, the quantitative measure being
8 taken out to a million years I believe is more
9 stringent than what is articulated in the IAEA
10 documents.
11 CHAIR RYAN: But you don't see the Agency
12 taking any action beyond recognizing it's final.
13 MR. McCARTIN: There are no changes that
14 we would need to make in our regulation to bring it
15 into compliance with what's required here with one
16 exception. I will say the worker dose aspect of 2
17 millirem a year averaged over five years.
18 CHAIR RYAN: Two rem.
19 MR. McCARTIN: Two rem, yes. Sorry. Two
20 rem over the five years, that's an ICRP recommendation
21 that the U.S. has not adopted.
22 CHAIR RYAN: Right.
23 MR. McCARTIN: And so with that --
24 CHAIR RYAN: That's not going to change
25 though.

1 MR. McCARTIN: Right. With that
2 exception.
3 CHAIR RYAN: Sure.
4 MR. McCARTIN: That is everything. There
5 is nothing else and --
6 CHAIR RYAN: But that has its own life in
7 the other part.
8 MR. McCARTIN: Right. Correct.
9 CHAIR RYAN: What I'm saying that's not a
10 Part 63 issue. That's really a Part 20 issue.
11 MR. McCARTIN: Right, but in the sense
12 that Part 63 points to Part 20.
13 CHAIR RYAN: Fair enough.
14 MR. McCARTIN: That is a slight difference
15 but the Commission has already talked to that and
16 believe the 5 rem limit per year is protective.
17 CHAIR RYAN: Five rem a year plus ALARA.
18 MR. McCARTIN: Yes. And with that, I
19 guess I'm happy to answer any questions.
20 CHAIR RYAN: Okay. Jim Clarke.
21 MR. CLARKE: Thanks, Tim. Like you say,
22 I guess the guidance will clarify a lot of this, what
23 it really means and what an undue burden to future
24 generations really is and the trade-offs between that
25 and having a flexible kind of safety analysis that

1 makes sense.

2 MR. McCARTIN: Yes. Although I will say

3 in the last five years the IAEA has sort of been

4 teetering back and forth on a particular issue and it

5 has to do with the level of detail they put in their

6 requirements document, the level of detail they put in

7 guidance documents and this particular document was

8 developed things were going back and forth and I would

9 say this document probably has a little more detail

10 than they currently are putting in requirements

11 documents. Some of the detail was taken out and the

12 guidance document is struggling with some of this --

13 that's what's in the requirements documents. That

14 should have been in guidance.

15 So I don't know. When you read this

16 document, some people will read it and say that's more

17 guidance than requirements. We are participating in

18 the development of the guidance and there is more on

19 that. I mean it is a bigger document. However, there

20 are certain philosophical areas such as what

21 constitutes protecting future generations and

22 providing no undue burden. I think there will be a

23 lot of flexibility in what's done, but I would not

24 expect as this document to provide a lot of firm,

25 sharp lines in an area where it's very difficult to

1 get firm lines.

2 MR. CLARKE: I guess that's where I was

3 going. You showed us the dose limits and the approach

4 in the beginning and that's a little different from

5 what we do. But we didn't see yet is a compliance

6 period, a time. Do you see that coming out of this

7 analysis?

8 MR. McCARTIN: No. There was a lot of

9 discussion on compliance period and should there be a

10 hard and fast compliance period and the desire was not

11 to set a sharp line there. There is discussion about

12 applying these numerical criteria and discussion that

13 once you get beyond a few thousand years for your

14 program, you need to evaluate how useful these numbers

15 continue to be for applying to those criteria.

16 MR. CLARKE: Kind of a rolling time

17 horizon approach which has a lot of merit.

18 MR. McCARTIN: Right, and they're leaving

19 it up to individual countries to decide how they want

20 to go. As an example, Finland, my understanding of

21 their current regulations, apply I believe the 30

22 millirem limit, although it might be 10 millirem, on

23 the order of a few thousand years.

24 CHAIR RYAN: They can't be serious that

25 there's a difference between 10 and 30 in thousands of

1 years.

2 MR. McCARTIN: No, I'm just -- That was my

3 understanding. I can't remember if they set 30 or 10.

4 CHAIR RYAN: Or 10. Okay. All right.

5 MR. McCARTIN: Yes. I think it might be

6 10 millirem, although I can get back to you with

7 exactly what it is.

8 CHAIR RYAN: No, that's all right. Ten,

9 30, 50, 2, whatever you like.

10 MR. McCARTIN: And that numerical criteria

11 is applied for a few thousands of years in their

12 standard and then afterwards, they compare to

13 background levels and that's their standard. And I

14 think the IAEA would say that is consistent with their

15 requirements document and you can see how somewhat

16 different the U.S. where we have a very sharp line.

17 We don't say a few thousand years. We say 10,000

18 years and now, of course, there will be a standard

19 from 10,000 to a million years.

20 MR. CLARKE: It looks that way, anyway.

21 MR. McCARTIN: Yes, and I would suspect

22 IAEA, I think, is no -- I think they're comfortable

23 with saying in general these numerical criteria on the

24 order of thousands of years. You can take the

25 calculation out further, but they caution that

1 comparing it to a standard like 20 millirem it starts
2 being meaningful and you might compare to other
3 things.
4 MR. CLARKE: Just one more question. Are
5 there other things included in this, for example, like
6 what we heard about this morning, the performance
7 confirmation? Is that too much detail? Is that a
8 piece of this?
9 MR. McCARTIN: No. The words "performance
10 confirmation" are as such a U.S. term in our
11 regulation. The monitoring that I spoke of is exactly
12 the same thing.
13 MR. CLARKE: That was my question. Okay.
14 So that's --
15 MR. McCARTIN: They speak of monitoring
16 during the development that you will factor in to the
17 safety assessments and your understanding as you go
18 along up until closure.
19 MR. CLARKE: We don't have post-closure
20 monitoring. Is that a factor?
21 MR. McCARTIN: Well, actually we do.
22 MR. CLARKE: We do?
23 MR. McCARTIN: Yes. Now it's not factored
24 into any decision because once the facility is closed,
25 there is no -- the NRC oversight of a repository ends

1 and it's now DoE's responsibility. But the
2 regulations require at closure, they have to have a
3 plan for long-term monitoring and control of the sight
4 that we would approve. So there is a requirement for
5 long-term monitoring, but it would be -- And we will
6 review that plan. But clearly, there are no other
7 decisions. Once it's closed, NRC would not be using -
8 - There are no more decisions.
9 MR. CLARKE: I understand. Thank you.
10 CHAIR RYAN: Ruth.
11 DR. WEINER: Tim, what is meant really by
12 protection of the environment as distinct from keeping
13 radioactive materials out of the human food chain?
14 What do they mean by that?
15 MR. McCARTIN: Well, on that issue, they
16 actually speak to the idea that if you protect man to
17 these levels they believe that is protecting the
18 environment and they leave it at that. However, they
19 do have a sentence or two saying that the discussion
20 of other types of things in terms of protecting the
21 environment is currently underway. But at least with
22 these requirements, they've put forward that
23 protecting man is synonymous with protecting --
24 CHAIR RYAN: They are not willing to fly
25 in the face of 50 years of radiation biology just yet.

1 MR. McCARTIN: Correct.

2 CHAIR RYAN: That's correct.

3 MR. McCARTIN: But recognizing there are
4 discussions going on. But for these requirements,
5 they're saying if you protect man you have protected
6 the environment.

7 DR. WEINER: That's a very useful
8 clarification.

9 MR. McCARTIN: Yes.

10 DR. WEINER: My other question really
11 speaks to my own ignorance. What is the regulatory
12 authority of IAEA? In other words, how are these
13 applied?

14 MR. McCARTIN: Sure. My understanding and
15 I will say I could be corrected by someone who knows
16 more and I will double-check with the people I talk
17 with at IAEA, but my understanding is that if you
18 accept money from the IAEA you are bound to adhere to
19 these requirements.

20 CHAIR RYAN: Does the U.S. accept money?

21 MR. McCARTIN: The U.S. does not accept
22 money from the IAEA.

23 CHAIR RYAN: But we do --

24 MR. McCARTIN: We actually give money to
25 the IAEA. And so that's the primary area. Now for

1 countries that are developing a waste management
2 program, this provides them useful information to
3 assist them. But in terms of enforcement, they only
4 enforce if you accept money and I don't know if Don
5 has a different perspective on that but that's my
6 understanding.
7 CHAIR RYAN: Could you go on the record
8 please?
9 MR. COOL: Donald Cool. I'm the Senior
10 Advisor for Radiation Safety and the International
11 Liaison. Two steps in this process. The IAEA
12 requirements documents are binding on IAEA activities.
13 When they go out and conduct missions or do technical
14 support, their requirements documents and guidance
15 would apply to those activities.
16 They also mandated to be part of a
17 country's regulatory structure for a country accepting
18 the technical assistance. For most of the big
19 developed nuclear countries including the United
20 States, we are not in that position. So the IAEA
21 standards and requirements become as we like to use
22 the phrase "a point of reference but not a benchmark."
23 But this is an ongoing, hotly debated
24 topic because the IAEA chooses to you as you might
25 expect the requirements and guides developed whenever

1 they are going out on assessment missions, OSARTs and
2 various other assessment missions of countries, of
3 facilities, and it does get to be a bit of an
4 interesting discussion to what extent a country has an
5 appropriate structure and an appropriate program if it
6 achieves the objectives as opposed to achieving the
7 check, check, check of each of the individual actions.
8 DR. WEINER: So if a developing country
9 were to choose like to follow the United States and to
10 have standards that are in some sense more stringent
11 than --
12 CHAIR RYAN: Just read Eisenhower's speech
13 on Atoms for Peace. It tells you the whole story.
14 DR. WEINER: Okay. Thank you.
15 CHAIR RYAN: No, it does.
16 DR. WEINER: I'm sure it does.
17 CHAIR RYAN: It lays out the charter.
18 DR. WEINER: But my question is if a
19 country were to be more stringent than the IAEA
20 standards would that interfere with their getting
21 technical assistance?
22 MR. COOL: No, I don't believe it would.
23 For most of the countries who are developing
24 infrastructures, they are not likely to have a high
25 level waste repository-type issue, but other

1 requirements, those relating to control of sources and
2 various things would be the ones that would be more
3 applicable to their programs and in general, those
4 kinds of countries that are just trying to figure out
5 what they have and what they need to have for a
6 structure will come very close to adopting, in some
7 cases verbatim, the requirements documents which is
8 why there has always been this little back and forth
9 about the degree to which a requirements document
10 looks like a regulation so that, in fact, a country
11 could choose to bring it more or less directly into
12 their infrastructure.
13 DR. WEINER: Thank you.
14 CHAIR RYAN: Allen.
15 VICE CHAIR CROFF: No thank you.
16 CHAIR RYAN: Bill.
17 DR. HINZE: Yes please. Slide 8, what is
18 meant by "all" sources, 100 millirem per year for all
19 sources? Does that include medical or what is all?
20 MR. McCARTIN: "All" is different like
21 what if you had a low-level waste site and a high-
22 level waste site both in the same region so you would
23 get exposures from the releases of those two.
24 CHAIR RYAN: Kind of all regulated
25 facilities.

1 MR. McCARTIN: Yes.

2 CHAIR RYAN: Or regulated activities.

3 MR. McCARTIN: Yes. It's --

4 CHAIR RYAN: Not background.

5 MR. McCARTIN: It's why you apportion I'll
6 give only 30 millirem to a high-level waste repository
7 because someone might be getting an exposure from
8 another nuclear facility.

9 CHAIR RYAN: And I would challenge to tell
10 me one place in the world where that happens. Is
11 there any? I don't know. I know of none. We always
12 talk about this apportionment and I can't think of a
13 single example.

14 DR. HINZE: Perhaps maybe if the
15 repository goes in.

16 DR. WEINER: Yes.

17 CHAIR RYAN: But they're 100 miles away.

18 DR. HINZE: No, they're not. Twenty miles
19 apart.

20 CHAIR RYAN: But Beatty is closed.

21 DR. HINZE: Yes. Sure, but that's the
22 kind of thing you're talking about.

23 DR. WEINER: But it's still a facility.

24 CHAIR RYAN: From Beatty it's zero
25 particularly from the people that live in Yucca.

1 MR. McCARTIN: It's a measure of
2 conservatism that has been adopted and been around for
3 a long time.
4 CHAIR RYAN: I know.
5 MR. McCARTIN: But you're right. In terms
6 of getting a significant release from another facility
7 I'm not aware of any other place where you're getting
8 a significant portion of a dose from two different
9 facilities.
10 DR. HINZE: Let me ask a question on the
11 basis of a stringency if you will of the U.S.
12 standards. You're familiar with the background of
13 those. Why are the U.S. standards more stringent? Is
14 this a result of the background information that is
15 used to make the assessment? Is it the interpretation
16 of the data? Is it the culture? What is it?
17 MR. McCARTIN: Well, the NAS
18 recommendations, I guess, and the court case as much
19 as anything. I think 15 millirem EPA prefers 15
20 versus the recommended 25.
21 CHAIR RYAN: The same number.
22 MR. McCARTIN: Yes. I mean they're in the
23 same. Now in terms of as-proposed, the EPA had a
24 10,000 year. On the order of thousands of years,
25 well, that's I would say in the same ball park and

1 clearly, the approach and the standard that was
2 remanded by the court was that you would qualitatively
3 look at doses beyond and that was the court decision.
4 DR. HINZE: But I understand correctly --
5 CHAIR RYAN: It didn't say qualitatively.
6 It said to consider the National Academy's
7 recommendation. It didn't say qualitatively.
8 MR. McCARTIN: No. In terms of the first
9 version of the standard, you had the peak dose
10 calculated beyond 10,000 years, but there was no
11 standard applied to it.
12 CHAIR RYAN: Right.
13 MR. McCARTIN: And that's what I meant by
14 that the first standard had the potential million year
15 dose in there as a qualitative -- But you weren't
16 comparing it and which would be very consistent with
17 the standard here. But that was a court decision.
18 DR. HINZE: Yes, the 350 from 10,000 to 1
19 million years is really based upon the naturally-
20 occurring radionuclides. It's background. It's based
21 on that.
22 MR. McCARTIN: Yes.
23 DR. HINZE: So it's very close to this.
24 Right?
25 MR. McCARTIN: Yes.

1 DR. HINZE: Except that it has a very
2 specific step function at 10,000 years.
3 MR. McCARTIN: Yes. That aspect is --
4 Yes, I would say that.
5 DR. HINZE: Thank you.
6 CHAIR RYAN: Okay. Tim, this is a great
7 update. I don't guess we have any letter writing to
8 do here, but it really is informative and I think will
9 help us be better prepared for the final EPA version
10 whenever that comes along and we appreciate your
11 coming down and updating us. Thanks.
12 MR. McCARTIN: Sure. Yes.
13 CHAIR RYAN: I bet you're glad to have it
14 finished.
15 MR. McCARTIN: Well, we're still working
16 on the guidance document.
17 CHAIR RYAN: Okay. This part is done.
18 One of the boxes is checked.
19 MR. McCARTIN: Yes.
20 CHAIR RYAN: Fair enough. Thanks, Tim.
21 MR. McCARTIN: Yes.
22 CHAIR RYAN: It being 2:15 p.m. There is
23 no reason not to perhaps if we can go to our next
24 briefing before we take a break. There is no reason
25 to have two breaks I don't think. Do you want to do

1 that or do you want to have a break now?

2 MR. DIAS: Do we have anyone listening?

3 There is a problem with advancing the briefing because

4 --

5 CHAIR RYAN: Fifteen minutes isn't going

6 break anyone, is it? We do have the flexibility to

7 shift stuff around a bit.

8 MR. DIAS: Someone has to hear about it.

9 PARTICIPANT: No call-in people.

10 CHAIR RYAN: No call-in people. Okay.

11 (Off the record comments.)

12 CHAIR RYAN: Is everybody here that needs

13 to be here?

14 (Off the record comments.)

15 CHAIR RYAN: All right. Why don't we go

16 ahead and get started?

17 (Off the record comments.)

18 CHAIR RYAN: Is it okay that we're going

19 early because if it's not we can wait. If you want us

20 to wait, if that's better for you guys, that's okay

21 with me. I don't want to get anybody upset. Tell you

22 what we're do. Let's take a 15 minute break. Could

23 you give them a buzz and maybe see if we can start 15

24 minutes earlier? That would be great. Let's do that.

25 Fifteen minutes and we'll come right back. Off the

1 record.

2 (Whereupon, the foregoing matter went off

3 the record at 2:14 p.m. and went back on the record at

4 2:28 p.m.)

5 CHAIR RYAN: On the record. Our next

6 presentation is on Interim Staff Guidance, ISG-3,

7 Preclosure Safety Analysis - Dose Performance

8 Objectives and Radiation Protection Program to

9 Supplement the Yucca Mountain Review Plan and our

10 presenter is Sheena Whaley. Welcome. Nice to have

11 you with us.

12 MS. WHALEY: Thank you. Can you all hear

13 me?

14 CHAIR RYAN: No. You have to probably

15 either -- Is there a lapel mike?

16 (Off the record comments.)

17 MS. WHALEY: My name is Sheena Whaley as

18 you all know and I work in the Division of High Level

19 Waste Repository Safety and I want to thank you for

20 inviting us to present this draft ISG on Part 63,

21 Preclosure Safety Analysis - Dose Performance

22 Objectives and Radiation Protective Programs.

23 I'd like to acknowledge Ali Simpkins who

24 helped put together this presentation and she's from

25 the Center for Nuclear Waste Regulatory Analysis and

1 Tim McCartin is over there. If you have any hard
2 questions, Tim is going to answer them.
3 (Laughter.)
4 MS. WHALEY: First, I'll discuss the
5 purpose of the ISG, why we decided to provide guidance
6 in addition to the guidance that we already have in
7 the Yucca Mountain Review Plan. To set the stage,
8 I've included the regulatory requirements of Part 63
9 that most directly pertain to this ISG and then I'll
10 provide definitions of Category 1 and Category 2 event
11 sequences. Then I'll discuss the areas for which this
12 ISG provides guidance, radiation protection programs
13 and estimating doses for consequence assessment.
14 The purpose of this interim staff guidance
15 or ISG is to supplement the current guidance to NRC
16 staff found in the Yucca Mountain Review Plan. As we
17 are preparing for a potential applications submittal
18 under Part 63, we've identified areas in the YMRP that
19 should be supplemented.
20 One area is in Section 2.1.1.5 of the
21 YMRP. This section provides guidance for reviewing
22 the applicant's consequence analysis and states that
23 the reviewer is to verify an appropriate method that
24 has been used by the applicant to aggregate the doses,
25 but the YMRP at present doesn't provide any guidance

1 on what an appropriate method is nor does it provide
2 details on determining the receptors for these doses.
3 The doses to be aggregated are from normal operations
4 as well as annualized doses from Category 1 event
5 sequences which I'll discuss shortly.
6 The other area of the YMRP where we
7 determined that additional guidance is needed is in
8 Section 2.1.1.8. Here again it doesn't provide any
9 clear guidance on what is expected to be in a
10 radiation protection program including the recovery
11 actions for Category 1 event sequences. Currently,
12 the guidance discusses contingency procedures for off-
13 normal occurrences rather than for Category 1 event
14 sequences.
15 Here I just provided the regulatory
16 requirements for the background information and I have
17 paraphrased in a lot of instances just to get it on
18 these couple of slides and save time. The preclosure
19 performance objectives that must be met are found in
20 63.111. 63.111(a) states that the geologic repository
21 operations area must meet the requirements of Part 20
22 of this chapter.
23 Then the Part 20 requirements here and
24 20.1101 discusses radiation protection programs and
25 ALARA principles. 20.1201 states that we must control

1 exposures to 5 rem per year to radiation workers and
2 this is a big paraphrase. That's basically it. And
3 then 20.1301 states that we must control exposures to
4 100 millirem per year to individual members of the
5 public.
6 And 63.111(a)(2) says that during normal
7 operations and for Category 1 event sequences annual
8 total effective dose equivalent to any real member of
9 the public may not exceed the preclosure standards
10 specified in 63.204. 63.204 gives the preclosure
11 standard and says that DoE must ensure that no member
12 of the public in a general environment receives more
13 than the annual dose of 15 millirem. And 63.111(b)(1)
14 gives the numerical guides for design objectives which
15 states that the geologic repository operations area
16 must be designed so that for Category 1 event
17 sequences the radiation levels in both restricted and
18 unrestricted areas will be maintained within the
19 limits specified in paragraph (a) of this section.
20 And that was really just to make sure everyone had the
21 background, the appropriate background.
22 An event sequence is defined in Part 63 as
23 a series of actions and/or occurrences within a
24 natural and engineered component of a geologic
25 repository operations area that could potentially lead

1 to exposures of individuals to radiation. Category 1
2 event sequences are defined as they are expected to
3 occur one or more times before permanent closure and
4 Category 2 event sequences are those other event
5 sequences that have at least one chance in 10,000 of
6 occurring before permanent closure.
7 The first topic discussed in the ISG is
8 the review of a radiation protection program
9 description including recovery action plans and the
10 incorporation of ALARA principles. The guidance
11 states that when reviewing the RPP description the
12 reviewer should verify that the applicant has provided
13 a description of the radiation protection program,
14 that it's commensurate with the scope of normal
15 activities proposed for the geologic repository
16 operations area and expected Category 1 event
17 sequences. Also since the radiation protection
18 program may be relied upon by the applicant to
19 demonstrate compliance with the performance
20 objectives, the reviewer should confirm that the
21 description is consistent with the assumptions used in
22 the preclosure safety analysis consequence assessment.
23 The ISG also provides guidance on what the
24 radiation protection program should address so that we
25 have confidence that personnel will be protected; the

1 administrative organization, the description of the
2 health physics equipment, policies and procedures for
3 access control and program implementation.
4 Also since Category 1 event sequences are
5 expected to occur and a license application is
6 supposed to identify these the reviewer should ensure
7 that the applicant has planned from recovery of these
8 based on actual conditions. Recovery actions are
9 those actions taken in the time period after the
10 termination of an event sequence, not during.
11 Since detailed procedures will be needed
12 for a specific event, the review is only to determine
13 that the applicant has described key elements of the
14 plan. The plan should provide enough detail to
15 determine that the corrective actions take will ensure
16 adequate access to vital areas and protection of
17 safety equipment. It should also describe the basic
18 steps to recover from an event and the radiation
19 exposure levels that may be present.
20 The other topic discussed in the ISG is
21 estimating doses. Part 63 requires that the geologic
22 repository operations area be designed so that the
23 performance objectives are not exceeded. Part of
24 determining compliance with the performance objectives
25 involves determining whether the applicant has

1 appropriately identified representative workers,
2 onsite persons and offsite members of the public. The
3 reviewer will determine if the applicant has used
4 appropriate representative exposure locations and
5 occupancy times based on the applicant's identified
6 restricted areas, radiation zones and other controls
7 described in the radiation protection program.
8 To determine the annual dose to the
9 receptors, 63.111 requires that the geologic
10 repository operations area be designed so that taking
11 into consideration Category 1 event sequences and
12 until permanent closure the aggregated radiation
13 exposures be maintained within the limits given in
14 63.111 and they are shown in the table on the next
15 slide.
16 There are many ways to aggregate doses and
17 the Yucca Mountain review plan does not provide any
18 guidance on acceptable methods for the staff to use in
19 its review to determine whether the applicant has or
20 has not demonstrated compliance with the Part 63
21 performance objectives. The staff determined that the
22 following method will provide a reasonable way to
23 determine the aggregate annual dose. Summing the
24 normal operations doses, the Category 1 event
25 sequences occurring one or more times a year including

1 all annual occurrences if they occur more than once a
2 year and the maximum Category 1 event sequences
3 expected to occur less than once a year. This is a
4 risk-informed engineering approach that's in line with
5 the Part 63 approach for determining the frequency of
6 event sequences relative to the broad frequency of
7 events for Category 1 event sequences and Category 2
8 event sequences.
9 And this table summarizes the Part 63
10 performance objectives. It's a little different than
11 what you saw in the draft ISG. We felt that this
12 clarified it by putting the normal operations and
13 Category 1 event sequences together because they are
14 supposed to be summed together and the other way may
15 have implied differently.
16 And the note down here under the table
17 that takes about the general environment because you
18 have the dose to the real number of the public located
19 beyond the site boundary and then one located in the
20 general environment and the general environment means
21 everywhere outside the Yucca Mountain site, the Nellis
22 Air Force Range and the Nevada Test Site.
23 In summary, the draft ISG-3 supplements
24 the Yucca Mountain review plan and provides guidance
25 for staff in reviewing the radiation protection

1 program and consequence assessment portion of the
2 license application. Thank you.
3 CHAIR RYAN: Professor Hinze.
4 DR. HINZE: I'll pass at this point.
5 CHAIR RYAN: Allen.
6 VICE CHAIR CROFF: I guess I'm scratching
7 my head a bit on maybe something very general or
8 fundamental but this is a supplement to NUREG 1804.
9 What does NUREG 1804 now say about these issues?
10 MS. WHALEY: It has some very broad
11 statements. It talks about, for instance, one
12 instance I can give is instead of talking about
13 recovery action plans, it talks about a contingency
14 plan for off-normal occurrences and that's about all
15 it says. You know, have it verify that the applicant
16 has submitted a contingency plan for off-normal
17 occurrences and we don't even really use that language
18 in Part 63.
19 VICE CHAIR CROFF: Okay. So the
20 supplement isn't really changing things as much as
21 providing a lot more detail.
22 MS. WHALEY: Exactly.
23 VICE CHAIR CROFF: Okay. Thanks.
24 CHAIR RYAN: Have you had any reaction
25 from the project teams?

1 MS. WHALEY: What project teams?

2 CHAIR RYAN: Yucca Mountain project. Is

3 this helpful to them?

4 MS. WHALEY: You mean the teams here at

5 the NRC?

6 CHAIR RYAN: No, the people who will be

7 submitting the information to you guys.

8 MS. WHALEY: The comment period just

9 closed last Friday on the 6th and we have -- I'm not

10 sure exactly if these are the only comments and I have

11 not reviewed them or gone through them yet. But we

12 have received comments from the Department of Energy

13 and from NEI. So we'll start processing those here

14 real soon.

15 CHAIR RYAN: Okay. It might be

16 interesting to come back and tell us how that's gone.

17 MS. WHALEY: Okay.

18 CHAIR RYAN: Ruth.

19 DR. WEINER: This is just a general

20 question and it goes back beyond this ISG. Why do you

21 use the total effect of dose equivalent which adds

22 external and internal doses?

23 MS. WHALEY: Well, actually it's in the

24 regulations.

25 DR. WEINER: Yes.

1 CHAIR RYAN: It is an effective dose.
2 That's the standard.
3 DR. WEINER: Yes, I know it's the
4 standard. I was asking -- I guess I'm digging --
5 CHAIR RYAN: Why would you leave one out?
6 DR. WEINER: I've never quite understood
7 why they were added together? Why not report them
8 separately? That's my question and I know it's in the
9 standard.
10 CHAIR RYAN: Because there's a
11 straightforward way to add them together and get total
12 risk.
13 DR. WEINER: Okay.
14 CHAIR RYAN: That's why. That's the
15 answer to your question.
16 DR. WEINER: All right. Well, that's the
17 answer to my question then. Thank you.
18 CHAIR RYAN: You're welcome. Happy to
19 help. Anything else?
20 DR. WEINER: No. That's it.
21 CHAIR RYAN: I get points for solving that
22 one.
23 (Laughter.)
24 CHAIR RYAN: Dr. Clarke.
25 MR. CLARKE: No questions. Thank you.

1 CHAIR RYAN: Okay. That's great. I might
2 ask that when you do get the comments organized and
3 you're at a point where you're resolving them, I think
4 that would be helpful to us to know if this process of
5 updating the standard review plan helpful and as you
6 make these updates, are you getting good comments back
7 on the updates of clarifying things or does it create
8 more questions or what? That's something we could
9 write a letter to the Commission on. At this point,
10 I don't really see us writing a letter on what we've
11 heard today.
12 MS. WHALEY: Okay.
13 CHAIR RYAN: Fair enough?
14 MS. WHALEY: Fair enough.
15 CHAIR RYAN: Great.
16 MS. WHALEY: Thanks.
17 CHAIR RYAN: Let us know when you get all
18 the comments resolved. Right? That's great. Thank
19 you both for being here. We appreciate that. Okay.
20 (Off the record comments.)
21 CHAIR RYAN: We have next on the agenda
22 Proposed Revision to Standard Review Plan Chapters
23 11.3 and 11.4 for New Reactor Licensing. Derek A.
24 Widmayer.
25 MR. WIDMAYER: You betcha. My speaker is

1 not here.

2 CHAIR RYAN: We'll just take a little

3 pause.

4 MR. WIDMAYER: I'll see if I can summon

5 him.

6 CHAIR RYAN: We'll take a pause in the

7 record to find our speakers please. Off the record.

8 (Whereupon, the foregoing matter went off

9 the record at 2:44 p.m. and went back on the record at

10 2:59 p.m.)

11 CHAIR RYAN: On the record. We're waiting

12 for two members. Jean-Claude, again thank you for

13 coming down. We got a little ahead of schedule, but

14 on we go.

15 PARTICIPANT: We're all here.

16 CHAIR RYAN: All right. Without further

17 adieu and straight from the upstairs hallways and

18 offices, Jean-Claude Dehmel is here to talk about

19 proposed revisions to Standard Review Plan Chapters

20 11.3 and 11.4 for New Reactor Licensing. Thank you,

21 Jean-Claude. It's nice to see you again.

22 MR. DEHMEL: Thank you. Likewise. I'm

23 going to go over Chapter 11.3 and 11.4 on Gaseous

24 Waste Management System and Solid Waste Management

25 System and what I would like to do is also bring you

1 up to date on an update in the revision of Chapter
2 11.2 that has taken place since I made the last
3 presentation.
4 CHAIR RYAN: Right, and this is kind of a
5 follow-on on what we agreed. If we're going to write
6 a letter, we would kind of wait until we heard from
7 you on this briefing.
8 MR. DEHMEL: Right. But there was a new
9 development on Chapter 11.2 which just occurred.
10 CHAIR RYAN: Right.
11 MR. DEHMEL: Since my last presentation.
12 CHAIR RYAN: I'm glad we decided to wait.
13 MR. DEHMEL: Okay. Basically, this point
14 I will follow almost identically. The format was used
15 for Chapter 11.2. So most of these slides will be
16 very familiar to you. Again, so we're talking about
17 the purpose and scope of both chapters, the approach
18 applied in revising both chapters, the types and
19 extent of revisions and I'll point out the important
20 ones and then identify the changes in primary and
21 secondary review responsibilities and go over the
22 conclusions.
23 With respect to Chapter 11.3, obviously
24 it's applicable to the Gaseous Waste Management
25 System. Some of the sources of gaseous waste include

1 the gas decay tanks and charcoal decay beds for BWR,
2 containment building purges, SG blowdown flash tanks,
3 buildings HVAC exhaust vents and plant stacks, offgas,
4 condenser air removal and steam jet air ejectors and
5 hydrogen/oxygen recombiners.
6 The emphasis really in Chapter 11.3 is
7 really on the non-condensable gases, you know,
8 hydrogen, oxygen and the associated radioactivity.
9 While there is much less emphasis on the amount of
10 radioactivity that may be released through normal
11 building ventilation such as the ambient air in a rad
12 waste building, the same thing with the general area
13 of the spent fuel building as well as the reactor
14 building. So those essentially are kind of shared
15 between Chapter 11.3 and the respective sections of
16 Chapter 9.4 which describes in much greater detail the
17 exhaust ventilation system.
18 As opposed to the liquid waste management
19 system, the way the systems are being described in the
20 applications, it primarily relies heavily on
21 permanently installed plant systems. You don't see as
22 much on portable or mobile equipment systems.
23 For Chapter 11.4 which is applicable to
24 Solid Waste Management System, again these are kind of
25 typical sources of radioactive waste that are

1 typically reported. I'm sure you have seen plenty of
2 information on that, dry solid wastes such as paper,
3 plastic, tools, clothing. Wet wastes involve resins
4 sludge, filter, coatings. Some plant equipment from
5 small equipment valves, pumps, to large equipment,
6 steam generators and some mixed wastes.
7 Now in the process of writing and updating
8 the SRP, we tried to make an effort for the applicant
9 to consider all sources. So you could look at the
10 large equipment such as vessels, steam generators
11 which are not routinely generated year in, year out.
12 It's kind of a one time event. So typically the
13 responses we've been getting or we are getting with
14 that is that if you're going to replace a steam
15 generator or large vessel, those are one time events
16 or they are going to be handled with respect to
17 specific procedures that are going to be developed
18 with that particular evolution because it's not
19 routinely generated waste. So we essentially flagged
20 this and now we want them to acknowledge the fact that
21 for those kind of unusual types of waste that those
22 will be addressed as special events and out of the
23 norm what specific operational procedures will be
24 developed for that.
25 CHAIR RYAN: They're really just

1 infrequent. I mean there's nothing special.

2 MR. DEHMEL: Exactly. Very infrequent.

3 Right. The reason why this is brought up is because

4 there is some issue about where is the waste going to

5 go, storage facilities, whether or not, for example,

6 the additional storage facilities that are not

7 described, for example, in the design certification

8 document but that the COL applicant would have to

9 describe, for example, an additional storage facility

10 such as a butler building that would be designed and

11 built by the applicant, but not by the NSSS vendor.

12 So we tried to essentially push the applicant, both

13 NSSS vendor as well as the COL applicant to make those

14 distinctions and to introduce them as flags in a

15 packet.

16 And again, the operation of solid waste

17 management systems relies heavily on mobile systems.

18 It's essentially the DCB application of the AP 1000,

19 the DCB application for the GESBWR, heavy reliance on

20 mobile rad waste systems with very little information

21 provided, very sketchy information, stating this

22 information will be made available at COL stage.

23 CHAIR RYAN: That's kind of 50.59 process.

24 MR. DEHMEL: No, it's part of the -- This

25 equipment and the associated operational programs

1 which obviously in Chapter 11.4 we talk about the
2 process control program, but those that are required
3 in Chapter 11.5 with the SRP, these are key
4 operational programs that have to be reviewed and
5 approved before fuel loading.
6 So the way the licensing track is working
7 right now is that, for example, just kind of
8 speculating, someone may submit an application and
9 they say, "Oh by the way, we may not have the full
10 technical details on these portable systems and
11 therefore we will make those documents available as
12 part of a license condition and then sometime once the
13 COL license has been issued but before fuel loading,
14 there will be an opportunity, a bright line, set in
15 this process where the staff would go and inspect the
16 system and confirm the appropriateness of the
17 operational programs associated with those systems and
18 the operating procedures and the training
19 qualification of the personnel. At that point, the
20 staff would make a decision that, yes, those license
21 conditions were met. Conceptually, that's the way
22 they were thought about but that essentially --
23 Again, you have to understand that's my
24 understanding at my level. There is a separate
25 licensing track that project management is developing

1 specifically for this because I believe there was a
2 SECY paper that was published, I think, two years ago
3 or so that talked about operational programs
4 recognizing that there are some documents that will
5 not be available at the COL application stage.
6 CHAIR RYAN: I guess I'm just falling back
7 to what is probably ancient history by this point that
8 a lot of plants would have mobile equipment
9 particularly for water and resins and so forth
10 processing under 50.59 reviews.
11 MR. DEHMEL: Yes, they would have to do
12 that. Absolutely.
13 CHAIR RYAN: But that's a step after the
14 process you're talking about?
15 MR. DEHMEL: Yes, essentially once they
16 have the license and if they go with Acme
17 radio=chemical processing system for one type of unit
18 and then next time they want to go with Wally Coudy
19 radio-chemical processing system, the change from one
20 brand to another would be done under 50.59 process.
21 CHAIR RYAN: I'm with you. Thank you.
22 MR. DEHMEL: So the major components again
23 is pretty much the same as we had seen last time:
24 tanks, pumps, valves, filters and so on, the run of
25 the mill stuff. The typical treatment methods,

1 filtration, reverse osmosis, ion-exchange, charcoal
2 absorption, compaction, stabilization and so on.
3 Again the selection of the treatment method considers
4 specific endpoints such as recycling, release or
5 disposal taking into account federal and state
6 regulations.
7 The design features reflect expected
8 volumes, storage capacities, processing flow rates and
9 use of contractors. The type of equipment will
10 essentially be designed according to these
11 requirements. And obviously, the instrumentation will
12 address not only the operational aspect of the unit
13 but as well as the radiological monitoring, effluent
14 controls, assessing the effectiveness of these types
15 of systems and so on. Then the system operation
16 obviously addresses safety, radioactivity releases,
17 equipment testing and inspection, maintenance and
18 calibration.
19 This is again similar to the one I
20 presented in 11/2. The radiological characterization
21 identifies yearly source terms in curies and potential
22 effluent concentrations. The characterization
23 considers the same type of issues that were discussed
24 except that now we have other considerations. For
25 example, treatment effectiveness is measured both in

1 terms of decontamination factors, removal efficiency
2 as well as volume reduction and volume increase
3 factors. In some cases, you can compact the waste so
4 you achieve a significant potential volume reduction
5 in some cases. If you have to neutralize the waste or
6 stabilize the waste, you may have the opposite effect.
7 It would be a volume increase factor. Again, that
8 would take into account the end point of recycling or
9 disposal. Again, the gaseous waste source term is
10 based on the BWR/PWR-GALE code and other models.
11 CHAIR RYAN: The old GALE code. No
12 updates.
13 MR. DEHMEL: Yes. Right now still the old
14 GALE code. That's the only tool we, the staff, have
15 at this point with the recognition that it's going to
16 be updated.
17 CHAIR RYAN: I know the EDO did not think
18 much of our idea.
19 MR. DEHMEL: Is that right?
20 CHAIR RYAN: Yes, the response was "thanks
21 but we're going to go with the old one."
22 MR. DEHMEL: Yes, because right now that's
23 all we have.
24 CHAIR RYAN: If I had a broken shoe, I
25 think I would get a new pair of shoes.

1 MR. DEHMEL: Yes.

2 (Laughter.)

3 CHAIR RYAN: Just me.

4 MR. DEHMEL: I think for us to start

5 revising the code, set a process in place, whether or

6 not making a determination is now going to be done in-

7 house only or we're going to in-house and with

8 contract support, that process takes time.

9 CHAIR RYAN: I appreciate that.

10 MR. DEHMEL: The key acceptance criteria

11 in the SRP Chapters 11.3 and 11.4 are listed here.

12 Essentially, those are the same as what we've

13 discussed in the past except that we have now those

14 two one Part 61, 61.55 and 61.56, on the low-level

15 waste classification including the specific

16 requirements on the waste form characteristics and the

17 DOT shipping requirements under 171 to 180. For the

18 sake of -- I did not include the specific requirements

19 in Part 20 addressing shipments and the need for a

20 shipping manifest and so on.

21 The regulatory guidance in both of these

22 chapters, again pretty much the same as we have seen

23 before except in this case, we have Reg. Guide 1.14

24 and 1.52 with respect to filtration system design and

25 performance specs and the BWR/PWR GALE code, the

1 GASPAR code and the guidance documents, namely NUREG-
2 1301 and 1302, dealing with the standard radiological
3 effluent controls, the outside dose calculation
4 manual, the radiological environmental monitoring
5 program and the process control program.
6 Basically, the way these things are
7 implemented and what we're seeing is that when the
8 licensee or the applicant describes liquid and gaseous
9 effluence from the solid waste management system, that
10 was essentially really captures in Chapter 11.2 on
11 liquid waste and Chapter 11.3. So those are
12 essentially not a separate discussion in Chapter 11.4
13 for those radioactive source terms both the liquid and
14 gaseous effluence. They're captured in those two
15 sections.
16 The structure of Chapters 11.3 and 11.4
17 pretty are the same as before. We revised the review
18 of the primary and secondary responsibilities again
19 with health physics branch having the lead
20 responsibility and then essentially acting as project
21 manager and tapping the resources and know-how from
22 all the balance of the plant, waste processing,
23 instrumentation and control and so on. And the rest
24 of them are pretty much the same with respect to the
25 areas of review, interface, criteria and so on.

1 What's new with those sections is that the
2 branch technical position. On 11.3 BTP 11-5, it
3 addresses the analysis of gas system leak or failure.
4 That's the assumption that some component in the gas
5 decay storage system or the gas decay bed fails and
6 that some amount of radioactivity is discharged into
7 the environment for the duration of up to two hours
8 and the applicant is required to provide a
9 radiological assessment as to what the impacts are
10 offsite.
11 CHAIR RYAN: Is that done with very
12 negative meteorology and so forth?
13 MR. DEHMEL: Yes. It's typically the site
14 boundary with accident k over Q. It's not an annual
15 average k over Q. It's accident-related k over Q.
16 For example, for the GE, they use a 10^{-3} k over Q. So
17 it's very conservative.
18 SRP 11.4 BTP 11.3, this is guidance on
19 low-level waste management addressing storage onsite
20 issues on solidification, stabilization and so on and
21 this is why I'm bringing you the update on Chapter
22 11.2 and there is now a new BTP called BTP 11-6 having
23 to do with the relocation of an accident that was in
24 Chapter 15.7.3 having to do with the failure of a rad
25 waste tank holding some radioactive or liquid waste.

1 It's analogous to the one of 11.5 for the analysis of
2 a gas system leak or failure.
3 CHAIR RYAN: Right.
4 MR. DEHMEL: Management made the decision
5 in comparing this kind of accident with what is
6 traditionally found in Chapter 15 of the SRP that
7 since it did not involve the core, it did not involve
8 primary coolant per se, it was more like an operation
9 upset and had normal releases. We felt that that
10 should be relocated in Chapter 11.2.
11 So what we did is we took that accident
12 from Chapter 15.7.3 and essentially translated it into
13 a BTP as BTP 11-6 in the SRP section 11.2 and if you
14 go on the website you can actually pull that up and
15 look at it.
16 CHAIR RYAN: Great.
17 MR. DEHMEL: So the focus, some of the
18 changes, focused obviously on Part 20.1406,
19 minimization of contamination and the other elements
20 are pretty much the same with respect to what you've
21 seen before with the liquid release lessons learned,
22 NUREG/CR-3587 and give you some examples of NRC
23 bulletins and circulars on example of issues and then
24 again, this is kind of -- These are placeholders until
25 the rulemaking on Part 20.1406, the issuance of the

1 supporting regulatory guide which is being worked on
2 right now and then the implementation of the Tritium
3 task force recommendations. There are 26
4 recommendations that were made. They've been divided
5 up among different offices and they've been worked
6 upon and then based on those recommendations we'll
7 have to look at them and figure out how of that needs
8 to be essentially folded back into the SRP.
9 Again, like in Chapter 11.2, the focus is
10 on mobile solid waste processing system. So we are
11 essentially pushing on --
12 CHAIR RYAN: Just a minute before you
13 leave that previous topic. That's a big chunk you
14 just said.
15 MR. DEHMEL: Which? The last bullet?
16 CHAIR RYAN: Yes.
17 MR. DEHMEL: Yes. That affects lots of
18 fundamental things like the site and the excavation
19 plan and how that deals the geohydrology and all that
20 kind of stuff.
21 MR. DEHMEL: I understand, but remember I
22 have some blinders on. I'm focusing on Chapter 11.2
23 through 11.5. The other issues you're referring to
24 there other branches, other offices, are going to be
25 looking at this.

1 CHAIR RYAN: Sure. One of the biggest
2 things to me is that when you plunk a big, huge
3 structure like a reactor and sub-basement and all that
4 stuff in the ground, you have in essence made a new
5 geohydrologic system. So anything you understood
6 about it pre construction at least within, give me a
7 number, 50 feet, 100 feet of that reactor, it's a new
8 ballgame.
9 MR. DEHMEL: Absolutely.
10 CHAIR RYAN: I wonder. Is that the kind
11 of thing that's going to be addressed too?
12 MR. DEHMEL: Yes, in fact, that is being
13 addressed with great interest with Vogel oversight
14 permit because it's right next to the river and right
15 across the river there is some groundwater
16 contaminated with tritium from the DoE Savannah River
17 site. So yes.
18 CHAIR RYAN: Okay.
19 MR. DEHMEL: When I was there in January,
20 there was a large team of geohydrologists looking
21 specifically at that. So it's being addressed.
22 Again, going back to this one, it reflects
23 the increasing trend by the industry using mobile
24 systems. We also went ahead and put an emphasis on
25 the definition of mobile system interfaces with

1 permanently-installed plant systems. We talk about
2 the design features to prevent leaks and so on, avoid
3 the contamination of non radioactive systems and
4 system interconnections for multi-unit stations as
5 applicable and the definition of boundary solid waste
6 management system from system interface to point of
7 storage, recycling, release and disposal.
8 We also like before -- This is kind of a
9 common theme that's going to show up also in Chapter
10 11.5 with a much bigger emphasis on some compliance of
11 40 CFR Part 190 and that's addressed in greater detail
12 in Chapter 11.5 because that's why this comes into the
13 play into offsite circulation manual and the
14 radiological environmental monitoring program. And
15 doses from external radiation is that within SRP
16 Chapter 12.3-12.4.
17 So of the miscellaneous changes and
18 updates, very similar to what we've done with 11.2.
19 They're very straightforward updates.
20 So to conclude, we instilled a number of
21 minor updates but nevertheless the chapter structure
22 is virtually unchanged. The updates provide a more
23 detailed guidance to the staff and applicant. We've
24 included some updated information or compliance with
25 Part 20.1406. We updated and incorporated some

1 information regarding the D&D lessons learned and the
2 groundwater contamination lessons learned report. And
3 in looking to the future long-term as compared to what
4 we've seen in 11.2 because the project was still kind
5 of a work-in-progress, here it's different. It's that
6 we've done essentially all sub-chapters and what's
7 left now is essentially looking and waiting to update
8 11.2 to 11.5 after the issuance of the Regulatory
9 Guide on 20.1406 and the rulemaking on 20.1406. We
10 don't know yet what the ramifications will be with
11 respect to these SRP sections but we're going to look
12 at them, again the implementation of Tritium task
13 force recommendations, whatever recommendations remain
14 and what the staff recommends with respect to
15 technical elements and then looking still further into
16 the future of the updates related to the computer
17 coded and regulatory guides. That's going to have to
18 be folded back in obviously in all of the Chapter 11
19 sections starting with 11.1 all the way up to 11.5.
20 That's all I have.
21 CHAIR RYAN: Sounds good. What's the
22 schedule for the GALE code?
23 MR. DEHMEL: I was hoping somebody from
24 Research would be here. We had asked somebody from
25 Research to be here.

1 MR. WIDMAYER: They'll be here in awhile.
2 We haven't reached the official starting time of your
3 session yet.
4 MR. DEHMEL: Yes. Basically, I know that
5 we've been asked to participate in this process.
6 There's a move afoot within Research to actually, or
7 maybe it's already underway, set up a charter and
8 develop a working group to address this.
9 CHAIR RYAN: That's great. The one thing
10 I think, I'm speaking just for myself now, I was a
11 little disappointed at the caveat when the GALE codes
12 were reissued wasn't a little stronger. It was just
13 a one sentence or so "be careful when you use this
14 because it might be out of date." That was just a
15 little comment. I don't think we would have -- We
16 would have probably written a different letter if it
17 was a little stronger. My question is does the
18 industry really understand how far out of date these
19 are.
20 MR. DEHMEL: Yes.
21 CHAIR RYAN: Or are they just using it as
22 a tool because the NRC said this is the tool?
23 MR. DEHMEL: Yes. That's the situation.
24 We have essentially a toolkit before us and the
25 toolkit includes outdated computer codes and in some

1 cases regulatory guidance. That's all we have. I
2 mean there has been discussion within the staff as
3 well as in public meetings with NEI and potential
4 applicants who had wanted to set up a spreadsheet and
5 update it to make it more flexible and we said we
6 could do that but we just can't. That by itself is
7 not a licensing document. It's not a licensing tool.
8 And for the staff to independently go on its own and
9 make some modifications like this and pose a question
10 to an applicant as part of the request for additional
11 information or challenge a position, it's just not
12 going to work. It would licensing by anarchy.
13 CHAIR RYAN: Yes. It creates a real
14 potential conflict situation.
15 MR. SIMMS: Yes.
16 CHAIR RYAN: I appreciate that.
17 MR. DEHMEL: And so --
18 CHAIR RYAN: However if there's a mistake
19 or there's something that's not representative of
20 current practice, we could have the same problem. But
21 we don't know. That's my concern. It's that we don't
22 know where we are.
23 MR. DEHMEL: We know that, for example, in
24 some instances that some applicants will look at these
25 computer codes and make specific adjustments. "This

1 specific parameter is different because..." So there
2 are instances where that kind of distinction is
3 needed.
4 CHAIR RYAN: If they feel comfortable that
5 they can do that and they do that, that's really
6 alleviates my concern a lot more. We actually waited
7 to respond to the EDO to talk with you more about
8 this. If they're comfortable to say we want to use
9 these six different parameters because the new systems
10 are different than they were 30 years ago.
11 MR. DIAS: But the staff finds itself in
12 a situation of never being able to verify what the
13 applicant is saying since the only tool the staff has
14 is GALE.
15 CHAIR RYAN: But I mean if you change a
16 parameter value in a code and they're very explicit
17 about how they did it and where they did it that's
18 easy to track. That's not so hard.
19 MR. WIDMAYER: But it didn't sound like
20 you were saying it was across the board. You just
21 have instances where --
22 MR. DEHMEL: Yes, it's not across the
23 board. For example, the GE for the estimation of
24 source term for gaseous effluent they did something
25 other than in the GALE code but they used the GALE

1 code for liquid effluence.

2 MR. DIAS: I have another comment here.

3 Has anyone tried to evaluate how off the current GALE

4 code is from current applications? I think instead of

5 going through the effort of developing a new revised

6 GALE code, I think the first step should be try to

7 evaluate how incorrect the predictions of the GALE

8 code are. It may be the case that there is enough

9 safety margin built into that code that you're still

10 okay. But that would be the first effort, identify

11 what you have in hand and try to learn from that and

12 then begin to make decisions what's to come next and

13 that's not a difficult issue. That's not a difficult

14 task and Research should have been doing this a long

15 time ago.

16 MR. DEHMEL: I beg to differ here. I

17 think that it's not going to be an easy task. Even

18 though we're told we have licensees generating these

19 annual effluent release reports where they actually

20 tell you what kind of radioactivity is being emitted

21 both injection gaseous effluent and liquid effluent

22 and so on. Why don't we use this affirmation to

23 actually do this benchmarking?

24 The issue is that the plants are

25 essentially different in many ways. So, for example,

1 they all have different types of fuel. There are many
2 types of fuel assemblies for PWR, the same thing with
3 BWR. Radiochemistry management is addressed
4 separately. Waste processing systems that utilities
5 use also vary among utilities.
6 So what we're seeing out of the stack or
7 out of the liquid discharge pipe essentially is kind
8 of an artifact of all of these parameters, all of
9 these counter-competing effects. So for us to
10 actually be able to make a correlation of what's going
11 out the stack, what's going out the discharge pipe,
12 you have to know a lot more precise information about
13 what kind of radiochemistry they're using, what kind
14 of fuel they're using and so on. So it's the kind of
15 detail that we do not have right now and which would
16 require a research project.
17 MR. DIAS: This would be the new GALE.
18 MR. DEHMEL: This would be the GALE,
19 right.
20 MR. DIAS: What you have in your hand,
21 right, is the old GALE.
22 MR. DEHMEL: Correct.
23 MR. DIAS: Now if you were to address a
24 current issue of release of effluence with the old
25 GALE, what would the predictions be? Would they be

1 above what the plant is reporting? Would they be
2 below what the plant is reporting?
3 MR. DEHMEL: It's well below.
4 MR. DIAS: So that means that GALE is not
5 conservative. It's totally out of whack.
6 MR. DEHMEL: Because we know that fuel
7 performance has improved. We know that radiochemistry
8 standard and controls have improved. So whatever you
9 predict with this code in the reality what you're
10 releasing is less and we know that from the --
11 CHAIR RYAN: I think that's a critical
12 issue. I mean if you look at trit, uranium, failed
13 fuel, rad waste systems, cement solidification and ion
14 exchange resin and all that, now it's reverse osmosis
15 and solid products and super clean water is the rule.
16 There are lots of reasons why it's probably not any
17 worse, but it's probably a lot better and I guess what
18 I thought about the GALE codes in our previous
19 discussion, I'm wondering just how many of these new
20 kinds of technologies and approaches to cleaning water
21 and managing liquid effluence and so forth are even
22 incorporated into the GALE code.
23 MR. DEHMEL: They're not.
24 CHAIR RYAN: They're not. So that's my
25 problem is that there's a lot of stuff happening that

1 this is 1910 Model A Ford on the Indy 500 racetrack.
2 MR. DEHMEL: Yes.
3 CHAIR RYAN: It's not that the 1910 Ford
4 is a bad car. It's just it's in the wrong place. I
5 guess I'm stuck with the idea that the GALE code may
6 be giving people a false sense of security or they're
7 checking the box that they've done the calculations
8 and I just get nervous that until there's been some
9 validation of where they sit relative to the new
10 designs that we're running a risk of having a
11 headache. Maybe not, but maybe so and I understand
12 the press of time. My grandmother used to say it's
13 much better to get it right than do it over.
14 MR. CLARKE: Can I ask a couple questions?
15 CHAIR RYAN: Let's start with Ruth and
16 then come around to you.
17 DR. WEINER: Jean-Claude, you said that
18 they're going to mobile systems to clean up these
19 wastes. What happens then? Where do the mobile
20 systems go with the waste that they have picked up?
21 MR. DEHMEL: The mobile systems are
22 essentially -- If they are rented or leased from a
23 contractor, basically the contractor takes the mobile
24 system, disconnects it from the plant and takes the
25 waste and whatever and disposes of it on behalf of the

1 utility. But those are kind of contractual
2 arrangements that at this point I just can't go into
3 a lot of detail because I just don't know what kind of
4 contractual arrangements they have.
5 In some cases, the radioactive waste could
6 remain at the utility while the equipment is
7 decontaminated and sent to the next power plant. In
8 other cases, the plant could purchase outright a
9 mobile waste treatment system, splice it into the
10 plant system and let it run for as long as it can and
11 then when it becomes ineffective or whatever it just
12 gets discarded, literally discarded as radioactive
13 waste.
14 CHAIR RYAN: Tell me if I'm wrong, Jean-
15 Claude, but I think this trend today, Ruth, to answer
16 your question is most plants tend to buy the service
17 as a package. They come in, do the job and they take
18 their equipment and leave.
19 MR. DEHMEL: Yes, that's right.
20 CHAIR RYAN: As opposed to hard-piping
21 stuff into their systems.
22 MR. DEHMEL: Yes.
23 DR. WEINER: What kind of volumes are we
24 talking about on the average with a plant and what
25 kind of volume of waste is then generated that has to

1 be disposed somewhere? That's my basic question.

2 CHAIR RYAN: Next to nothing. Hundreds of

3 cubic feet for a plant.

4 MR. DEHMEL: Yes, it's not much.

5 CHAIR RYAN: Or a hundred cubic feet

6 maybe. Well, hundreds.

7 MR. DEHMEL: No, it's more. It's a few

8 hundred cubic meters.

9 DR. WEINER: A few hundred cubic meters.

10 MR. DEHMEL: Yes.

11 CHAIR RYAN: That's everything.

12 DR. WEINER: But that's the whole thing.

13 MR. DEHMEL: The whole thing.

14 DR. WEINER: So the disposal is not itself

15 a problem.

16 CHAIR RYAN: No.

17 DR. WEINER: That was really the thrust of

18 my question.

19 MR. DEHMEL: All these facilities now

20 essentially are putting together storage facility

21 buildings, storage facilities onsite.

22 DR. WEINER: I see. So they could just

23 collect it there.

24 DR. WEINER: When you absorb gaseous

25 stuff, is there any problem? Is it cost effective,

1 resource effective, to regenerate the absorbent,
2 diffused charcoal, and collect the gas?
3 MR. DEHMEL: That's currently the plan and
4 the design we're seeing is that the charcoal decay
5 beds it's regenerated in situ, in place, and then the
6 only time that provisions are made to dispose of it is
7 if it becomes waterlogged where it's beyond
8 essentially drying in situ or it becomes contaminated
9 with some chemicals where the charcoal granules are
10 now "poisoned" and are not longer effective. But
11 conceptually what is being proposed is regenerations
12 of the charcoal granules in place.
13 DR. WEINER: That's a fairly common
14 practice. One final question about the GALE code, you
15 mentioned that some time some utilities change. Do
16 they only change the parameters or do they actually
17 rewrite part of the source code or do you keep the
18 source code?
19 MR. DEHMEL: I don't know if they have
20 made changes to the source code itself. I'm not
21 really too sure about that. I know that, for example,
22 for the GE application, they've gone ahead and used a
23 conceptual approach of the code into a arbitrary owned
24 code.
25 DR. WEINER: Well, how is that then

1 verified and QAed with -- What happens to the QA
2 system then because the GALE code I would assume is
3 QA.
4 MR. DEHMEL: The QA of the code that the
5 applicant uses to generate source term, they have to
6 comply with the 10 CFR 50 set of requirements.
7 DR. WEINER: Okay. So they --
8 MR. DEHMEL: But they have to document the
9 QA/QC of the code.
10 DR. WEINER: Okay. That was my question.
11 Thank you.
12 CHAIR RYAN: Jim.
13 MR. CLARKE: If I could just comment.
14 You're closing the loop and that's great and taking
15 the lessons learned and preventing legacy sites and
16 taking that information back and we're tracking that
17 very closely.
18 CHAIR RYAN: Bill Hinze.
19 DR. HINZE: A very simple question. Is
20 there a chapter on decommissioning standard review
21 plan and if there is, how does this parallel with it?
22 MR. DEHMEL: No, there's nothing in the
23 SRP on decommissioning.
24 DR. HINZE: I thought we were interested
25 in how we would decommission if we licensed the plant.

1 So there is no provision made for decommissioning.

2 MR. DEHMEL: No, the requirements for

3 decommissioning are addressed in 50 Part 82 and then

4 when the plant decides to decommission they have to

5 submit a report and then at that point the agency

6 looks at the decommissioning.

7 DR. HINZE: So there is no pre-thought

8 then on if you're constructing how that's going to be

9 decommissioned.

10 CHAIR RYAN: 20.1406 gets you to part of

11 that.

12 MR. DEHMEL: Right. 20.1406 gets you to

13 that and that's why this regulatory guide will address

14 this. The regulatory guide will address design,

15 facility, operation and design features that should be

16 built up front to minimize the amount of waste on

17 facility decommissioning when the time comes.

18 DR. HINZE: All right. Thank you. That

19 was my question.

20 MR. WIDMAYER: And the requirement to meet

21 20.1406 is sprinkled all throughout several chapters

22 of the standard review plan depending on what aspect

23 of the reactor you're talking about.

24 DR. HINZE: That's what I was asking in

25 terms of parallelism here. Okay.

1 CHAIR RYAN: Allen.

2 VICE CHAIR CROFF: It's all been said.

3 CHAIR RYAN: Great. Jean-Claude, thank

4 you.

5 MR. DEHMEL: Thank you.

6 CHAIR RYAN: Appreciate it very much.

7 Gentlemen, thank you for being with us. Is there

8 anything you wanted to add?

9 (Off the record comments.)

10 CHAIR RYAN: All right. Maybe we could

11 finish up, Jean-Claude. We're discuss do we need a

12 letter on this now. So if you wanted to stay with us

13 for a few minutes now, that would be great. Next up

14 on the agenda is letter writing.

15 VICE CHAIR CROFF: Off the record.

16 CHAIR RYAN: Yes. I'm sorry. We can

17 conclude the report here. That's fine. Off the

18 record.

19 (Whereupon, at 3:37 p.m., the above-

20 entitled matter was concluded.)

21

22

23

24

25

CERTIFICATE

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

Name of Proceeding: Advisory Committee on Nuclear Waste 178th Meeting

Docket Number: n/a

Location: Rockville, MD

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

Charles Morrison
Official Reporter
Neal R. Gross & Co., Inc.

ACNW Briefing

Update on Revision
of
Standard Review Plan (NUREG-0800)
Chapter 11.3 - Gaseous Waste Management System
Chapter 11.4 - Solid Waste Management System

April 10, 2007

Jean-Claude Dehmel
(NRR/NRO)

Overview of Presentation

- Purpose and scope of SRP Chapters 11.3 and 11.4
- Approach applied in revising SRP Chapters 11.3 and 11.4
- Types and extent of revisions
- Important revisions
- Changes in primary and secondary review responsibilities
- Conclusions

Purpose & Scope of SRP Chapter 11.3

- Applicable to the Gaseous Waste Management System
- Typical sources of gaseous wastes:
  - Gas decay storage tanks and charcoal decay beds
  - Containment building purges
  - SG blowdown flash tanks
  - Buildings HVAC exhaust vents & plant stacks
  - Offgas, condenser air removal, steam jet air ejectors
  - Hydrogen/Oxygen recombiners
- Operation of GWMS relies on permanently installed processing and monitoring equipment

Purpose & Scope of SRP Chapter 11.4

- Applicable to the Solid Waste Management System
- Typical sources of solid and wet wastes:
  - Dry solid wastes - paper, plastic, tools, clothing, etc.
  - Wet wastes - resins, sludge, filter coatings, etc.
  - Plant equipment - valves, pumps, S/G, etc.
  - Mixed wastes – paints, solvents, etc.
- Operation of SWMS relies on permanently installed tanks and mobile processing equipment

Purpose & Scope, cont'd

- Major components include: tanks, pumps, valves, filters, demineralizer beds, chemical neutralization, instrumentation, etc.
- Typical treatment methods used: filtration, reverse osmosis, ion-exchange, charcoal adsorption, compaction, stabilization, etc.
- Selection of treatment method considers endpoint (recycling, release, or disposal) given NRC, EPA, State, and local regulations
- Design features reflect expected volumes, storage capacities, processing flow rates, use of contractors, etc.
- Instrumentation addresses operation, radiological monitoring, process and effluent control, treatment effectiveness, etc.
- System operation addresses safety, radioactive releases, equipment testing and inspection, maintenance, and calibration

Purpose & Scope, cont'd

- Radiological characterization identifies average yearly source terms (Ci/yr), and potential effluent concentrations (uCi/ml)
- Characterization considers:
  - Effectiveness of treatment method (filtration, reverse osmosis, ion-exchange, charcoal adsorption, etc.)
  - Physical, chemical, and radiological properties of wet and solid wastes
  - Treatment system capacities and processing flow rates
  - Treatment system effectiveness (decontamination factors, removal efficiencies, volume reduction/increase factors)
  - Endpoint (recycling or disposal) vs regulatory requirements
- Gaseous waste source term based on BWR/PWR-GALE code, or other methods (e.g., modified ANSI/ANS N18.1-1999 standard)

Purpose & Scope, cont'd

- Key acceptance criteria cited in SRP Chapters 11.3 and 11.4
  - Part 20, Appendix B, Table 2, effluent concentration limits
  - Part 20.1302, dose limits for the public
  - Part 20.1301(e), doses to the public and 40 CFR Part 190
  - Part 50.34a, design objectives and equipment in controlling releases of radioactivity in effluents
  - Part 50, Appendix A, GDC 3, 60, 61, and 63
  - Part 50, Appendix I, ALARA dose objectives for all effluents
  - 10 CFR Part 20.1406, minimization of contamination
  - Parts 52.47 and 52.97, ITAAC as they relate to DCD and COL
  - Parts 61.55 and 61.56, LLW classification
  - DOT 49 CFR Parts 171 to 180 - Hazmat shipping regulations

Purpose & Scope, cont'd

- Regulatory guidance cited in SRP Chapters 11.3 and 11.4
  - RG 1.70 and 1.206, format and content of applications
  - RG 1.112, source term development
  - RG 1.109, 1.110, and 1.111, dose assessment
  - RG 1.143, processing system design guidance
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  - NUREG-0016 and -0017, BWR/PWR GALE codes
  - NUREG/CR-4653, GASPAR II Code, effluent doses
  - NUREG-1301 (PWR) and -1302 (BWR), and -0133, dealing with SREC (aka RETS), ODCM, REMP, and PCP

Structure of SRP Chapter 11.3 & 11.4

- Structure of Chapters 11.3 and 11.4, still as:
  - Review responsibilities (primary/secondary)
  - Areas of review
  - Review interface
  - Acceptance criteria
  - Technical rationale
  - Review procedures
  - Evaluation findings
  - Implementation
  - References
  - SRP 11.3 BTP 11-5, analysis of gas system leak or failure
  - SRP 11.4 BTP 11-3, guidance on LLW management

Changes to SRP Chapters 11.3 and 11.4

- Focus on Part 20.1406, minimization of contamination
  - D&D lessons-learned FSME memo (Part 20.1406)
  - Liquid release lessons-learned NRR taskforce (tritium leaks)
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  - NRC bulletins and circulars, as examples of issues:
    - IE Bulletin 80-10, contamination of non-rad systems
    - IE Bulletin 79-19, leaking radioactive shipping containers
  - Above items are interim guidance to be supplemented by:
    - rulemaking on revision to Part 20.1406,
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- Supplemental guidance on meeting Part 20.1301(e) and EPA dose standards of 40 CFR Part 190

- Considerations of all potential sources of radioactivity and radiation
  - Potential internal exposures, inhalation and ingestion
  - External radiation exposures, onsite contained sources of radioactivity, and offsite deposited radioactivity
  - Doses due to the entire site, all units, buildings, and facilities
- Dose receptor is a "real member" of the public
- Integration of all exposures and pathways in assessing "total dose"
- Confirmation of compliance demonstrated in ODCM and REMP
- ODCM and REMP are reviewed in SRP Chapter 11.5
- Dose from external radiation is dealt in SRP Chapter 12.3-12.4

Changes to SRP Chapters 11.3 & 11.4

- Miscellaneous changes and updates
  - Clarifications on ITAACs for COL and DCD applications, as they relate to SRP Section 14.3
  - Clarifications on COL action items, and certification requirements and restrictions
  - Update of internal cross-references, within each subsection and with SRP Chapters 11.2 and 11.5
  - Update of review interfaces with other SRP chapters
  - Changes in assignment of review responsibilities
  - Addition of citations to Part 20.1406 and Part 52
  - Addition to and update of cited references
  - Editorial updates, as clarifications, corrections, etc.

Conclusions

- Minor updates and chapter structure remains unchanged
- Update provides more detailed guidance to staff and applicants on specific topics
- Update includes requirements and interim guidance on Part 20.1406
- Update incorporates information from recent staff studies:
  - ground water contamination lessons-learned taskforce report into the review of new reactors (NRR, ML062650312)
  - D&D lessons-learned report (FSME, ML0619201830)
- Next updates (long-term):
  - Update SRP Chapters 11.2 to 11.5 after issuance of Regulatory Guide on Part 20.1406 and Rulemaking on Part 20.1406
  - Implementation of Tritium Taskforce recommendations
  - Update of related computer codes and regulatory guides
- Any questions?

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- Considerations of all potential sources of radioactivity and radiation
  - Potential internal exposures, inhalation and ingestion
  - External radiation exposures, onsite contained sources of radioactivity, and offsite deposited radioactivity
  - Doses due to the entire site, all units, buildings, and facilities
- Dose receptor is a "real member" of the public
- Integration of all exposures and pathways in assessing "total dose"
- Confirmation of compliance demonstrated in ODCM and REMP
- ODCM and REMP are reviewed in SRP Chapter 11.5
- Dose from external radiation is dealt in SRP Chapter 12.3-12.4

Changes to SRP Chapters 11.3 & 11.4

- Miscellaneous changes and updates
  - Clarifications on ITAACs for COL and DCD applications, as they relate to SRP Section 14.3
  - Clarifications on COL action items, and certification requirements and restrictions
  - Update of internal cross-references, within each subsection and with SRP Chapters 11.2 and 11.5
  - Update of review interfaces with other SRP chapters
  - Changes in assignment of review responsibilities
  - Addition of citations to Part 20.1406 and Part 52
  - Addition to and update of cited references
  - Editorial updates, as clarifications, corrections, etc.

Conclusions

- Minor updates and chapter structure remains unchanged
- Update provides more detailed guidance to staff and applicants on specific topics
- Update includes requirements and interim guidance on Part 20.1406
- Update incorporates information from recent staff studies:
  - ground water contamination lessons-learned taskforce report into the review of new reactors (NRR, ML062650312)
  - D&D lessons-learned report (FSME, ML0619201830)
- Next updates (long-term):
  - Update SRP Chapters 11.2 to 11.5 after issuance of Regulatory Guide on Part 20.1406 and Rulemaking on Part 20.1406
  - Implementation of Tritium Taskforce recommendations
  - Update of related computer codes and regulatory guides
- Any questions?

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Draft HLWRS-ISG-03: Preclosure Safety Analysis - Dose Performance Objectives and Radiation Protection Program

Presenter: Sheena Whaley
United States Nuclear Regulatory Commission

Briefing to the Advisory Committee on Nuclear Waste (ACNW)
April 10, 2007

U.S.NRC

Outline

- Purpose
- Regulatory Requirements
- Event Sequences
- Radiation Protection Program
- Estimation of Doses
- Summary

Purpose

- Draft HLWRS-ISG-03 Supplements Yucca Mountain Review Plan (NUREG 1804, Revision 2)
  - 2.1.1.5 Consequence Analysis
    - Provide guidance on aggregation of doses for the consequence assessment
  - 2.1.1.8 As Low as is Reasonably Achievable (ALARA)
    - Provide guidance on radiation protection program

Regulatory Requirements

- **63.111(a)(1) Performance Objectives –** "The geologic repository operations area must meet the requirements of part 20 of this chapter."
- **Part 20 Requirements**
  - Implement Radiation Protection Program and ALARA principles that are commensurate with licensed activities (20.1101)
  - Control exposures to 5 rem/yr to radiation workers (20.1201)
  - Control exposure to 100 mrem/yr individual members of the public (20.1301)
- **63.111(a)(2) Performance Objectives –** "During normal operation and for Category 1 event sequences, the annual TEDE....to any real member of the public...may not exceed the preclosure standard specified at 63.204."

Regulatory Requirements (Contd.)

- **63.204 Preclosure Standard** – "DOE must ensure that no member of the public in the general environment receives more than an annual dose of 0.15 mSv (15 mrem)..."

- **63.111(b)(1) Numerical Guides for Design Objectives** – "The geologic repository operations area must be designed so that.. for Category 1 event sequences ... radiation levels in both restricted and unrestricted areas... will be maintained within the limits specified in paragraph (a) of this section."

Event Sequences (ES)

- **Category 1 ES** - expected to occur one or more times before permanent closure

- **Category 2 ES** – other ES that that have at least one chance in 10,000 of occurring before permanent closure

Radiation Protection Program

- Radiation protection program (RPP) description and incorporation of ALARA
  - Commensurate with scope of normal activities proposed for the GROA and expected types of Category 1 event sequences
  - Consistent with the assumptions used in the PCSA consequence assessments
  - Verify RPP addresses
    - Administrative organization
    - Description of health physics equipment, facilities, and instruments
    - Describes policies and procedures for access control
    - Description of program implementation

Radiation Protection Program (Contd.)

- ALARA principles should be incorporated in the proposed GROA recovery action plans for Category 1 ES
  - Assure adequate access to vital areas
  - Protection of safety equipment
  - Basic recovery steps
  - Description of general radiation exposure levels

Estimation of Doses

- Selection of receptors for Consequence Assessment
  - Workers, on-site persons, and off-site members of public
  - Representative exposure locations and occupancy times

Estimation of Doses (Contd.)

- Aggregation of annual dose
  - Sum of doses from:
    - Normal operations
    - Category 1 ES occurring one or more times per year
    - Maximum Category 1 ES expected to occur less than once per year

Part 63 Performance Objectives

	Normal Operations & Event Sequences	
Receptor Type	**Normal Operations and Category 1**	**Category 2**
Radiation Worker	5 rem per year	None
On-site Person	100 mrem per year	None
Real Member of the Public Located Beyond the Site Boundary but on the Nellis Air Force Range or Nevada Test Site	100 mrem per year	5 rem per event
Real Member of the Public Located in the General Environment*	15 mrem per year	5 rem per event

*General Environment means everywhere outside the YM site, the Nellis Air force Range, and the Nevada Test Site.

Summary

- Draft HLWRS-ISG-03 Supplements Yucca Mountain Review Plan (NUREG-1804, Revision 2) in the areas of Radiation Protection Program and Consequence Assessment
- Draft HLWRS-ISG-03 provides guidance for staff in reviewing the radiation protection program and consequence assessment portion of the license application

Development of International Standards on Geological Disposal

178th Meeting of
Advisory Committee on Nuclear Waste
April 10, 2007

Tim McCartin 301-425-7285 tjm3@nrc.gov
Division of High Level Waste Repository Safety
U.S. Nuclear Regulatory Commission

Outline

- Background
- Safety Fundamentals
- Safety Objectives for Geological Disposal
- Safety Requirements for Geological Disposal

2

Background

- IAEA's Radioactive Waste Safety Standards Program
  - principles and requirements
  - guidelines for implementation
- Internationally agreed Safety Standards
  - provide a point of reference for national criteria, standards and practices

3

IAEA Safety Related Documents

- Safety Fundamentals
  - basic objectives, concepts and principles
- Safety Requirements
  - requirements to be met to ensure safety
- Safety Guides
  - recommended actions conditions or procedures for meeting safety requirements

4

IAEA Safety Fundamentals

- Sets principles that apply to all radioactive waste management activities
- Objective of waste management:
  - protect human health and environment now and in future
  - not impose undue burdens on future generations

5

IAEA Safety Requirements for Geological Disposal

- Objectives for protection of human health and environment including quantitative criteria
- Strategy for achieving safety
- Development, operation and closure

6

Safety Objectives During Operations

- Limits on radiation doses to workers and public
  - worker (5 rem in any one year and 2 rem per year averaged over 5 years)
  - public (average doses to relevant critical groups of 100 mrem per year)
- As low as reasonably achievable, social and economic factors being taken into account

7

Safety Objectives Post Closure

- Limits on radiation dose or risk to public
  - 100 mrem per year from <u>all</u> sources
  - 30 mrem per year from disposal facility (risk constraint on the order of 10^{-5} per year)
- Caution on applying criteria at very long time periods in the future
  - dose from natural occurring radionuclides provide indicator of significance

8

Requirements for Safety Strategy

- Planning for Geological Disposal Facilities
  - legal and organizational framework
  - responsibilities of government, regulator and operator
- Safety approach
  - consideration of safety at major decision points
  - passive safety
  - adequate understanding and confidence (e.g., could low probability events cause widespread loss of safety)
- Safety design principles
  - multiple safety functions (i.e., barriers)
  - containment (100's to thousands of years)
  - isolation (inevitable release of limited amount after several thousand years)

9

Requirements for Development of Geological Disposal Facilities

- Framework for geological disposal
  - step-by-step development and evaluation
  - preparation of safety case and safety assessments
- Safety case and Safety Assessments
  - preparation (progressively developed)
  - scope (evolution of repository, design feasibility, uncertainties)
  - documentation (justification, clarity, traceability)

10

Requirements for Development of Geological Disposal Facilities (cont.)

- Steps in development of geological disposal facilities
  - site characterization
  - design (optimal use of site features)
  - construction (flexibility in underground engineering, preserve post-closure safety)
  - operation
  - closure (well defined and practicable)

11

Requirements for Development of Geological Disposal Facilities (cont.)

- Assurance of safety and security
  - waste acceptance
  - monitoring
  - Post closure institutional controls
  - safeguards
  - management systems (includes quality assurance)

12

Summary

- IAEA published safety requirements for geological disposal (WS-R-4; May 2006)
  - planning
  - designing
  - operating
  - closure

- Safety strategy is important for ensuring that at each step in the development an adequate understanding and confidence in safety is developed
  - information commensurate with safety significance

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U.S. Department of Energy
Office of Civilian Radioactive Waste Management

www.ocrwm.doe.gov

Yucca Mountain Project Update

Presented to:
NRC Advisory Committee on Nuclear Waste

Presented by:
Edward F. Sproat, III
Director, Office of Civilian Radioactive Waste Management
U.S. Department of Energy

April 10, 2007
Bethesda, MD

Purpose

- Provide status of the Yucca Mountain Project Key Issues
- Overview of Areas of Management Attention

Best Achievable Schedule Program Key Milestones

- License Application Design Complete- Nov. 2007
- LSN Certification- December 2007
- Supplemental EIS- May 2008
- License Application Submittal- June 2008
- Start Nevada Rail Construction- October 2009
- YM Construction Authorization- September 2011
- Operating License Submittal- March 2013
- Rail Line Operational- June 2014
- Begin Receipt- March 2017

Program Strategic Objectives

- Submit a high-quality and docketable license application to the Nuclear Regulatory Commission no later than June 30, 2008
- Design, staff and train the Office of Civilian Radioactive Waste Management (OCRWM) organization so it has the skills and culture needed to design, license, and manage the construction and operation of the Yucca Mountain Project with safety, quality, and cost effectiveness

Program Strategic Objectives

- Address the Federal Government's mounting liability associated with unmet contractual obligations to move spent fuel from nuclear plant sites
- Develop and begin implementation of a comprehensive national spent fuel transportation plan that accommodates state, local and tribal concerns and input to the greatest extent practicable

Key Issues Update

- Legislative Proposal
  - Access to Waste Fund
  - Land Withdrawal
  - 70K MT Limit Removal
- FY '08 Budget Request
  - $494.5 M
- FY '07 Appropriations
  - $444.5M
- Revision to EPA Standard 40CFR197

Areas of Senior Management Attention

- The License Application
  - Project Status Reviews
  - Strategic Licensing Decisions
- The Organization
  - Business Processes
  - Staffing
  - Management Development
  - Culture
    - Quality and Quality Assurance
    - Corrective Action Process
- The Congress
  - Education
  - Building Credibility

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