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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS

(ACNWM)

179th MEETING

+ + + + +

TUESDAY,

MAY 16, 2007

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The meeting was convened in Room T-2B3 of  
Two White Flint North, 11545 Rockville Pike,  
Rockville, Maryland, at 8:30 a.m., Dr. Michael T.  
Ryan, Chairman, presiding.

MEMBERS PRESENT:

MICHAEL T. RYAN

Chair

ALLEN G. CROFF

Vice Chair

JAMES H. CLARKE

Member

WILLIAM J. HINZE

Member

RUTH F. WEINER

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Member

NRC COMMISSIONER PRESENT:

JEFFREY S. MERRIFIELD

NRC STAFF PRESENT:

DEREK WIDMAYER

ANTONIO DIAS

NEIL M. COLEMAN

TIM McCARTIN

JOHN FLACK

THERON BROWN

ROBERT JOHNSON

ANDY CAMPBELL

ALBERT WONG

ABOU-BAKR IBRAHIM

ALSO PRESENT:

DOROTHY DAVIDSON

ALAN HANSON

FREDERIC BAILLY

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    NRC Staff Review Readiness and Views on

    the Issues

Adjourn

P R O C E E D I N G S

8:31 A.M.

1  
2  
3 CHAIR RYAN: Okay, while we're getting the  
4 last of the audio-visual equipment set up, I'd like to  
5 formally open the meeting, please. The meeting will  
6 come to order. This is the first day of the 179th  
7 meeting of the Advisory Committee on Nuclear Waste.  
8 During today's meeting, the Committee will consider  
9 the following: AREVA Spent Nuclear Fuel Recycle  
10 Facilities; the ACNW White Paper on Volcanism; the  
11 ACNW with Commissioner Jeffrey S. Merrifield; we'll  
12 consider the Yucca Mountain Preclosure Repository  
13 Design: and particularly the NRC Staff Review  
14 Readiness and Views on the Issues; and Discussion of  
15 ACNW Letter Reports.

16 Antonio Dias is the Designated Federal  
17 Official for today's session.

18 We've received no written comments or  
19 requests for time to make oral statement from members  
20 of the public regarding today's session. Should  
21 anyone wish to address the Committee, please make your  
22 wishes known to one of your Committee's staff.

23 It is requested that speakers use one of  
24 the microphones, identify themselves and speak with  
25 sufficient clarity and volume so they can be readily

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1 heard. It's also requested that all cell phones or  
2 pagers that you kindly turn them off.

3 I will turn over the meeting to our  
4 cognizant member for this morning's session. That  
5 would Vice Chair Allen Croff.

6 Allen?

7 VICE CHAIR CROFF: Thank you, Mike. This  
8 morning I'm pleased that we have representatives from  
9 AREVA here to talk about spent nuclear fuel recycle,  
10 recognizing what they do in France. We've also asked  
11 them to discuss a little bit decontamination and  
12 decommissioning activities. So we'll hear some of  
13 that.

14 The lead speaker is going to be Dorothy  
15 Davidson, who is vice president of Nuclear Energy and  
16 Science Program for AREVA in the United States and  
17 responsible for their activities with DOE.

18 Dorothy, take it away.

19 MS. DAVIDSON: I can't get it to not go  
20 through really, really fast. And yes, I can talk  
21 fast, but I don't think you'd want me to do it this  
22 quickly. Is it okay if I just do it -- we can't get  
23 it to go into a run mode for some reason. So if  
24 that's okay --

25 VICE CHAIR CROFF: If that's what it

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1 takes.

2 MS. DAVIDSON: We're not sure why the  
3 computer is reading it this way.

4 I just wanted to thank the Council for  
5 allowing us to have this time to speak to you about  
6 reprocessing and recycling. I'm not sure how you want  
7 to do this as far as questions.

8 VICE CHAIR CROFF: Probably prefer --

9 MS. DAVIDSON: Before or after?

10 VICE CHAIR CROFF: We'll let you go  
11 through your presentation and then -- unless there's  
12 something really urgent and then we'll have a Q and A  
13 session.

14 MS. DAVIDSON: We're just going to go  
15 through it this way. We were asked to talk about a  
16 number of subjects, so I'm not going to go into a lot  
17 of detail just because of the limited time here.

18 First off, I wanted to touch briefly on  
19 why even reprocessor treat and recycle used with their  
20 fuel, then talk about some of our current experience  
21 that we have within AREVA, some of the advanced  
22 technology that we're working on as far as process  
23 development, and then lastly about D&D fuel cycle  
24 facilities, excluding the reactors at this point.

25 First slide that we have is just a picture

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1 which everybody is familiar with, the nuclear fuel  
2 cycle. I just wanted to point out, AREVA plays a part  
3 in all of the nuclear fuel cycles, so whether it's the  
4 front end reactor services, back end, as well as  
5 transmission and distribution and now we have a new  
6 division that does renewables.

7 This is just a diagram to just show if  
8 people aren't real familiar with reprocessing --

9 VICE CHAIR CROFF: You have to sit down  
10 near the microphone. Use the pointer.

11 MS. DAVIDSON: Just very simply, this is  
12 a block diagram of what happens for reprocessing. The  
13 used fuel assemblies are coming from the utilities,  
14 transported -- they can be by ship, by truck, by  
15 train, and then they are unloaded into a -- by either  
16 dry or wet unloading stages, into a receiving or a  
17 buffer area. Then the fuel assemblies themselves are  
18 sheared. They're dissolved. And then they separate  
19 into the different product streams. What comes out of  
20 here and the main things we're going to talk about is  
21 uranium, the plutonium, and then the processed waste.  
22 We'll talk some about the different waste there.

23 This is just another diagram that actually  
24 shows this and you can see under the shearing and the  
25 dissolution, the compaction. This is your holes and

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1 your end pieces, the actual mechanical parts of the  
2 fuel assembly. In the separation phase, the uranium,  
3 plutonium, and the fission products, the minor  
4 actonides go in the fission products and they're  
5 actually vitrified into a glass waste and then stored  
6 at this point, eventually for final disposal in a  
7 repository.

8 The uranium is purified and the plutonium  
9 is purified, so we have the uranyl nitrate and the  
10 plutonium oxide. That's what is actually the two  
11 parts that are recycled.

12 I guess the first question asked is why  
13 bother with recycling and there's a number of good  
14 reasons we believe on why people go through the  
15 process of treating their used fuel and recycling it.  
16 Obviously, one of the major reasons has to do with  
17 safety. Another one has to do with you'll see some  
18 numbers from diagrams, but there's a certain amount of  
19 actual material that's still left and it's reusable as  
20 an energy source that we want to recycle. We also  
21 want to minimize the amount of waste that would  
22 eventually go into a repository.

23 As I mentioned, the uranium and plutonium  
24 is what we recycle. We also believe, and I can show  
25 you some things on reducing proliferation risks and

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1 that it makes it more economical to do this. And then  
2 one of the things, I guess, comment I would make, if  
3 you recycle uranium and plutonium, it's equivalent to  
4 about a 25 percent natural resource conservation. So  
5 it takes about 25 percent of uranium for the reactors  
6 that we don't need for the next cycle.

7 The main thing that we talked about, I  
8 apologize, I've had bronchitis so I'm coughing some,  
9 the main thing that we're looking out when we talk  
10 about as far as recycling, is that 96 percent of the  
11 fuel, what's left over after you actually use it in  
12 the reactors, 96 percent of it is still recyclable.  
13 So we think that's an important part. That's also  
14 partly why we use the term "used fuel" instead of  
15 "spent fuel" because we believe that there's actual  
16 value still in the fuel and that you recycle this  
17 material, whether it's uranium or the plutonium back  
18 into light water reactors.

19 You can see in here of that about 94 to 96  
20 percent is uranium. About one percent is plutonium.  
21 It's a little bit more than one percent. And the last  
22 small part, three to five percent, is actually the  
23 waste that's vitrified.

24 The other reason that we recycle has to do  
25 with volume reduction. If you take out the uranium --

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1 this is the canister of just used fuel without any  
2 treatment, if you take out the uranium and plutonium,  
3 there's about a four to five reduction in volume of  
4 the waste that you actually get as a result of  
5 treatment.

6 Now recognizing at Yucca Mountain that  
7 volume is not the only thing that's important.  
8 Obviously, heat is important. Radiotoxicity is  
9 important. On the heat, as far as the heat is  
10 concerned, the major constituents being cesium,  
11 strontium in the short term and then americium in the  
12 long term, if you take out the plutonium though and if  
13 you treat the fuel and remove the plutonium, you're  
14 also removing that decay path to the americium to the  
15 neptunium which also can have a significant impact on  
16 the heat load on Yucca Mountain. So even with a four  
17 to five volume reduction, if you treat the fuel early,  
18 within the first four years after discharge from the  
19 reactor, we've calculated that you can get about a  
20 four to eight factor as far as improvement in Yucca  
21 Mountain.

22 Just from just being able to remove the  
23 plutonium also -- can affect the head load on Yucca  
24 Mountain.

25 CHAIR RYAN: What do you mean by

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1 improvement?

2 MS. DAVIDSON: Pardon?

3 CHAIR RYAN: An improvement in Yucca  
4 Mountain.

5 MS. DAVIDSON: An improvement meaning as  
6 far as you could actually load -- granted, there's  
7 legislative reasons as far as limits, but you could  
8 load four to eight times as much into Yucca Mountain  
9 with the same heat capacity.

10 CHAIR RYAN: By volume?

11 MS. DAVIDSON: Based just on the heat  
12 part. So if I looked at it from a heat standpoint,  
13 how much we're putting in there, and fuel based on the  
14 heat capacity, you could have four times as much, you  
15 could load into Yucca Mountain, because you remove  
16 that, the plutonium and the americium.

17 So volume reduction is another reason.  
18 Another reason that you'll see up there is reduction  
19 in the radiotoxicity. You can see that if you remove  
20 the uranium/plutonium, obviously still the main  
21 contributor is going to be fission products. As I  
22 said, if you actually treat early within that first  
23 four years, you're also not producing the neptunium  
24 which has an impact on reducing the radiotoxicity  
25 compared to Yucca Mountain.

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1           So just some of the summary, just right up  
2 front of why we recycle: one, 96 percent of the  
3 content of the fuel we believe is recyclable, so  
4 there's still an energy value to the used fuel. It  
5 conserves about 25 percent of our natural resources by  
6 recycling the uranium and the plutonium. It consumes  
7 less than six percent of cost of the kilowatt hour.  
8 Divides the waste volume by five and then if you look  
9 at it from a unique point of view, it's about a factor  
10 of four to eight there; and then the waste toxicity by  
11 a factor of ten.

12           This one is kind of hard to see the slide,  
13 but this is a picture of -- pictures of two of the  
14 major facilities, the first one being La Hague, which  
15 is the reprocessing of treatment facility and MELOX,  
16 which is in southern France which is the MOX fuel  
17 fabrication.

18           For social reasons, these are not  
19 colocated. If you were to build a facility now and  
20 even what DOE is looking at under GNEP, they're  
21 looking at colocation of the treatment facility and  
22 the fuel fabrication facility. So at this point, the  
23 plutonium oxide that comes out of the treatment  
24 facility is actually transported to the MOX facility  
25 for fuel fabrication.

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1           Just as an important thing to note here is  
2 there's about 58 PWR in France. About 80 percent of  
3 the electricity is coming from nuclear power. So it's  
4 a very large contributor. But it is also said that  
5 it's important to them to deal with the waste issue.

6           I'm going to talk just a little bit about  
7 the individual facilities and some of our experience.  
8 You can see here this facility was commissioned in  
9 1969. About 1700 metric ton capacity per year for  
10 this facility. I mentioned earlier you can do both  
11 wet unloading and dry unloading of the casks that come  
12 in. There are about 28 different utilities in 7  
13 countries and we actually just signed a contract with  
14 Italy to treat used fuel from Italy.

15           And there's just some statistics. There's  
16 over 6,000 casks have been unloaded; 74,000 fuel  
17 assemblies; and that amounts to about 29,000 tons of  
18 uranium that's actually been processed through this  
19 facility.

20           This is just a picture of the layout of  
21 the site. It's about a half mile by a mile and a  
22 half, if you look at it, so about 550 acres. It's  
23 located in the northwest corner of France. One of the  
24 things to point out is that what's self-imposed was a  
25 height restriction. In this facility, two-thirds of

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1 the buildings are all underground. So only a third of  
2 it is actually when you go -- if you look at this  
3 facility, about a third of the facility, the height is  
4 actually above ground. Most of it is down underneath  
5 ground. And that was self-imposed, as far as a design  
6 constraint.

7 In addition to the facility, in addition  
8 to the facility that you see, an important part of  
9 this is the transportation that actually brings the  
10 material to La Hague. Most of the material that comes  
11 into La Hague, actually it comes in by train, the  
12 exception being obviously from Japan, but comes in by  
13 train and it comes into an intermodal facility that's  
14 located in Valognes. In Valognes, the trains, the  
15 casks themselves are transferred onto trucks and  
16 they're trucked the last 25 miles to La Hague.

17 The other thing, in Cherbourg, which is  
18 close to La Hague, there's also a seaport so in the  
19 case of the Japanese used nuclear fuel, it's brought  
20 in by sea and then again it was brought in from train  
21 and then trucked in finally to La Hague.

22 And then the used fuel, the glass that  
23 goes back to Japan also goes back on these same ships.

24 This is just a picture of one of the casks  
25 that they use that actually comes in and this is after

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1 it's at La Hague. It comes in before they start  
2 unloading it.

3 So I guess what I would say is on the La  
4 Hague facility, this is a third generation  
5 reprocessing plant. We've been doing this for almost  
6 40 years now, gone through a number of facilities,  
7 obviously through all the process improvements for  
8 that. The other part of the facility is the MELOX  
9 facility which is in southern France. This is where  
10 the fuel fabrication is done.

11 Right now, well, actually as of April, we  
12 just received a new authorization and they're  
13 authorized up to 195 tons of MOX fuel production. So  
14 that has continually increased over time as the need  
15 has increased for the MOX fuel.

16 This is an important one and it was a  
17 question that had been asked to me, has to do with MOX  
18 fuel and one of the concerns, obviously, has to do  
19 with under GNEP even, they talk about the plutonium  
20 inventory and how we're going to actually work down  
21 the inventory worldwide.

22 One of the things that if you look at this  
23 diagram, what this shows is it looks at the 52  
24 reactors in France. This is the assumption of how  
25 much plutonium is coming in, how much is actually

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1 generated, so the first one is no MOX. This is all  
2 just UOX fuel. The second one has about a third of  
3 the fuel loading is in MOX and the fourth one is 100  
4 percent, like in the Gen 3-plus reactors could do. So  
5 what you notice though is if you have -- this one here  
6 which is comparable to what EDF does in its facilities  
7 in France. If you have about a third MOX loading,  
8 what you find out is you're actually at a break even  
9 point.

10 So by using MOX, you're not only burning  
11 plutonium, obviously, in the MOX fuel, but we actually  
12 have a net break even point or zero gain in the  
13 plutonium inventory by using MOX. So we are working  
14 down that plutonium inventory by using MOX. If you do  
15 a 100 percent core loading of MOX, you could see that  
16 you're actually consuming quite a bit of the plutonium  
17 just in the LWRs.

18 CHAIR RYAN: Can you translate that into  
19 what's in the inventory today? I mean the inventory  
20 is growing. It hasn't tipped over or started to go  
21 flat or any of those things yet. I mean what's the  
22 projection for when all that --

23 MS. DAVIDSON: Worldwide or in France?

24 CHAIR RYAN: Both.

25 MS. DAVIDSON: I don't know what the

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1 answer is.

2 CHAIR RYAN: Either one.

3 MS. DAVIDSON: I know what the answer is  
4 for global, but go ahead Alan.

5 MR. HANSON: The inventory right now is  
6 flat. We are basically recycling enough fuel such  
7 that the inventory of plutonium stored at La Hague is  
8 no longer going up.

9 VICE CHAIR CROFF: Identify yourself,  
10 Alan?

11 MR. HANSON: I'm sorry. I'm Alan Hanson  
12 also from AREVA, Executive Vice President for  
13 Technology and Used Fuel Management.

14 CHAIR RYAN: So that would be just  
15 France's story, the inventory is flat, based on  
16 France's use?

17 MR. HANSON: No, based on all of our  
18 customers.

19 CHAIR RYAN: Just so I can understand the  
20 kinetics a little better, is that based on contracts  
21 in hand to use it, or is that physically what's there  
22 now?

23 MR. HANSON: Presumably it's both because  
24 we are reprocessing in real time with regard to the  
25 French reactors and the same thing is true for

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1 customers in Germany and Switzerland. The  
2 reprocessing of the Japanese fuel is complete, the  
3 mixed oxide fuel. The largest part of the inventory  
4 that's still sitting there is MOX that's going to go  
5 back to Japan. The program there has been delayed and  
6 when they start taking MOX in reasonable quantities,  
7 the inventory in La Hague will go down dramatically.

8 CHAIR RYAN: Got you. Thank you very  
9 much. That's helpful.

10 MS. DAVIDSON: Another concern or question  
11 that comes up has to do with the -- from a  
12 nonproliferation concern. And I guess the one point  
13 that I would make here is that it's important to  
14 recognize that when you go through and actually burn  
15 MOX in a reactor, it also degrades the isotopics of  
16 plutonium, so it makes it less amenable as a weapons  
17 material. So we also think that there is a  
18 proliferation advantage. Not only are we working down  
19 the inventory, but also from an isotopic standpoint.

20 This just shows an example of the reactors  
21 that are out there that are actually burning MOX right  
22 now. You can see some of the latest ones where the  
23 Belgian ones, a large number of the ones in France are  
24 already burning MOX. It's about 35 total reactors  
25 that are burning MOX.

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1 (Pause.)

2 CHAIR RYAN: It seems like -- it's  
3 interesting, I guess when is the most recent licensing  
4 action?

5 MS. DAVIDSON: Licensing action for?

6 CHAIR RYAN: You're saying the date that  
7 MOX was first loaded. When was the last plant to come  
8 on and be authorized for MOX? Is that an on-going  
9 process or is there a gap and who's been authorized  
10 when?

11 MS. DAVIDSON: In France?

12 CHAIR RYAN: In the countries where you're  
13 doing business?

14 MS. DAVIDSON: I don't know what the  
15 latest one would have been.

16 CHAIR RYAN: Duke, I guess has a few test  
17 elements.

18 MS. DAVIDSON: Well, they have the LTAs,  
19 yes. They're actually in Duke.

20 CHAIR RYAN: Beyond that in the U.S.?

21 MS. DAVIDSON: Oh no, not beyond the  
22 United States.

23 CHAIR RYAN: How about, are there new  
24 efforts to use MOX in the rest of the world these days  
25 or not?

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1 MS. DAVIDSON: There is interest in a  
2 number of other countries, but I don't know of any of  
3 the recent contracts or what the most recent would  
4 have been.

5 CHAIR RYAN: That's fine. I'm just trying  
6 to get a sense of is this a groundswell that's  
7 building now or are you're working on building as time  
8 goes on.

9 MS. DAVIDSON: On the MOX side or on the  
10 treatment side?

11 CHAIR RYAN: MOX.

12 MS. DAVIDSON: On the treatment side,  
13 you'll see in here that there are some countries, new  
14 ones that are coming on. There are some countries for  
15 political reasons are actually reevaluating nuclear  
16 altogether, such as Germany.

17 On the MOX side, it's still pretty much  
18 the same customers that we've had that have been using  
19 MOX.

20 CHAIR RYAN: Okay, that's great, thanks.

21 MS. DAVIDSON: This one just summarizes  
22 again as graphically as you can see, 35 reactors in  
23 Europe that are using MOX and then as Alan had  
24 mentioned, there's 10 reactors in Japan that are  
25 committed to use MOX. They have not started doing

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1 that yet.

2 A little bit on operating experience and  
3 that was very quickly on what we have done in the  
4 facilities. This kind of talks about some of the  
5 design principles and in designing, in particularly  
6 the treatment plant. Obviously, safety is the first  
7 concern when they're designing that. The exposure to  
8 both the people that are working there, as well as the  
9 public around them. The efficiency, the performance  
10 levels, as far as availability, that has continually  
11 increased over time.

12 The maximum amount of uranium and  
13 plutonium recoverable again. That's something that we  
14 believe has an energy value to it. The environmental  
15 impact, you'll see that there have been significant  
16 changes in how we have operated over the last 40 years  
17 that have reduced those levels. And then the waste  
18 packaging. That's another area that we spent a lot of  
19 time trying to figure out how to do sorting and to do  
20 waste optimization again trying to minimize the amount  
21 of waste that eventually would have to go to a  
22 repository.

23 Just a couple of comments on some of the  
24 safety. The safety record at La Hague is very  
25 positive. The one thing just to mention that you'll

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1 see here, when you start talking about safety though,  
2 it is very different than a reactor. We're not  
3 talking about the high pressure or the high  
4 temperatures. It is a static process. So it's a  
5 different process you're talking about that we have to  
6 actually go to our safety authorities with that we  
7 deal with as far as our licensing.

8 Major concerns are containment, as far as  
9 safety features, are the containment and the cooling.  
10 You've seen the pictures when we talk about as far as  
11 the buffer storage, there's about -- we can store  
12 about 16,000 metric tons of used fuel when it comes  
13 into the plant for processing. So there's a large  
14 amount of water that's in there and then containment  
15 is the other part that's very important throughout the  
16 whole process.

17 The facility, if you go into the facility,  
18 the first thing probably -- I guess the first time I  
19 went in there, my first reaction is there's no people  
20 here. It wasn't really obvious we were doing  
21 anything. This is all remotely done. The only time  
22 you really see a lot of people in the facility are  
23 during the scheduled maintenance periods.

24 So everything is done from the central control rooms.

25 The important thing, these are the same

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1 ones we've talked about. As I said, we've just signed  
2 a contract with Italy to process about 235 metric tons  
3 from them. The important thing is that over 22,000  
4 metric tons have already been treated at La Hague. If  
5 we look at Yucca Mountain, that's about a third, the  
6 equivalent to about a third of what the legal limit is  
7 of what's going to go into the mountain. So it's  
8 already been treated from these different facilities.

9 We mentioned that the Japanese contract,  
10 that one is done. They're in the process of  
11 commissioning their own reprocessing plan at Rokkasho-  
12 mura. And some of these others are still on-going.

13 This just shows that exact same  
14 information, but graphically, this is about the time  
15 period when most of the European facilities and the  
16 Japanese had finished, the contracts had finished.  
17 Some of the large contracts that we had, and  
18 particularly, the Japanese and that's why you see this  
19 dip that's occurred here.

20 Just a note about licensing, because over  
21 time, just like any other nuclear facility, we  
22 continue to work with our safety authorities. There  
23 have been some changes, especially back in about 2003,  
24 where we went back and we were looking at -- trying to  
25 expand the number of fuels or the type of fuels that

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1 we could bring into the facility, so now there are  
2 some research reactor fuel actually that comes into La  
3 Hague in addition to the commercial fuel, but can be  
4 treated. There's been a number of things that  
5 happened, having to do with effluence, and I can show  
6 you some of the numbers there. And how that has  
7 influenced over time.

8           And then the treatment capacity itself has  
9 gone up. And as I said, we're up to about 16,000  
10 metric tons, a pool capacity. What you'll see though  
11 as we increase production, what you're also going to  
12 see that there's a decrease in as far as the  
13 environmental impact or the releases and with that,  
14 the safety authorities have also decreased the limits  
15 that are allowed under the permits.

16           This is just one of the examples. There's  
17 a number of them, I'll go through them quickly so we  
18 can get to some of the other topics. As you can see,  
19 this is the production rate. As far as the amount of  
20 used fuel that's been treated, and this is the  
21 radiation exposure. A number of things, and then you  
22 can see, especially at this point, where they've gone  
23 through and we went through that next generation of  
24 reprocessing plants. And so a lot of improvements  
25 were made and in particular, having to do with remote

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1 operations. And how we operate the facility that has  
2 continued to reduce the exposure to the employees.

3 This is just another one that actually  
4 just shows the same thing that we've had a continuing  
5 trend reducing exposure, based on how we do operation.  
6 Now we get into some of the releases that are out  
7 there. What you're going to see is over this time  
8 period from about 1985 or 1990, again, there is a  
9 significant drop in the releases that are coming from  
10 the facility. What was done is from a liquid  
11 releases, about this time there was a change in the  
12 process. A lot of the liquid releases instead of  
13 having releases from the facility into the sea the  
14 releases were actually, they now go into the -- the  
15 fission products into the vitrified glass, so they're  
16 not released at all.

17 The one exception that you see is the  
18 tritium which is still released into the sea, still at  
19 a low level, but that one is released and the tritium  
20 and there's difficulties with sequestering the  
21 tritium. So there have been some real challenges. So  
22 it does not go into the glass. The other ones you can  
23 see a significant improvement that they have been  
24 reduced.

25 This one shows, it shows the same things

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1 during that period. You see this was actually an  
2 operational change on how we operate the facility and  
3 how we treat the liquid waste. This is just kind of  
4 a summary slide to show you. If you look at the  
5 waste, we already mentioned you have the vitrified  
6 waste which has your glass that has your fissure  
7 products and your minor actonides. This is your high  
8 level waste. You have the compacted waste and then  
9 there's other low level waste. There's solid waste.

10 You also have liquid releases, the  
11 majority of that which is coming from tritium and it's  
12 released right into the sea and it goes in a pipe  
13 which goes -- I don't know how far out. It's a couple  
14 of miles, but it goes out and it's actually diluted  
15 there in the current. And then you the gaseous  
16 releases, the primary one being the krypton.

17 What you see is as far as contribution  
18 though, the primary contribution as far as impact is  
19 coming from the krypton. The iodine is very small and  
20 the fission products are small. The tritium, as far  
21 as from an impact, environmental impact, is almost  
22 negligible.

23 CHAIR RYAN: Why isn't tech-99 kind of on  
24 your special --

25 MS. DAVIDSON: It is actually captured in

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1 some of the -- with the waste.

2 CHAIR RYAN: Not always so.

3 MS. DAVIDSON: Not 100 percent. You're  
4 right, it's not 100 percent, but it's down here. It's  
5 grouped into that number with the fission products.

6 But we do capture a large part of that.  
7 Part of it is also with the cladding itself is where  
8 the tech-99 is from.

9 CHAIR RYAN: Technetium in the literature  
10 has been a big issued in particularly the European  
11 Community and the Nordic countries.

12 MS. DAVIDSON: Yes, well, they track all  
13 of these things. You can see -- they're pulling  
14 samples. They pull about 26,000 samples routinely to  
15 do these, plus we have -- there are independent  
16 agencies in the government that come and pull their  
17 own samples to actually do validations on those.

18 CHAIR RYAN: Thanks.

19 MR. BAILLY: I just wanted to add one  
20 point. I'm Frederic Bailly. I'm a technical liaison  
21 with AREVA. Regarding the technetium in 1992, there's  
22 part of the modifications to the process that were  
23 implemented was reinforced barrier under technetium  
24 and redirection of the technetium to the glass. That  
25 was part of the big decrease in the alpha and beta

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1 releases except for tritium.

2 CHAIR RYAN: Thank you.

3 MS. DAVIDSON: Just a couple of words, you  
4 know, when we do some comparisons and looking at the  
5 environmental impact, this just gives you some dose  
6 rates. If you look at comparisons, average dose rate  
7 is about 2.4 milli-Sieverts per year per person on  
8 average. You can see just La Hague here -- and this  
9 is a 2003, it's less than .02, so there's a  
10 significance of the factor of difference between what  
11 the natural background is relative to what the  
12 environmental impact from La Hague operations.

13 DR. HINZE: Is that per year?

14 MS. DAVIDSON: These are actually --

15 DR. HINZE: Annual doses. Thank you.

16 MS. DAVIDSON: I am not going to go into  
17 a lot of detail because of time. This was a report  
18 that was done to look at the impact of actual releases  
19 into the North Sea and the Atlantic, so I think the  
20 important thing that comes out of this that they  
21 concluded is if you look at the alpha-emitting  
22 releases, the majority of that impact is not coming  
23 from nuclear operations. Most of that is coming from  
24 the oil and gas industry and the fertilizer business.  
25 So that was a significant report that had been done

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1 back in the late 1990s, looking at what the impact  
2 comes from the different industry on the sea.

3 This is just some more numbers showing the  
4 exact same thing. This is the overall nuclear versus  
5 the fertilizer, oil and gases.

6 The last thing on the environmental  
7 impact, as I said, routine monitoring is just normal  
8 operation there. There are air samples. We're  
9 routinely pulling samples from the farms that are  
10 right around us, so all the farms are tested, all the  
11 cheeses are tested, milk is tested. The grass is  
12 actually tested. And then there are people -- they're  
13 also pulling samples from the sea on a routine basis.

14 About 26,000 samples are taken every year,  
15 around 83,000 analyses. In addition to the samples  
16 that AREVA does, we also have government agencies that  
17 come in and do their own verifications.

18 So continuous improvement, as far as  
19 environmental monitoring, and environmental impact is  
20 one of the major goals at La Hague.

21 Waste management, I want to just mention  
22 some of the -- again, the way we've touched on them  
23 briefly, but some of the major waste streams that are  
24 dealing with here. Key principles, as far as waste  
25 management is again, we're trying to minimize waste as

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1 much as possible. That's going to eventually have to  
2 go into the repository. They're doing as much  
3 conditioning of the waste streams in line as possible.  
4 Waste sorting is critical here. And then they're  
5 doing, what you'll see is the standardization of the  
6 waste containers themselves.

7 Three major types of waste forms at La  
8 Hague, first is the high level waste. This is the  
9 glass. That's where the fission products and the  
10 minor actonides are. The long term intermediate waste  
11 forms that again go in a repository, that's like your  
12 holes and your end pieces, that's what's been  
13 compacted. After they're cleaned, then they compact  
14 them. And then we have the short-lived and this will  
15 actually go in a surface disposal site, but you can  
16 see the amounts. It's about .31 total cubic meters  
17 per metric ton that's produced of the high level and  
18 the intermediate level waste at La Hague.

19 This is the canister that we use. It's  
20 the same canister. It's identical. Whether we're  
21 putting the compacted waste in there which is what  
22 this is or whether the glass itself is in there for  
23 the high level waste. So all the handling as far as  
24 transporting, as far as loading into the cask, it  
25 simplifies the whole process by having the same exact

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1 container for both waste forms.

2 This is just a picture of one of the areas  
3 where we do the storage. These are pits. You can put  
4 nine of these containers on top of each other and  
5 stack them down inside of the pit. There's forced  
6 convection that's actually cooling these, so these are  
7 stored so the glass can be stored there before it  
8 ultimately goes back to the waste, whoever the owner  
9 of the waste is. So whoever's fuel it was, it will go  
10 back to that country for final storage or disposal.

11 So this is one facility that is one of the  
12 areas where we do some of the interim storage. This  
13 is another facility that's all natural convection and  
14 again, this is where all the canisters themselves can  
15 be stored as they're cooling.

16 Some of these facilities we have built  
17 facilities similar to this in other countries. And  
18 with the design criteria somewhere between 100 and 300  
19 years. So the capability to be able to store these  
20 canisters for that period of time.

21 One of the next things that I was asked,  
22 we wanted to talk about, was some of the advanced  
23 technology. This kind of gets probably closer to some  
24 of the things that have to do with GNEP and what the  
25 Department of Energy is looking at. When you consider

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1 that this is a third generation plant and AREVA was  
2 already looking at what is the fourth generation for  
3 the La Hague, average life time of these facilities is  
4 about 50 years.

5 So already you -- as a normal commercial  
6 business, you're looking at this saying okay, I've got  
7 40 or so years of experience, what are my lessons  
8 learned? If I was going to do the next facility, what  
9 are the things that I would implement as process  
10 improvements?

11 So continually we're looking at this and  
12 there is engineering teams, even at the facility  
13 that's operating now and looking and saying and trying  
14 to determine what kind of process improvements can we  
15 do, how can we cut the costs, how can we improve  
16 safety, how do we reduce our exposure to our  
17 employees, how do we get better, you know, as far as  
18 process efficiencies. Those things we are continually  
19 working on.

20 So there is a significant amount of money  
21 that AREVA invests just in these improvements for that  
22 next generation plant that's just part of the  
23 commercial business. There's also a part of this and  
24 I'm just going to touch on some of these, but there is  
25 a part of this that if you're looking at, if you were

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1 going to implement treatment and recycling in the  
2 United States, what needs to be different? What would  
3 you do differently from one country to the next? So  
4 we have also been looking at that.

5 The first one which is an important one to  
6 mention has to do with COEX or co-extraction. This is  
7 instead of, as everybody knows, the process that is  
8 used worldwide right now is a process that was  
9 developed in the United States. Since about the early  
10 1990s, we have been working on a process called COEX  
11 and COEX just means that when you are separating the  
12 uranium plutonium, you never have a pure stream of  
13 plutonium. So you always maintain a certain amount of  
14 uranium with the plutonium stream when you do the  
15 separation.

16 And that can amount up to about a 50/50  
17 ratio of uranium and plutonium, and there are  
18 tradeoffs of where you want that to be based on the  
19 process itself and on safeguards. This was  
20 originally, and as I've mentioned, this was started  
21 back in the early 1990s. This wasn't done because of  
22 GNEP. This was done as a process improvement having  
23 to do with fuel fabrication. If you look at the way  
24 that they do fuel fabrication of the MOX fuel is  
25 mechanically actually ground and bound together. If

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1 you do it this way, they're looking at actually  
2 chemically binding the two, and so they're looking at  
3 it as a process improvement that it was better, that  
4 it could actually make it better for the MOX fuel.

5           So that's where the purpose came from.  
6 This also has applications obviously in GNEP because  
7 of the process itself and the possibility of using  
8 something like this in the United States. So the  
9 process is exactly the same as what is done now. The  
10 only part that changes is the center part where you  
11 actually are doing the separation itself of the  
12 plutonium. So you end up with a U,Pu oxide that goes  
13 into making the fuel assemblies, and whether they are  
14 fast reactor fuel or whether it's the light water  
15 reactor fuel.

16           Fast reactor fuel has about 20 percent  
17 historically, about 20 percent plutonium in it. The  
18 light water reactor fuel is less than ten percent,  
19 about eight percent on the plutonium. But the waste  
20 streams themselves are still the same.

21           So one of the areas that we have been  
22 doing a lot of development on is in the COEX process  
23 itself that's been going on. On some of these other  
24 areas, I'm just going to touch on and I don't have  
25 slides on them. I'll just talk to them. Some of the

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1 other areas that we've been looking at as I have said  
2 they've been kind of lessons learned and process  
3 improvements after -- as we move towards the fourth  
4 generation. But also in looking at GNEP there is a  
5 number of things that we've looked and said if I take  
6 the flow sheet, if I look at the whole process, what  
7 would I change that we believe could make it easier to  
8 license this?

9           So what things could we do that we think  
10 could improve the safety of the facility? And there  
11 are some things that we have identified that have to  
12 do even with the chemical process itself, what  
13 solvents you use, lessons that have been learned from  
14 the MOX fuel fabrication facility, and the ongoing  
15 discussions there. Lessons that have been learned  
16 having to do with the process plant in Rokkasho-mura.  
17 So we've tried to take those lessons learned.

18           Fuel qualification. As you have mentioned  
19 that Duke has the LTAs that are actually being  
20 irradiated now for the MOX fuel. We've looked at some  
21 of the -- we're looking at also other tests that can  
22 be done, how can you do some of these tests that again  
23 could help us qualify the fuel, recognize that it  
24 normally takes about ten years to qualify a new fuel.  
25 We're trying to figure out how you can do that,

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1 especially if we have to do a irradiations in fast  
2 reactors. There is limited number of fast reactors in  
3 the world. One of them is Phoenix which is in  
4 Southern France, about 2008, 2009 and I don't remember  
5 the exact date that that actually shuts down.

6 Other facilities are in Japan or in  
7 Russia, so there is limited fast reactors where we can  
8 even do irradiation, so we're looking at some of the  
9 simulations what other tests could be done.

10 Fission product concentration. One of the  
11 major differences in the glass that comes out of La  
12 Hague versus like the defense wastes that would go  
13 into Yucca Mountain, it is the waste loading itself.  
14 It's significantly higher as far as the activity that  
15 we load into the glass that comes out of the  
16 reprocessing plant.

17 So we're continually looking at how we can  
18 improve not only the matrix itself of the glass and  
19 qualify it for ultimately for a Yucca Mountain or a  
20 repository in the U.S., but we're also looking at how  
21 can we improve that waste loading even farther. So  
22 one of the things that we have here is the cold  
23 crucible induction melter, which is -- it's a new  
24 generation of melters that we are using in the La  
25 Hague. We're actually in the process of installing

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1 one in the process line at La Hague and it will be  
2 operational in about 2010.

3 So it's actually both in the melter itself  
4 and in the glass form. We're looking at improvements  
5 there. The waste management hauls it in pieces.  
6 Right now that waste is not slated to go to Yucca  
7 Mountain because of the type of waste of that. So it  
8 will either require legislative change there or there  
9 are things like Savannah River is doing that, is  
10 looking at can you do some decontamination of the  
11 hulls so it's not radioactive waste. So that's one of  
12 the things that we're looking at as how you would  
13 manage the hulls and end pieces defines management.  
14 This is the part that's not dissolved in the process.

15 So the very fine pieces that are not  
16 dissolved, right now it goes into the glass. We're  
17 looking at other options again because of the way how  
18 you want to do to the waste loading of how you can  
19 manage the fines there. Storage, we continue to look  
20 at how we can better store some of the waste coming  
21 out of the treatment process.

22 Releases is another big area that we have  
23 had discussions with. We've been working with as a  
24 result of the tech transfer and working with the  
25 people in Japan at Rokkasho-mura. There's a lot of

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1 interest on can you go in and actually sequester some  
2 of these things? Can we do something more with the  
3 iodine? Can we do additional -- can we get additional  
4 improvement and reduction as far as what do you do  
5 with tritium? There are people that even, the  
6 laboratories are looking at how do you capture  
7 krypton?

8 None of these are easy and we've already  
9 gone through and looked at all the different or known  
10 processes that can be done now and evaluated whether  
11 you can actually add them to the facility and what it  
12 would take cost-wise and what impact we think it would  
13 be. One of the areas though, as we move forward, and  
14 as the U.S. continues down this path, one of the  
15 important things is going to be coming up with  
16 agreement on what are the release limits for such a  
17 facility. And I haven't seen the published numbers on  
18 this is what's going to be acceptable. I know there  
19 are a lot of discussions going on with that right now.

20 Safeguards and security is another area  
21 that obviously, it's very important. The United  
22 States, for sure, we know how to safeguard our  
23 material. We've been doing it for years through the  
24 weapons program. So I don't believe there's an issue  
25 with not knowing how to handle plutonium or how to

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1 handle special nuclear material in the United States,  
2 but I think we're always looking at this and saying  
3 what can we do to improve this process.

4 There's never been an incident, but we  
5 want to make sure that again, that we have addressed  
6 this adequately. This is one of the area, key areas  
7 under GNEP that DOE has identified that they want to  
8 do advance safeguards, so there is a lot of discussion  
9 there, both within the Department of Energy, the IAEA  
10 has a strong interest and we have been interfacing  
11 with the IAEA. At the La Hague facility, we have  
12 inspectors that are there and actually live there.  
13 They're there routinely, monitoring from an  
14 accountability standpoint all the time.

15 And the last thing has to do with  
16 radiolysis is another area that we're looking at. So  
17 we have research teams that are taking each of these  
18 and looking at both for our next generation at La  
19 Hague, what would we do as far as process improvements  
20 to reduce the cost of efficiency, improve safety and  
21 then we're looking at this from the United States of  
22 what would you do? And I think we have found that  
23 we've identified in detail, there are a number of  
24 things that could be done that we believe could  
25 simplify the licensing process.

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1           Last subject that was asked about was what  
2           about decommissioning these facilities? This is a  
3           normal part of the process in France of the life cycle  
4           of the fuel cycle facilities. So I'll forget about  
5           the reactors for right now.

6           If I look at the other facilities whether  
7           it's front-end facilities, the enrichment facilities,  
8           whether it's a conversion facility, the mines  
9           themselves or the back end which is where all of the  
10          -- both the recycling and the treatment is, a normal  
11          part of that is is actually to set just like on with  
12          the utilities in the United States is to set aside  
13          funds for decommissioning. So the assumption is once  
14          you've made it through that life cycle of or that life  
15          time of that facility, the assumption is it has to be  
16          decommissioned. So that's just part of our planning  
17          that goes on from the very beginning on these  
18          facilities.

19          We have a number of projects that we have  
20          done, some that are on going and some that are just in  
21          the planning phases for the fuel cycle. We talk about  
22          the front end just as an example. This is one of the  
23          diffusers. This is the Pierrelatte. That's a gaseous  
24          diffusion plant in southern France. That's one of the  
25          ones that's actually finishing up the decommissioning

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1 of that facility now. So we've already gone through  
2 that whole process for the front end facility.  
3 Obviously, reclamation of any of the mines, whether  
4 they're in France, North America, there's major  
5 reclamations here. Africa. And then there's on going  
6 mines in Canada, in particular.

7 Now I want to talk specifically about the  
8 back end, because this is where the treatment plants  
9 are. There have been a number of facilities that  
10 we've already started going through the D&D process  
11 for. And the major one I'll talk about is going to be  
12 the Marcoule plant which is in southern France which  
13 was called UP1. That was one of the first  
14 reprocessing plants in France.

15 This is just an aerial view of the UP1  
16 facility. You can see these are the major areas where  
17 the process -- this is a very large facility. It's in  
18 the middle of a large area though also where there are  
19 on-going operations, whether it's research  
20 laboratories associated with the CEA or other  
21 facilities such as the MELOX facility is down in this  
22 area. So it's not a plant that's sitting out by  
23 itself. It's right in the middle of an industrial  
24 area. You can see this thing, how large it is.  
25 There's 410 rooms and workshops that they are

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1 decommissioning on this facility. Large tanks in  
2 there, pipes, electrical cables, everything in there.  
3 So a big part of this that went into actually doing  
4 this project was the planning that went up front.

5           So the planning was a critical stage that  
6 they did on this facility. It was commissioned. It  
7 was one of the first reprocessing plants.  
8 Commissioned back in the late 1950s. Has all the same  
9 dissolution, everything just like the reprocessing  
10 plant at La Hague now. Separation of the uranium and  
11 plutonium fission products. All the big tanks,  
12 process tanks that you would see now as well as all of  
13 the pooling pools that are out there. You can see  
14 about 18,000, a little over 18,000 tons of used fuel  
15 were processed. It was shut down in the late 1990s,  
16 in 1997.

17           One of the questions I was asked was what  
18 is the end state for this? This facility is not going  
19 to go down to a green field. It will go down to a  
20 state where they don't have to do any more radiation  
21 monitoring and you wouldn't have to wear NICs or  
22 anything to go into the building. So it will just --  
23 they'll decommission it completely and you can have  
24 access in the building, but there's no radiation  
25 control required. And I have not heard of the final

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1 state as far as what they were looking at and whether  
2 they're going to re-use the building.

3 I just wanted to put up a couple of  
4 pictures, when you start talking. Some of this you  
5 recognize. Some of it when we start talking about the  
6 high-level waste, some of the treatment and the tanks  
7 that we see even in the United States at the DOE  
8 sites, you can see some of these things. In the  
9 pools, we're not just talking about pools, cleaning  
10 them, all they had with the fuels, sitting in them.  
11 I mean there's a lot of pieces of fuel fragments,  
12 things in the bottom of these pools that they were  
13 dealing with. Lot of sludges. Lot of dissolvers.  
14 There are things that never did dissolve. The resins  
15 in the treatment pits themselves, all of this they had  
16 to plan on how they were going to handle this, keeping  
17 in mind that one of the end goals when they  
18 decommission this is you don't want to generate a hull  
19 of orphan waste and you don't want to generate a whole  
20 lot of waste period. You want to minimize the waste  
21 that is actually generated from this process.

22 So when they went through this and looked  
23 at this, there are a number of things that they looked  
24 at. When they were going through the planning stage,  
25 one of the things is the level of decontamination and

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1 that gets you back do you want this to be a green  
2 field? Are you going to use it for industrial  
3 purposes later? Are you just going to leave the  
4 building there because it's part of a complex that  
5 doesn't need to come down?

6           Whether or not when you're doing the D&D,  
7 how much of it can you do it with hands on? How much  
8 of it has to be done with remote control? A lot was  
9 invested in the robotics on how to actually get into  
10 some of these areas that were so highly contaminated.  
11 And areas that were previously blind cells that nobody  
12 had ever been into because normally in the areas in  
13 the hot cells, no one goes and does maintenance  
14 inside. It's all done -- maintenance itself is done  
15 remotely and then you have to be able to access your  
16 maintenance equipment remotely also.

17           Technical approaches, whether or not in  
18 situ rinsing, whether you are going to -- how you are  
19 going to handle some of the waste. One of the  
20 questions that they had to look at, be careful with  
21 was if you're looking at some of the waste streams,  
22 you didn't want to look at an area and say okay, I  
23 could easily get this one deactivated, decontaminated  
24 and then what we found in one case was we actually had  
25 decontaminated an area and then we have some orphan

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1 material that we actually needed that part of the  
2 process line to finish treating some of the waste that  
3 had been generated. So you really have to know the  
4 complete flow of what material you're going to be  
5 generating and how you're going to handle all of this.  
6 You don't want to actually tear down a part or  
7 decommission part of a facility and then you needed  
8 that process to finish. And now you've got leftover  
9 waste that nobody knows what to do with.

10 The waste path, again, optimizing the  
11 condition of the storage. Disposal costs. Looking at  
12 what we are going to do with the waste that was coming  
13 out of there and risk and the costs are always  
14 important. The last thing there, the make or buy,  
15 there was a lot of consideration of whether to develop  
16 these things or were there things that actually were  
17 commercially available that we could adapt for this  
18 process.

19 This is just one of the examples, one of  
20 the pools that they were cleaning up. You can see  
21 them. There are some actual casks that are stored in  
22 there. This was during -- you can't see very well,  
23 but the alter high-pressure water jetting which is a  
24 fairly normal process they know how to do well and  
25 then afterwards and this is what that area, the

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1 facility would look like now.

2 If you were to go into the facility now,  
3 what you would see is a lot of the areas that had been  
4 taped off in the hot cells, they slowly got through  
5 each of these areas and most of those areas you could  
6 walk right in there. They're not contaminated at all  
7 any more. So this is again some other type of work  
8 that they were doing. In this case it had to do with  
9 one of the pools that they needed to be able to go in  
10 and do some stirring, so that they actually could  
11 remove the material from the tank. And this was just  
12 one of the robotics that they actually -- that they  
13 had developed to go inside and do this remotely.

14 As I mentioned, we wanted, we're trying to  
15 minimize how much waste is out there and whether it's  
16 liquid waste, whether it's solid waste. This is the  
17 vitrification crucible that we were talking about.  
18 We've looked at ways that again that we can increase  
19 the loading, the activity loading from these that goes  
20 into the glass. There's other things as far as  
21 sludges and particularly that's been a real challenge  
22 working with some of the sludges that exist at the  
23 facilities.

24 This just shows some other things, whether  
25 it's super compaction. They also do some of the work

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1 that's being done. They still do some of the grouting  
2 on the low level waste. And as far as technology,  
3 this is just a list of some of the things that have  
4 been done.

5 One of the things I'll just mention that  
6 was done that was -- that had been requested from  
7 AREVA was they set up this decommissioning school. So  
8 a big part of this, this wasn't a process that people  
9 were normally working on, especially the people that  
10 were transitioning within that had been operators in  
11 the facility, was to go back in and to train them in  
12 how to do decommissioning. A whole other task. So  
13 they set up a school down at Marcoule and they brought  
14 in people to train the local work force to be able to  
15 do the decommissioning work. So that was a transition  
16 and kind of the job force that could support this  
17 project because it's a very large project.

18 The last comment to make was just some of  
19 the lessons learned. As I mentioned, one of the  
20 things you have to be really careful with when  
21 planning is you want to make sure you don't get ahead  
22 of yourself and you actually work yourself into a  
23 corner where you have an orphan waste that you don't  
24 have any way to treat it any more because you already  
25 tore down that part of the building. That was one of

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1 the things. Personnel skill, as I said, this was a  
2 big challenge. We're talking a work force that was  
3 used to operating these facilities, not on how to take  
4 these down and how to go in there and work with all  
5 the robotics to be able to decommission these  
6 facilities. So there's a lot of education that went  
7 in there, a lot of planning up front on what was the  
8 best path to go again, from a safety and a cost  
9 standpoint.

10 And then I think another thing that -- a  
11 couple comments that we made is one of the first  
12 things they said, the people that I've talked to that  
13 have been involved with this is you've got to  
14 challenge the data. There's a lot of data out there.  
15 There's a lot of old data out there. Really challenge  
16 that historical and characterization data during your  
17 planning stage.

18 The other thing is really working closer  
19 with authorities. That was something that was done  
20 here that is on-going, is being able to work with them  
21 and try to identify in advance exactly what process  
22 they were going to do and be able to address the  
23 issues and try to anticipate as much as possible.

24 VICE CHAIR CROFF: Thank you.  
25 Fascinating.

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1 Jim?

2 DR. CLARKE: Thank you. You covered an  
3 awful lot of ground in a very short time. I do have  
4 a few questions.

5 Your Slide 5 which you started out with,  
6 I take it that's the process that is being used as we  
7 speak?

8 MS. DAVIDSON: Yes.

9 DR. CLARKE: And that's basically the  
10 Purex process is that correct?

11 MS. DAVIDSON: Correct.

12 DR. CLARKE: And that does generate a  
13 plutonium stream.

14 One of the things I think I heard you say  
15 and I'm puzzled by it is that you're not co-locate the  
16 reprocessing facility with the fuel fabrication  
17 facility, that is what's being proposed in GNEP. And  
18 I think I heard you say you did that for safety  
19 reasons.

20 MS. DAVIDSON: Social.

21 DR. CLARKE: Social.

22 MS. DAVIDSON: Social reasons.

23 DR. CLARKE: Okay.

24 MS. DAVIDSON: It's not -- that's not what  
25 we would recommend, but that was a social decision.

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1 DR. CLARKE: Because that involves  
2 transporting plutonium.

3 MS. DAVIDSON: Yes, you would like to  
4 eliminate any of that transportation between fuel and  
5 fab, but that was a social decision.

6 DR. CLARKE: I heard safety and I was very  
7 confused.

8 Your facility in France can take advantage  
9 of a different waste classification system than we  
10 have here in the U.S. And I think it was your slide  
11 44 that spoke to the different types of waste that  
12 would be generated and the high level, intermediate  
13 level, low level. It looks like the intermediate  
14 piece in the second bullet is comparable to the high  
15 level piece, but I'm wondering in the third bullet  
16 where you have 2000 cubic meters a year, how much of  
17 that is what you would call intermediate? Is that a  
18 significant portion?

19 MS. DAVIDSON: Compared to what we would  
20 call intermediate?

21 DR. CLARKE: I think you're calling it  
22 short-lived, low-end, intermediate level waste?

23 MS. DAVIDSON: Yes.

24 DR. CLARKE: And that could go to surface  
25 disposal. All of that could?

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1 MS. DAVIDSON: All of it can.

2 DR. CLARKE: Okay.

3 MS. DAVIDSON: All of that goes to surface  
4 disposal.

5 DR. CLARKE: Are we going to be in a bad  
6 way here without that category, do you think? One of  
7 the things we were trying to get our arms around is  
8 how GNEP is identifying, classifying their waste  
9 streams and it looks like at least in the short term  
10 they're calling a lot of things high-level waste, what  
11 we're wondering about as well. Does the lack of an  
12 intermediate waste classification system in the U.S.  
13 have an impact?

14 MS. DAVIDSON: What I think we need to  
15 look better at and that's one of the things we have  
16 somebody looking at it now, is really not the high  
17 level because I think we're comfortable with that,  
18 especially since the last can go to Yucca Mountain for  
19 the defense waste. I think is really what they're  
20 calling long-term intermediate waste which is the  
21 classification in France is whether or not that could  
22 go to Yucca Mountain or not.

23 I'm not sure of that. We still don't know  
24 for sure and we're looking at that. That is  
25 definitely transuranic waste. But it doesn't meet the

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1 legislative discrimination or how they specify that as  
2 far as transuranic waste there. So that's the one  
3 that we need to look at. But it's also one that I  
4 think that there's R&D that is going on that could do  
5 some improvement and you wouldn't have to dispose of  
6 that as high level waste at all. And so that's one of  
7 the things that we've looked at and said we're trying  
8 to figure out what can you do because we'd like to not  
9 have to even dispose of that in Yucca Mountain. So  
10 that's one of the process improvements we've talked  
11 about.

12 DR. CLARKE: I think what they're doing in  
13 Japan and I could be wrong, I think they're looking at  
14 intermediate waste as something between near surface  
15 and deep geologic disposal. So they would have an  
16 intermediate depth that they would use for that  
17 classification.

18 You mentioned MOX and we are using some  
19 MOX in the U.S. now, I guess, on a trial basis. You  
20 mentioned Duke Power. Do you see more of that?

21 MS. DAVIDSON: I can only tell you that  
22 the utilities, there is a growing interest among the  
23 utilities in interest in MOX. So just from -- as a  
24 fuel supplier, I can tell you that we've asked it  
25 quite a bit lately about availability of MOX. And I'm

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1 sure that's being driven by just because of the cost  
2 of uranium as far as they look at the long-term fuel  
3 requirements.

4 But I can't tell you what's going to  
5 happen. I can just tell you that the utilities are  
6 asking a lot more questions about it and want some  
7 more information on it and have looked at whether or  
8 not they could modify the license on their reactors,  
9 what that would require to do that to be able to burn  
10 MOX.

11 DR. CLARKE: I have one more question  
12 which is kind of a -- may not be a fair question. It  
13 may not be a short answer and if that's the case,  
14 that's fine, but one of the things that this Committee  
15 is looking at or we've been asked to look at hard is  
16 how would we take lessons learned from on-going  
17 decommissioning activities and link them to plans for  
18 new facilities?

19 So I guess my question would be what have  
20 you learned in decommissioning the kinds of facilities  
21 that you talk about that would cause you to do things  
22 differently. Say you were going to build a new  
23 reprocessing plant that would use the COEX process or  
24 whatever. You were just going to start from scratch  
25 and build a new reprocessing plant. What would you

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1 kind of in a major area basis, what would you do  
2 differently?

3 And the other thing I did want to ask you  
4 about, I think it ties into this is you talked a lot  
5 about the radioactive waste classifications, but  
6 didn't say much about chemical waste. And these  
7 plants use chemicals and they generate what we would  
8 call mixed waste, I guess, in this country. And how  
9 does that factor into the way you might do things  
10 differently?

11 MS. DAVIDSON: I'll answer the one about  
12 what would we do differently.

13 As I said, we have already started looking  
14 at and we've been working for about three years now of  
15 those what ifs, if the U.S. were to decide the policy  
16 was to close the fuel cycle in the United States,  
17 basically. So we have been looking at those  
18 facilities and taking those same lessons learned based  
19 on what we've gone through at UP1 and now we're going  
20 through UP2 400 which is one of the earlier plans. So  
21 we've already started taking those same lessons  
22 learned and looked at a complete life cycle of how we  
23 would impact all stages of that, not just how would  
24 you make it easy to license, the easiest to license,  
25 how you would also make it impact the building, the

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1 operations, and the decommission.

2 So we have started to put those in there.  
3 As far as the process itself, the chemical process  
4 itself, that doesn't have a significant impact on it.  
5 It's more along the operations line.

6 DR. CLARKE: Okay.

7 MS. DAVIDSON: Especially on how we handle  
8 waste, in particular. So we are looking at -- we've  
9 already started actually taking those lessons learned  
10 and going through the whole life cycle of the plant  
11 and how we would --

12 DR. CLARKE: With the objective being when  
13 you get to the end of the life, the operating life of  
14 the plant, you've got a situation that's much easier  
15 to deal with than you would --

16 MS. DAVIDSON: That would be the goal.  
17 It's based on what we know now and as we go, as you go  
18 through the design phase, too, we would continue to  
19 try to figure out what lessons we have from the two  
20 major facilities that we're decommissioning right now.

21 DR. CLARKE: So you do have a link between  
22 all your learning in the decommissioning and what  
23 you're doing now.

24 MS. DAVIDSON: I'm sorry?

25 DR. CLARKE: You do have a link between

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1 what you're learning in the decommissioning and what  
2 you're doing at the planning stage for new facilities.

3 MS. DAVIDSON: That's kind of the -- I  
4 guess an advantage to us is that after working for 40  
5 years doing in treatment and recycling and having that  
6 kind of history, and the fact that we have operating  
7 facilities that are going on now, we're looking at  
8 next generation already for our own facilities and  
9 we're decommissioning two facilities. We're in  
10 different stages of decommissioning two of the older  
11 generations, we have that advantage that we have those  
12 lessons learned, so we can actually put them into  
13 design now. So I agree with you. I think that's  
14 important to do that now as we -- if we were thinking  
15 about building a new facility and try to do that now.

16 DR. CLARKE: Thank you.

17 MS. DAVIDSON: The other question you  
18 asked about the chemical, the chemical, Frederic, you  
19 can answer this better because Frederic Bailly was  
20 actually was one of the managers at La Hague, so I  
21 asked him to be here. But the chemical is primarily  
22 recycled.

23 MR. BAILLY: Yes, primary recycled and  
24 recovered. A part of it goes into the sea, but we  
25 have regulations in France also regarding chemical

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1 releases. So we have to -- which are European  
2 regulations so we have to stick to those regulations.  
3 Other than that, solvents for instance, that we use,  
4 as we use them, their efficiency goes down so some of  
5 it has to be disposed of and it is not released into  
6 the environment. It is mineralized and in DLE late  
7 '90s, early 2000, FIC called for mineralization of the  
8 solvents was started up to grout. So they are  
9 basically burned and then grouted, the ashes are  
10 grouted with cement.

11 DR. CLARKE: Thank you.

12 VICE CHAIR CROFF: Ruth?

13 DR. WEINER: How does -- you are really  
14 using the Purex process essentially. How does your  
15 chemical process differ from the Purex process that  
16 was used in the United States?

17 MS. DAVIDSON: With the exception --  
18 essentially it's the same.

19 DR. WEINER: But you're not using canyons?

20 MS. DAVIDSON: No, no, no.

21 DR. WEINER: That's what I was --

22 MS. DAVIDSON: We are not using the canyon  
23 design.

24 DR. WEINER: So what do you use?

25 MS. DAVIDSON: Well, you can answer that,

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1 Frederic.

2 MR. BAILLY: Well, basically, it's  
3 succession of different cells, some of them that need  
4 maintenance and have an easy access with remote  
5 maintenance tools. Some of them are cells that are  
6 closed with fuel tanks and pipes. But we -- it is  
7 more of modular separate buildings that achieve  
8 separate functions.

9 The process, like you said, is the same.  
10 The core process. I would say the chemistry that does  
11 separation is the same, but the technology has evolved  
12 over 40 years.

13 DR. WEINER: How do you relieve the  
14 pressure build up or don't you get a pressure build up  
15 in the cell?

16 MR. BAILLY: Pressure build up?

17 DR. WEINER: These are reactions that some  
18 are exothermic, aren't they? And you're getting some  
19 gaseous pressure releases, aren't you? Or is this  
20 entirely at relatively ambient temperatures?

21 MR. BAILLY: Actually, the main part that  
22 is heated is the front end, it's a different step.  
23 And after that, temperatures are not really high. We  
24 are to the contrary cooling part of that. There's the  
25 evaporation step where we evaporate to concentrate and

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1 those are -- we have a ventilation system, process  
2 ventilation that is separate from the building's  
3 ventilation.

4 DR. WEINER: What I was leading up to is  
5 -- was basically, you clearly do a very job of worker  
6 safety as far as radiation exposure is concerned. And  
7 I was interested in what you did as far as chemical  
8 safety is concerned.

9 MR. BAILLY: We do apply the European  
10 rules and essentials of classic chemical risk and I  
11 mean the safety records, not on the nuclear side, but  
12 on the regular risk side of the plant puts the  
13 activities to the front to the best manners of the  
14 European industry because the risk is taken, it's in  
15 the culture of the company.

16 DR. WEINER: Thank you. Why do you put so  
17 much of your plant underground? I was just curious?

18 MS. DAVIDSON: This is in a seismic area,  
19 so that was just a design constraint that AREVA chose  
20 to do was to actually put part of it underground.

21 DR. WEINER: So it's primarily for seismic  
22 safety?

23 MS. DAVIDSON: Yes.

24 DR. WEINER: And I noticed you have an  
25 intermodal when you bring material into the plant, you

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1 have an intermodal transfer facility. Are you just  
2 taking the casks, you transport rail casks on trucks,  
3 move your rail cask trucks or do you use truck casks  
4 on trains? Because there's a big size -- there could  
5 be a big size difference.

6 MS. DAVIDSON: I let Alan because Alan is  
7 the expert on casks.

8 MR. HANSON: The cask fleet that is used  
9 to transport material to La Hague is essentially an  
10 all-rail cask fleet and the Valognes terminal was  
11 built and is operated as an intermodal rail to heavy  
12 haul truck because the rail line does not run all the  
13 way out to the plan on the point of the peninsula and  
14 it was decided not to take the rail line out that far.  
15 There are some truck casks still in use, but  
16 everything is so standardized that it's probably 99  
17 percent rail.

18 DR. WEINER: So you actually use heavy  
19 haul trucks?

20 MR. HANSON: Yes.

21 DR. WEINER: To transport them. About how  
22 far do those heavy haul trucks go?

23 MR. HANSON: Somewhere between 12 and 20  
24 miles, isn't it? About 20 miles at most.

25 DR. WEINER: A short haul?

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1 MR. HANSON: Very short, yes.

2 MS. DAVIDSON: And it's going over the --  
3 the normal roads there. They're not closing the  
4 roads.

5 DR. WEINER: They're just very large.

6 MS. DAVIDSON: Yes, they are very large.

7 DR. WEINER: I noticed you're concerned  
8 about the tritium release. Have you considered some  
9 sort of getter for the tritium? Is that possible with  
10 your process?

11 MS. DAVIDSON: We continue to look at  
12 that. It has not been from an environmental impact as  
13 far as I mean it's been acceptable. It's within  
14 acceptable limits, so I'll make that statement first.  
15 But we continue to look at what things you could do to  
16 improve that, but it's not an easy issue is what our  
17 engineers tell us.

18 DR. WEINER: No, it isn't an easy issue.

19 MS. DAVIDSON: So they continue looking at  
20 that, the tritium, in particular.

21 DR. WEINER: My final question relates to  
22 your decommissioning and I was very interested in the  
23 responses to Dr. Clarke's questions.

24 How do you make the decision to  
25 decommission a plant? What goes into that decision?

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1 MS. DAVIDSON: It's not an optional  
2 decision that we're going to decommission. That's  
3 just a normal part of that lifetime process of that  
4 facility. The assumption is when it's at the end of  
5 a lifetime that we go through, we have to decommission  
6 the facility.

7 DR. WEINER: Let me ask it in a different  
8 way. How do you determine what the lifetime of the  
9 plant is? What are the factors in determining the  
10 lifetime of the plant?

11 MS. DAVIDSON: It's actually defined in  
12 the design right up front by our engineers.

13 DR. WEINER: What are the factors that go  
14 into it, in general? I mean is it -- you know, in  
15 some cases with the reactor you look at the amount of  
16 irradiated stuff that you have. Is that what  
17 determines it? In other words, at what point -- what  
18 is it about the plant that determines its lifetime?

19 MR. HANSON: Maybe I can add something at  
20 this particular point in time. None of the facilities  
21 that are being decommissioned are being decommissioned  
22 because they came to what I would call a technical  
23 lifetime. They came to the end of their mission and  
24 therefore were no longer needed. And then you're  
25 right, then you get to the question of do you do safe

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1 store and just sit on it for a long period of time,  
2 come back and decommission it later, or do you move  
3 into decommissioning earlier, because there are  
4 tradeoffs to be made there.

5 And I would suspect that among the  
6 tradeoffs, just as we see in the complex in the United  
7 States, some of those decisions are what in France we  
8 call social reasons and so there is a desire to keep  
9 the -- one of the things that we've learned that it is  
10 good to do the decommissioning when you still have the  
11 people who operated the facilities and understand  
12 where things are and how they operate. If you wait 30  
13 or 40 years and all of these people have retired or  
14 died, you've lost some of the intellectual knowledge  
15 you need to do proper decommissioning and that pushes  
16 you into doing things a little bit earlier than you  
17 might otherwise for radiological purposes.

18 DR. WEINER: Thank you. One final point  
19 that you have just touched on. What then does happen  
20 to the workers who have been working at the plant and  
21 have now shut it down? Do they -- is there any  
22 provision for transitioning them? Is that knowledge  
23 gone? What happens to them? Because decommissioning  
24 for the workers is not a very exciting experience. I  
25 mean you're shutting -- you're basically shutting down

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1 your own job. So what does happen?

2 MS. DAVIDSON: I guess I could answer part  
3 of that. I think as Alan said, you don't want to lose  
4 that work force that knew how to run this facility and  
5 knew all the ins and outs of the operations of that  
6 facility. You need them when you're actually in the  
7 phase of doing the decommissioning. A lot of these  
8 people though, they've been working at these  
9 facilities, 20, 30 years, you know, so they're already  
10 at -- they're looking at this -- I guess I don't think  
11 they're thinking about it so much as they're working  
12 themselves out of a job in a sense, partly because  
13 it's been technically challenging for them and it's  
14 been learning a whole new skill for them.

15 The people that were not ready to retire  
16 once in the decommissioning phase that are doing the  
17 decommissioning, those people actually have moved on  
18 to other projects within AREVA. So one is the  
19 training of how do you get people to transition from  
20 being an operator to being part of a decommissioning  
21 team. The next one is if that person is not ready to  
22 retire anyhow, there are actually other facilities  
23 that they would look at and they would actually move  
24 them around.

25 DR. WEINER: Thank you.

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1 MS. DAVIDSON: But I would like to make  
2 one other comment that Alan said about the lifetime.  
3 Where we say a nominal lifetime of a facility is 50  
4 years, as Alan said, it's not technically because it's  
5 the technology is over, you've got to stop type thing.  
6 Because we also look at facilities and say is there an  
7 upgrade that you could do to that facility? Can we  
8 change out or add just another and process line and  
9 part of the facility may still be okay and there's  
10 nothing outdated on that technology. So they'll look  
11 at different options and it's not just the case of  
12 this whole facility. In particular, UP1, it's mission  
13 was done. And the reprocessing had been moved to La  
14 Hague. So that was a whole facility where it was  
15 decided that they would decommission it.

16 DR. WEINER: Thank you very much.

17 VICE CHAIR CROFF: Mike?

18 CHAIR RYAN: Thanks. I'll take just a  
19 teensy bit of difference with Dr. Weiner. I think  
20 decommissioning is interesting and fun.

21 (Laughter.)

22 I think it's almost as fun as building  
23 something.

24 Let me turn your attention to the waste  
25 because very often in decommissioning and operating

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1 waste management. So you're dealing with the Santre  
2 de Lobe. You're dealing with probably EU Safety  
3 Directive 6 and what can be released from further  
4 control. You're dealing with intermediate level waste  
5 and some day, I guess, you'll be dealing with high  
6 level waste as well.

7 How much of your criteria for your  
8 operations at La Hague really drive your program in  
9 waste management? Because very often I find that  
10 waste acceptance criteria or what people process  
11 through rather than some external driver.

12 MR. BAILLY: I can say one point on the  
13 waste characterization of vitrified waste, for  
14 instance. The waste criteria has been licensed in  
15 five countries, I guess. So we have to operate into  
16 -- to make sure that the waste will meet those  
17 criteria. And it's the operation factors that would  
18 drive that.

19 Am I answering your question?

20 CHAIR RYAN: Yes. So basically you are  
21 working toward the waste acceptance criteria. Just as  
22 a simple example, sometimes there are caps on the  
23 concentration of say technetium-99. So you might be  
24 able to process where you get all of the technetium  
25 into one waste, but you have to limit it because of

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1 those kinds of criteria.

2 MR. BAILLY: Absolutely.

3 MS. DAVIDSON: So just as important as the  
4 plutonium, obviously, the purification of the  
5 plutonium and uranium, if we are going to recycle  
6 that, the waste acceptance is deriving the process for  
7 us.

8 CHAIR RYAN: Okay, you know that can have  
9 a big swing on volumes created on costs and all those  
10 kinds of things. The second is how much do you  
11 release from further control under Safety Directive 6,  
12 the release criteria? In other words, you check it,  
13 it's not radioactive. It meets all of the release  
14 criteria and it goes to normal solid waste disposal.  
15 Is there a lot of that? A little? None?

16 MS. DAVIDSON: I don't know the answer to  
17 that. I could find out, but I don't know the answer.

18 CHAIR RYAN: The reason I ask that  
19 question as you know disposition of solid material in  
20 the United States has not moved forward. I'm curious  
21 how much material actually leaves regulatory control  
22 from the radiological standpoint. That would be an  
23 interesting thing to think about.

24 MS. DAVIDSON: I can get an answer back to  
25 you if you'd like.

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1 CHAIR RYAN: That would be terrific. What  
2 makes an orphan waste?

3 MS. DAVIDSON: It's just we don't have a  
4 disposition, disposal path --

5 CHAIR RYAN: What would be an example of  
6 an orphan waste?

7 MS. DAVIDSON: If there was a -- in the  
8 case, I would say the D&D one, in the case there was  
9 actually some fuel fragments that they had and they  
10 couldn't treat them to actually dispose of that waste.  
11 So they had no disposal path.

12 CHAIR RYAN: It's chunks of plutonium in  
13 fuel and stuff like that, it's probably your biggest  
14 headache?

15 MS. DAVIDSON: Well, on the D&D side that  
16 was one of the biggest things.

17 CHAIR RYAN: How about on the normal  
18 operating side?

19 MS. DAVIDSON: Well, we don't have any  
20 orphans that we don't have a path that we're dealing  
21 with them so --

22 CHAIR RYAN: So you don't really create  
23 any orphans in your normal operating waste?

24 MS. DAVIDSON: None that we don't have  
25 some path that ultimately is going to be disposed of.

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1 CHAIR RYAN: You might be holding it for  
2 later treatment?

3 MS. DAVIDSON: Well, even the sludges  
4 they've gone back -- they've gone back and actually  
5 started treating those.

6 MR. BAILLY: I have an example on that.  
7 When we started MELOX, we had to make the evidence  
8 that we were able to process the scraps of material  
9 that can be off-specs, so we had to build the specific  
10 facility to re-dissolve this and re-process those  
11 scraps of material before we got the authorization to  
12 start the MELOX extract.

13 CHAIR RYAN: And just in general the idea  
14 there was to avoid a large inventory of plutonium  
15 contaminated waste.

16 The reason I ask that series of questions,  
17 I think it raises the question for the U.S. scheme, we  
18 don't have a release from regulatory control at this  
19 point in a uniform way. We don't have an intermediate  
20 waste category. So it's challenging to think about  
21 how you are going to separate the low-level waste that  
22 meets the current 10 CFR 61 schemes in the licensed  
23 facilities of high level waste and you alluded to the  
24 idea that when thinking about what you can squeeze  
25 into Yucca Mountain that might be higher in actonides

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1 or uranium or higher in the fuel tank material.

2 So to me, that's a very significant  
3 challenge and reprocessing under the current  
4 regulatory scheme in the U.S. I'm not trying to imply  
5 it's not possible, but there's lots of details to work  
6 through.

7 Would you agree with that?

8 MS. DAVIDSON: I agree. I think that's  
9 under GNEP, that's one of the major goals. Obviously,  
10 there's multiple goals there, but as one of the goals  
11 is to be able to address the waste management and  
12 making sure that you do have those disposal paths and  
13 you've optimized that.

14 CHAIR RYAN: I agree with you. I've seen  
15 a couple of the presentations that DOE has made, the  
16 fact that they're calling them tritium high level  
17 waste, for example, just makes no sense to me. So I  
18 really struggle with how these characterizations of  
19 waste are --

20 MS. DAVIDSON: And that's one of the  
21 things that we have been looking at and have a team  
22 that's looking at, of all the waste that are coming  
23 out, what could you do, what would you do with them?  
24 What other regulations that exist and we actually  
25 hired a legal firm to say what would legislatively

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1 have to change if you wanted to dispose of certain  
2 waste in a different way than is currently possible.

3 CHAIR RYAN: You know, of course, within  
4 regulations themselves you don't have to jump the  
5 legislation. There are lots of kinds of things you  
6 can think about like license conditions, permanent  
7 conditions.

8 MS. DAVIDSON: True.

9 CHAIR RYAN: Guidance. Regulatory  
10 changes. You don't have to jump in Congress' pocket  
11 to start making a change.

12 MS. DAVIDSON: We were mostly thinking it  
13 had to do with the Nuclear Waste Fund, so that was the  
14 --

15 CHAIR RYAN: It's the money, that's right.

16 MS. DAVIDSON: Yes.

17 CHAIR RYAN: I guess I'm taking away the  
18 message that there are some significant differences in  
19 the systems that are based on what's done in France  
20 versus what the thinking is about GNEP, but I really  
21 see some significant thinking that's yet to be done to  
22 address those basic questions. Very often, the waste  
23 management questions become the steering wheel that  
24 drives the bus. You can process all day long, but at  
25 the end of the day you have tanks of this and bins of

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1 that and you have to figure out what to do with it,  
2 otherwise the process stops.

3 Thanks. Allen?

4 VICE CHAIR CROFF: I'll let Bill go first.

5 DR. HINZE: Thank you, Ms. Davidson, for  
6 a very lucid and comprehensive presentation. One of  
7 the things I didn't hear about, however, was the  
8 siting of the facility and the characterization of the  
9 site that needed to be done for this process. Can you  
10 tell us what was involved, what criteria were involved  
11 in the site characterization and after this plant  
12 running for a period of time, do we have any lessons  
13 learned regarding the site characterization?

14 MS. DAVIDSON: I think we have lessons  
15 learned as far as the impact. The impact will differ  
16 depending on where you site a facility. So obviously,  
17 in this case it's actually sited right next to the  
18 sea. So whether you're talking it's next to a river  
19 or to the sea or it's in the desert, will have an  
20 impact as far as -- will be different from one site to  
21 the next.

22 As far as siting a facility, and Frederic  
23 may know more than me, but some of the key parameters  
24 and as you know, some of the siting studies have just  
25 finished with the Department of Energy had been doing

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1 related to the GNEP siting studies for the  
2 environmental impact statement and had been looking at  
3 a number of sites around the United States with some  
4 generic type criteria of what you would need, whether  
5 it's water requirements, whether the power  
6 requirements for actually siting a facility, this  
7 facility.

8 So in the case of La Hague, obviously,  
9 there was concerns as far as water for the process and  
10 then because of how they operate as far as the  
11 effluence. There's power requirements for there.  
12 There's social requirements as far as the people in  
13 the work force that was there and the case of actually  
14 siting the facility itself, seismic was an important  
15 parameter in choosing this site.

16 DR. HINZE: Disruptive events.

17 MS. DAVIDSON: Yes.

18 DR. HINZE: What type of monitoring of the  
19 groundwater is in place at these new facilities? You  
20 talked about 26,000 samples being monitored each year  
21 and collected and appraised each year? Are there  
22 groundwater monitoring schemes that are built within  
23 the site to make certain that there is nothing getting  
24 outside of the site?

25 MS. DAVIDSON: There is monitoring inside

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1 the site, but there is also monitoring that's done  
2 routinely outside the site.

3 DR. HINZE: Is that done from wells to the  
4 groundwater?

5 MS. DAVIDSON: Yes.

6 DR. HINZE: Very good. Let me -- please  
7 help me clarify the volume issue of the waste. I have  
8 read and heard anecdotally that the volume may go up  
9 in terms of the waste that comes from reprocessing and  
10 I've heard you here now that the waste by volume is  
11 only about 20 percent. In slide 44, you had the three  
12 different types of waste -- the high-level, the long-  
13 lived intermediate, and the short waste. By volume,  
14 where do we stand in each of these types of waste if  
15 we take a volume, what percentage is it in each one?

16 MS. DAVIDSON: Well, it is comparable as  
17 you can see. Between the top two you're producing  
18 almost the same amount between the compacted hulls and  
19 the high level of the glass. So it's almost  
20 equivalent between those two per metric ton that  
21 you're actually processing.

22 DR. HINZE: Okay, so those are about  
23 equal. What about the short-lived?

24 MS. DAVIDSON: By far, as far as volume  
25 and that's over a year, so that's about 17,000 metric

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1 tons, so it's a little over one maybe. So it's -- the  
2 largest one is actually going to be the short-lived.

3 DR. HINZE: So is there any way that one  
4 could look at this situation where one would get the  
5 idea that you're dealing here with a larger volume of  
6 waste than the original spent nuclear fuel that you're  
7 reprocessing? Is there any way that we could look at  
8 this, because I've read that this will lead to -- in  
9 terms of volume, not in terms of heat generation, but  
10 in terms of volume that you will lead to a greater  
11 volume of waste than is the spent nuclear fuel. Is  
12 that correct?

13 MS. DAVIDSON: I can't even imagine how  
14 you would get to that conclusion.

15 MR. BAILLY: It is possible that some  
16 people will argue that you are increasing the volume,  
17 but one important thing to note in the 2000 cubic  
18 meters per year is that it is not directly linked to  
19 the through-put you have during the year. A good part  
20 of it comes from the resins that filter the water for  
21 the cooling and will get a capacity of 16,000 metric  
22 tons of fuel La Hague. This generates quite a bit.  
23 So if someone would say that you could argue on the  
24 other side that this fuel is being cooled at our  
25 plant. If it were filtered at a reactor, there is

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1 also low-level waste that is generated there.

2 So it is not a deactor link between this  
3 low-level waste and the actual through-put to go back  
4 to the metric ton, the cubic meter per metric ton.

5 MS. DAVIDSON: Well, I guess I still am  
6 not sure how they would get to that conclusion that  
7 you're having, you're creating more waste.

8 DR. HINZE: Well, I think that you have  
9 helped clarify it for me and I do appreciate that.

10 Let me ask you the MOX fuel that is being  
11 used in the reactors in Europe, for example. You  
12 listed the number of them in each country -- Belgium,  
13 Germany, France, etcetera. What is -- is there any  
14 criteria -- are there any criteria that are used to  
15 decide who is going to use that MOX fuel? Does that  
16 have anything to do with the reactor itself?

17 MS. DAVIDSON: Well, it has something to  
18 do with the reactor, but that's not how you decide who  
19 is going to use it. That is a decision that is made  
20 within the country itself and the users themselves.

21 DR. HINZE: What is the basis of that  
22 decision?

23 MS. DAVIDSON: In some cases, in the case  
24 in Germany, it's a political decision of whether or  
25 not they want to recycle the fuel or not or whether

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1 they

2 -- where they decide they're going to go as far as  
3 nuclear, period, as part of their energy mix. So it's  
4 partly -- it's a political decision or an economic  
5 decision that a utility may make for their fuel. You  
6 know, what they're going to do with their fuel,  
7 whether they are going to recycle or not or distort.

8 DR. HINZE: In proximity to the MOX  
9 facility, the MELOX facility or anything of that  
10 nature?

11 MS. DAVIDSON: I don't think that's a  
12 consideration. They ship that fuel without any  
13 problems. So I don't think that is a major concern  
14 for them. I think it is more political. I think it  
15 is the economics that the individual utilities go  
16 through. As far as being able to modify, we've looked  
17 at this and tried to determine. In some cases, it's  
18 literally a licensing, but it's more of a paper  
19 change. In some cases, there are actual modifications  
20 to the reactor that are done to be able to burn MOX  
21 fuel and it depends on the reactor type.

22 DR. HINZE: A final question. In France,  
23 for example, what is being done with the high level  
24 waste. Is it being stored on the site or is there  
25 some intermediate storage area or you don't have a

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1 final storage facility?

2 MS. DAVIDSON: It's actually stored --

3 DR. HINZE: Do you store it on the  
4 facility?

5 MS. DAVIDSON: It's being stored at the  
6 facility. Now some of the waste sites, such as Japan,  
7 some of that high level waste has already gone back to  
8 the end user that actually shipped the fuel to begin  
9 with. So ultimately the high level waste goes back,  
10 both the compacted waste and the glass goes back to  
11 the end user.

12 DR. HINZE: Thank you very much.

13 MS. DAVIDSON: In the case of France, it's  
14 obviously just being store because you're right, there  
15 is no repository yet.

16 DR. HINZE: Right. Thank you very much.

17 VICE CHAIR CROFF: I think while we are on  
18 this slide, I have yet another question about the  
19 long-lived intermediate waste, and that is the  
20 Department of Energy is some place in the process of  
21 working on, I guess, an environmental impact statement  
22 for greater-than-Class-C-waste. Are these types of  
23 wastes from reprocessing on their screen?

24 MS. DAVIDSON: In the greater-than-Class-  
25 C?

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1 VICE CHAIR CROFF: Yes.

2 MS. DAVIDSON: I don't know the answer to  
3 that. I have not talked to them about it.

4 VICE CHAIR CROFF: Is this one type of  
5 waste that they might end up having to take in this  
6 kind of a facility in the future?

7 MS. DAVIDSON: We've had that discussion  
8 associated with Yucca Mountain about greater-than-  
9 Class-C, and in one case, like I say, we are looking  
10 at whether or not the hulls, the compacted waste would  
11 meet that classification. So that was the one  
12 conversation that we have had as far as with a  
13 question mark after it.

14 VICE CHAIR CROFF: Okay, I think the  
15 greater-than-Class-C issue is being handled by a  
16 different department over there, so it's --

17 MS. DAVIDSON: Yes.

18 VICE CHAIR CROFF: I would like to get a  
19 little bit more pointed on a couple of aspects of the  
20 chemical waste issue. First, to be a little more  
21 specific. Would you expect any waste from a  
22 reprocessing or a refabrication plant to be a mixed  
23 waste in the U.S. By mixed waste I mean contain  
24 RICRA, hazardous materials, hazardous chemicals. I'm  
25 not hearing any, but I wanted to be explicit on that

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1 point.

2 MS. DAVIDSON: Yes, I don't know the  
3 answer. But I will ask the question. Because it is  
4 not something that normally that you hear about. So  
5 I will --

6 VICE CHAIR CROFF: It's not an issue in  
7 much of the rest of the world. It's a U.S. thing.

8 MS. DAVIDSON: But I need to just go back  
9 to our waste management group though and ask them  
10 specifically to make sure that there is not that type  
11 of waste.

12 VICE CHAIR CROFF: I guess maybe I should  
13 say that you indicated that you get back, I think,  
14 probably getting the information back to John Flack  
15 over here.

16 MS. DAVIDSON: Okay, so far I have two  
17 questions. Some may have some others. I will get  
18 that to you.

19 VICE CHAIR CROFF: Second question, more  
20 on chemical safety. What's your experience been with  
21 this red oil issue? Have you had any problems with it  
22 or is it a recognized thing and you avoid it? How  
23 would you -- what's the situation?

24 MR. BAILLY: We have not had the issue.  
25 But this has been part of the -- quite a few

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1 discussions with the NRC during the MFFF licensing.  
2 This is also one of the reasons why we intend to work  
3 on -- to improve parts of the process to have it  
4 easier to license. We never have seen red oil issues.

5 VICE CHAIR CROFF: Do you think you  
6 haven't seen it because you operate your facilities in  
7 France at temperatures and conditions that doesn't  
8 produce the red oil, or maybe some of the assumptions  
9 on its production are overly conservative?

10 MR. BAILLY: I am not a specialist of  
11 that, so I cannot answer your question.

12 VICE CHAIR CROFF: Next, concerning off-  
13 gas treatment. You noted early on that the iodine  
14 was, essentially, all of it is going into the ocean  
15 which is rather different from I guess expectations in  
16 the U.S. Let me say it that way. What lead to the  
17 decision to put it in a liquid stream into the ocean  
18 as opposed to capture it into some solid and grout it  
19 or whatever?

20 MS. DAVIDSON: Some of it is captured in  
21 the glass. So there is some in the glass of that, but  
22 not all of it.

23 VICE CHAIR CROFF: By the figures in early  
24 on, it would look like very little. I think it was 99  
25 percent was going to the -- but was it just because

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1 you happened to have an ocean nearby and there is a  
2 lot of iodine in it anyway or do you have any idea  
3 what lead to that?

4 MR. BAILLY: There is a part of the iodine  
5 that goes to the stacks and there is iodine filters  
6 that we have implemented to reduce the release of  
7 iodine on the gaseous part. On the liquid part is the  
8 fact that there is an ocean not far. It is easier  
9 with the criteria.

10 VICE CHAIR CROFF: Okay, and when you were  
11 talking about -- I'm hopping all over the place here,  
12 but when you're talking about D and D you noted that  
13 you have a number of tanks that have sludges and this  
14 kind of stuff. I want to be clear on a point and that  
15 is have you neutralized any of your acidic waste as  
16 they did in the U.S.? As DOE did it in the U.S., or  
17 are these sludges not from high-level waste sludges  
18 but just other processes that happen to yield a sludge  
19 or something insoluble? Did you ever do this  
20 neutralization business?

21 MR. BAILLY: I think mostly we did not  
22 because we did vitrify on-line. We went directly to  
23 vitrification of the acidic form.

24 VICE CHAIR CROFF: But you have very  
25 little storage of high-level liquid waste.

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1 MR. BAILLY: Absolutely.

2 VICE CHAIR CROFF: Okay, sounds like a  
3 good idea.

4 In the fabrication, in your advanced  
5 development discussion, you noted that when you co-  
6 extracted you'd have both uranium and plutonium in  
7 liquid form. And then going to a fabrication process  
8 and I thought I understood you to say that fabrication  
9 process would not be the standard powder to pellet  
10 process where you were looking at some alternative to  
11 the standard powder to the pellet process. What kind  
12 of alternative might you envision there, some gel  
13 sphere kinds of things or --

14 MS. DAVIDSON: No, it's still is powder to  
15 pellet.

16 VICE CHAIR CROFF: Okay.

17 MS. DAVIDSON: It still is that. The only  
18 difference is it's the composition of the plutonium  
19 that actually goes into the powder that we're actually  
20 to making the MOX pellets. It's only a chemical  
21 difference in the material, the feed that goes into  
22 the --

23 VICE CHAIR CROFF: I see. Okay. Let's  
24 see. Got that one. I guess at this point I'd like to  
25 ask a more general question, taking off on some of

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1 Mike's discussion. You've obviously done considerable  
2 looking at the U.S. situation with respect to  
3 licensing a plant and you obviously have other stuff  
4 on-going, but I'll ask it in a very open-ended way.  
5 Where do you see the need for regulations or guidance  
6 or requirement to help you make your decisions and  
7 understand what you need to do and what you need to do  
8 and to optimize your plants?

9           You mentioned one before which is release  
10 limits. But for some reason your radionuclides don't  
11 exist in the U.S. Are there others that you've hit up  
12 against?

13           MS. DAVIDSON: Well, let me just clarify.  
14 When I say it's easier to do, I don't want to make it  
15 sound like it's easy, it's going to be easy to license  
16 this.

17           VICE CHAIR CROFF: I understand.

18           MS. DAVIDSON: Next to the politics, I  
19 think licensing is going to be one of the biggest  
20 challenge, more so than even the technical part of  
21 actually how do you design it and build one of these  
22 facilities.

23           So I think that's definitely an area that  
24 we have a lot of work to get to, to be able to license  
25 a facility like this.

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1           Effluence is one of the areas. Some of  
2           the other areas that, as I said, that we've been  
3           looking at, have to do with those waste streams and  
4           what can you do with the waste streams, how can we  
5           optimize those waste streams? So waste streams is  
6           another area making sure that we have a disposal path  
7           for them.

8           And then another area has to do with the  
9           process itself, down at the level of what solvents  
10          you're using, what may make it easier or better from  
11          a safety standpoint.

12          So those are the kind of interfaces that  
13          we're hoping we can take a lot of the lessons learned  
14          that we already have internationally and be able to  
15          see if there is a way to apply some of those lessons  
16          learned on reprocessing and take advantage of that in  
17          the United States.

18                   VICE CHAIR CROFF: Okay.

19                   MS. DAVIDSON: But I think the one that I  
20                   am most concerned about has to do with the effluence.  
21                   Is just -- is having, knowing what your limits are  
22                   that you're working towards.

23                   Because as I said, we can go from site to  
24                   site and depending where it is, it will have a  
25                   slightly different environmental impact. And we need

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1 to know what the guidelines, as far as that  
2 environmental impact and even more so, I'll say that  
3 rather than talking releases per se, talking  
4 environmental impact and what is that acceptable limit  
5 there.

6 VICE CHAIR CROFF: Well, environmental  
7 impact, you mean liquid and gas?

8 MS. DAVIDSON: Yes.

9 VICE CHAIR CROFF: Both. And in a couple  
10 of points you talked about the cladding waste and  
11 maybe trying to get it down so it's less than Class C.  
12 That seems like a difficult goal to achieve, but you  
13 mentioned the Savannah River process and I'm not  
14 familiar with it. Can you tell just a little bit  
15 about it?

16 MS. DAVIDSON: My understanding and it was  
17 part of the AFCI program, actually, when they were  
18 looking in one of the waste streams, was looking at  
19 ways that they could I'll say decontaminate, but  
20 you're not really decontaminating. You're actually  
21 removing material, but actually removing the inner  
22 walls of the cladding so that you've actually  
23 concentrate and have a much smaller amount of material  
24 that you had to actually handle as a higher activity  
25 waste. So they were looking at, essentially, and I

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1 don't know the process well, but I know it's one of  
2 the areas that they said that they've been doing  
3 research on is trying to figure out how to literally  
4 reduce that volume and remove that inner wall of the  
5 cladding which is where the contamination is.

6 VICE CHAIR CROFF: I had understood that  
7 one of the big problems with cladding was you get some  
8 pinched ends when you shear these, that trapped a  
9 little bit of fuel, and of course the acid can't get  
10 to it and that's a real problem. Is that sort of an  
11 irreducible minimum that may give you a lot of  
12 problems trying to get the list in Class C?

13 MS. DAVIDSON: I have not heard that as a  
14 limiting factor in the process of what I've seen, the  
15 pinching, as a problem, have you?

16 MR. BAILLY: No. There is some remaining  
17 -- how do you call that? There is some remaining  
18 material in small quantities that has to be counted  
19 before we take the hulls and compact them. So we do  
20 count that. But all in all, you said that we've  
21 improved the recovery of uranium and plutonium and the  
22 recovery is 99.88, so it means that .12 percent of the  
23 material goes to the waste in the vitrified waste or  
24 this waste. And most of it goes into vitrified waste.

25 VICE CHAIR CROFF: Okay.

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1 MS. DAVIDSON: I had not heard anything  
2 about the pinching. I can ask the question of the  
3 process people.

4 VICE CHAIR CROFF: I think with that, I'll  
5 move on. Staff?

6 MR. FLACK: John Flack, ACNW Staff, ACNW  
7 and M Staff. One question. I was brought up in the  
8 reactor world mostly and watched the evolution of PRA  
9 within that field and then how it was used in decision  
10 making and that sort of thing. But I had not seen the  
11 same kind of improvement in the use of those tools  
12 within the fuel cycle facilities or methods applied to  
13 fuel cycle facilities and was wondering to some extent  
14 why because in decisions you can use those insights  
15 and identify where the source of the most risk is and  
16 then showing whatever it is is acceptable in some way.  
17 And find it just even in an integrated way, provides  
18 a perspective from which to view these things.

19 Do you have a comment on the use of PRA in  
20 the field and whether or not you see that as a tool  
21 that's evolving or maybe because the source terms  
22 aren't as great reactors is why people don't care to  
23 go there? I just don't know at this point and kind of  
24 just raise it as a general kind of question, use of  
25 risk in these contexts?

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1 MS. DAVIDSON: I don't have an answer.  
2 I'm not sure how it's --

3 MR. FLACK: But there's no plans to go in  
4 that direction at this point in time or use that in  
5 interfacing with the regulatory bodies in discussions  
6 on the effects of radiological materials on people,  
7 environment and that sort of thing?

8 MS. DAVIDSON: I don't have an answer for  
9 that. I will find out for you. I don't know the  
10 answer.

11 MR. FLACK: Okay.

12 VICE CHAIR CROFF: Okay, do we still have  
13 the Center on-line? Are there any questions out  
14 there?

15 (Off the record.)

16 MR. DIAS: I have a very quick question.  
17 This is Antonio Dias, ACNW Staff, and I'm basically  
18 compounding two figures. I have slide 21 and 27. On  
19 21, you said that France began loading MOX fuel in  
20 1987 and that 40 percent of the active fleet is using  
21 MOX. However, when I go to slide 27, I see that the  
22 reprocessing of MOX is extremely small. Is it because  
23 in volume it's too small or you're just waiting? Why  
24 aren't you processing more of the MOX fuel?

25 MS. DAVIDSON: Normally, in France, the

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1 norm is that they'll go through one cycle so they just  
2 go one. Technically, you can go three to four cycles.  
3 There's some degradation after each cycle, so the norm  
4 is or the normal practice is in France that they only  
5 go through one cycle and then that used MOX is  
6 actually being stored for next generation reactors.  
7 So fast reactors.

8 So the norm is that they do it once, but  
9 they have gone back and actually done tests to show,  
10 demonstrate that they could recycle it and go through  
11 a second cycle.

12 MR. DIAS: And one other quick question.  
13 You mentioned that the drop you see there is because  
14 of the contract with Japan ended, but --

15 MS. DAVIDSON: That's a big part of it.

16 MR. DIAS: Does it mean Japan plans to  
17 have its own reprocessing plant over there and that's  
18 why they're not contracting?

19 MS. DAVIDSON: They do have one that  
20 they're going through commissioning right now.

21 MR. DIAS: Yes.

22 MS. DAVIDSON: So they have at Rokkasho-  
23 mura. They have a plant, but they're just in the  
24 start up phases right now.

25 MR. DIAS: Thank you.

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1 MS. DAVIDSON: So they went through some  
2 of it and as Alan said, we still have some of the  
3 material that's being stored that ultimately will go  
4 to Japan once they actually start up.

5 MR. DIAS: Okay, thank you.

6 VICE CHAIR CROFF: Great. Thank you very  
7 much. That was a fabulous presentation. It was  
8 really helpful to let us know what's going on over  
9 there and what can be done and some of the issues  
10 arising. So we really appreciate it and with that,  
11 back to you.

12 CHAIR RYAN: We will take a 12 minute  
13 break and start at 25 to 11 with Professor Hinze. So  
14 we'll take a very short break and come right back.

15 (Off the record.)

16 CHAIR RYAN: All right. We have  
17 Commissioner Merrifield coming at 11:30 so we will  
18 promptly wrap up at 11:25 if that is all right with  
19 you, Professor.

20 MEMBER HINZE: Fine. I hope that we will  
21 be finished before that.

22 CHAIR RYAN: Before that, okay, great. So  
23 I'll turn the microphone over to you, sir.

24 MEMBER HINZE: What you have are two  
25 items. Feel free to replace what I sent you last

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1 night with the two that Neil has handed out to you.

2 Let me ask Theron or someone here, is  
3 Bruce Marsh on the line?

4 MR. BROWN: I do not know. And neither  
5 one are here.

6 MEMBER HINZE: Bruce was given the  
7 opportunity to be on the line but we have no record.

8 The color photograph item on the first  
9 page, the first six pages of that are the Executive  
10 Summary. The Executive Summary --

11 CHAIR RYAN: Professor Hinze, excuse me.  
12 Theron, is Bruce Marsh on the line?

13 MR. BROWN: No one is on the line except  
14 for the Center.

15 CHAIR RYAN: Okay, I think we are going to  
16 try and hook -- he had a chance to dial in, I guess,  
17 but maybe he did not.

18 MEMBER HINZE: The first six pages are the  
19 Executive Summary. This is what you have seen before  
20 in all substantive matters. The item six, the copy  
21 that you received last night inadvertently eliminated  
22 the part of the sentence dealing with the  
23 probabilistic volcanic hazard assessment. And so that  
24 has been updated and is in your copy that is in your  
25 hands.

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1 CHAIR RYAN: This is on page nine?

2 MEMBER HINZE: This is on page five.

3 CHAIR RYAN: Five, sorry.

4 MEMBER HINZE: Five. The item six of the  
5 Executive Summary.

6 CHAIR RYAN: Thank you.

7 MEMBER HINZE: From seven on to the end of  
8 that handout includes the summary and conclusions.  
9 Again, there is very little, if any, change in the  
10 substantive aspects. And there is also a revised  
11 Table 7.1, which is the summary of the views on  
12 significant igneous activity topics.

13 And the second document you have is a  
14 draft of the cover letter for the report. Again, this  
15 is essentially the same with some reordering of what  
16 we visited a month ago.

17 What we have done in terms of changes from  
18 a month ago is we have done our very best to react to  
19 your comments and in addition to that, the comments of  
20 the NMSS staff. We have also added a brief segment in  
21 the text and also in the conclusions and in the draft  
22 letter regarding the possibility of phreatic eruptions  
23 associated with a volcanic event passing through the  
24 repository.

25 This is something that we neglected to

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1 include because it was such an inconsequential -- of  
2 such inconsequential significance. What we have done  
3 is included it though because of a recent novel that  
4 has been published dealing with a phreatic explosion  
5 passing through the Yucca Mountain Repository.

6 With that, Mike, that brings us pretty  
7 much up to speed with what we have. The Table 7.1,  
8 which is, I hope, useful to all the readers, has been  
9 modified only slightly to include some additional  
10 references. Also what we have done is we have taken  
11 all the topics and arranged them by virtue of the risk  
12 so that it was easier to read and easier to use.

13 With that, I believe that Ruth, Neil,  
14 Bruce Marsh, and I are ready for any questions that  
15 you might have and suggestions of how to proceed.

16 CHAIR RYAN: Allen?

17 VICE CHAIR CROFF: Are you asking for  
18 process suggestions?

19 MEMBER HINZE: Well, sure, process or  
20 substantive suggestions. Certainly the process leads  
21 to substantive. I might make a comment to you, Allen,  
22 that what we have done is added two sentences at the  
23 end of the letter, which are an attempt to present the  
24 Committee's views on how we might deal with this as we  
25 look to the future and the steps forward.

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1           And I think this was one of your concerns  
2 was that we have something like this. And what we've  
3 done is written two sentences here, one that looks  
4 forward to the staff considering the alternate views  
5 that are presented in this report and evaluating them  
6 in terms of risk.

7           The second is that we are interested in  
8 following up on the staff's continued development of  
9 information on the subject of igneous activity,  
10 including those items that we have isolated in the  
11 summary and conclusions of this report.

12           VICE CHAIR CROFF: I'll ponder those for  
13 a little bit --

14           MEMBER HINZE: Sure.

15           VICE CHAIR CROFF: -- if I can. I had --  
16 I don't know whether this is substance or not. This  
17 goes to -- this is in the letter item nine, on the way  
18 up I tried to digest the comments that I guess you  
19 received some written comments. Neil sent out a  
20 package.

21           And there was a -- the fellow from the  
22 Smithsonian, is it Melson --

23           MEMBER HINZE: Bill Melson, yes.

24           VICE CHAIR CROFF: -- had a number of  
25 interesting comments that, if I understood it

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1 correctly, he seemed to be advocating the view that  
2 the magma -- this is in the intrusive scenario -- that  
3 the magma would go some significant distance down a  
4 drift. And mentioning experience or observations at  
5 Mount Etna, I think, if I recall the comment  
6 correctly.

7 I don't know how to ask this question  
8 exactly but do we believe what we've developed in this  
9 magma physics business and quenching sufficiently to  
10 say what we are saying in the second half of item  
11 nine?

12 MEMBER HINZE: Well, this is certainly a  
13 viable alternative view. And that is what we are  
14 saying. And if we, on the basis of the magma physics,  
15 it is unlikely to form at any time in the style of  
16 vulcanism expected at Yucca Mountain either in the  
17 early stage or in a subsequent stage of the igneous  
18 eruption.

19 VICE CHAIR CROFF: So you don't entirely  
20 agree with what Melson is saying? Or his example  
21 doesn't apply here? I'm --

22 MEMBER HINZE: I don't think his example  
23 applies here.

24 VICE CHAIR CROFF: So Etna lava is  
25 different than this lava?

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1                   MEMBER HINZE: Right. Well, it is indeed.  
2                   But the manner of that discussion or the manner of  
3                   that intrusion is different than what we are dealing  
4                   with here.

5                   VICE CHAIR CROFF: Okay. Okay. So --

6                   MEMBER HINZE: You know I really think  
7                   that that has been covered. I hope it has. We've  
8                   done everything we could to cover that.

9                   CHAIR RYAN: Bill, what -- I'm sorry.

10                  VICE CHAIR CROFF: Go ahead.

11                  CHAIR RYAN: Okay. One of things I was  
12                  thinking about in the letter is are we prepared to  
13                  make a comment on the state of the staff's  
14                  preparedness to review an application with regard to  
15                  these issues? I think, you know, that could be a fair  
16                  question from the Commission. Well, you reviewed the  
17                  state of knowledge, the differing views, and all that.  
18                  And I guess I'll throw out an idea here.

19                  My thought is is it seems reasonable to me  
20                  to say something that while there are a range of views  
21                  on technical points and issues, the Commission may  
22                  look to us to say well, do you feel the staff is, you  
23                  know, through this exercise and through their own work  
24                  over many years, prepared to review thoroughly this  
25                  topic, you know, in an LA?

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1                   MEMBER HINZE: Mike, we have thought about  
2 that question. And it is a very appropriate question.

3                   First of all, I would say that our writing  
4 of this white paper and the preparation really has not  
5 been focused upon that question. However, I think  
6 this is really dealt with in the first sentence of the  
7 last paragraph.

8                   CHAIR RYAN: Okay.

9                   MEMBER HINZE: And in a way in that there  
10 are some alternative views, Mike, that are presented  
11 in this report that we believe that the NRC staff  
12 should thoroughly investigate or investigate all the  
13 credible views. And consider their impact upon risk.

14                   That really follows from the presentation  
15 that Tim McCartin made at the working group meeting if  
16 you recall.

17                   CHAIR RYAN: I do recall, yes.

18                   MEMBER HINZE: And I think that was a very  
19 appropriate comment and it has really led to that  
20 sentence.

21                   CHAIR RYAN: I guess it would be, I think,  
22 helpful to the Commission, and I appreciate that. The  
23 minute I read that, I thought of Tim McCartin's  
24 presentation and a further dialogue. But it might be  
25 helpful to the Commissioners, who really don't have

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1 the benefit of that ongoing dialogue, to get a little  
2 bit more explicit sentence or two in that.

3 MEMBER HINZE: Well, I think that, you  
4 know, if you wish to change that sentence, fine. But  
5 I think that -- I frankly would be unwilling to write  
6 an observation that I believe the staff is ready to --

7 CHAIR RYAN: Maybe I picked my words  
8 incorrectly. I think the staff has certainly  
9 participated with us in the ongoing dialogue on all of  
10 this. And I think we just need to explicitly  
11 recognize that a little bit more.

12 MEMBER HINZE: Okay.

13 CHAIR RYAN: Something like that. I just  
14 -- and we don't have to wordsmith it now. Maybe we  
15 can think about it and come back to it.

16 But I'm trying to get across to the  
17 Commission that the staff has actively participated  
18 with us along the way here in this exercise of  
19 exploring the range of views. You know they certainly  
20 have interacted on our document. They have interacted  
21 with us in many meetings. And I think it is helpful  
22 to at least identify that has happened in a little bit  
23 more explicit was for the Commission's benefit.

24 MEMBER HINZE: Yes, I understand what you  
25 are saying.

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1 CHAIR RYAN: Okay.

2 MEMBER HINZE: The fact of the matter is,  
3 if I might suggest, I think that we might be able to  
4 find a place right in the first paragraph of the  
5 letter, which would make it clear that we have had  
6 this continuing candid dialogue and conversation with  
7 the staff in preparing this document.

8 CHAIR RYAN: I think that is helpful.

9 MEMBER HINZE: And that could right in the  
10 first paragraph and, I think, meet your concerns.

11 CHAIR RYAN: So I'll just leave it maybe  
12 to you to maybe just make that a little bit more  
13 explicit for the Commission's benefit.

14 MEMBER CLARKE: I just want to reinforce  
15 that, Mike. I think that was a good place to put it,  
16 right up front.

17 VICE CHAIR CROFF: Mike, I've got --  
18 having a couple moments to think here, regarding the  
19 last sentence in the letter, I'm thinking about this  
20 last sentence in terms of Committee priorities, I mean  
21 what we have coming at us and this kind of thing.

22 And I guess after having gone through this  
23 whole igneous activity thing and read it, what it  
24 seems to come down to is -- and this is based, I  
25 guess, primarily on the staff's analysis -- at a

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1 relatively high probability, ten to the minus seven.

2           And using what I think this Committee, my  
3 sense of the Committee is using fairly conservative  
4 assumptions and concerning magma viscosity, for  
5 example, and some of the resuspension and other stuff  
6 we have gone through, when they do that and they turn  
7 the crank on it, they still end up with a dose that is  
8 quite low compared to the limit. The limit, I think,  
9 is 15 millirem. And I remember dose is like .03  
10 millirem per year or something like that.

11           And so I'm sort of asking myself if we  
12 have got a relatively high probability within the  
13 established range, you know it is toward the upper end  
14 of it, and all these conservatisms and it is still  
15 that low, you know, how much more do we need to do  
16 here?

17           MEMBER HINZE: Well, I think those two  
18 sentences really capture a thought that we have had  
19 almost from the beginning here. And that is that  
20 there are these differing views but we don't know the  
21 significance of them to risk.

22           And we've stated several times in our  
23 presentations to the Committee that we felt that these  
24 differing views should be looked at from the  
25 standpoint of risk. And if they have no impact upon

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1 risk, then the differing view, in my view, are  
2 inconsequential.

3 VICE CHAIR CROFF: Well, I'm getting --

4 CHAIR RYAN: Let me try and help here. I  
5 think there is an important thing that is not in these  
6 two sentences, Bill.

7 And that is that Tim McCartin, if I heard  
8 him right, at the working group agreed he was going to  
9 explore, in particular, the table, you know, form of  
10 key issues and advise us on his insights as to what it  
11 means in terms of a dose calculation or a risk  
12 assessment.

13 And I think we need to be a little bit  
14 more explicit to say we understand the staff is going  
15 to come back and address, you know, the range of views  
16 and the various topics with regard to risk  
17 significance in the report.

18 MEMBER HINZE: Well, you know, let's read  
19 that sentence out. The Committee looks forward to a  
20 timely interaction with the NRC staff on the  
21 consideration of alternative views on igneous activity  
22 identified in the attached report and their evaluation  
23 of the importance of these views to risk from the  
24 proposed repository.

25 CHAIR RYAN: I wouldn't say the Committee

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1 looks forward. I'd say the Committee understands the  
2 staff is prepared to, that is a little bit more  
3 definitive.

4 MEMBER HINZE: Okay. You know I was  
5 trying to give some wiggle room here. And what you  
6 are trying to do is remove that. And that is great.

7 CHAIR RYAN: You know, I mean somebody  
8 correct me if I'm wrong, but that is not going to  
9 happen. But I think I heard Tim indicate he is  
10 willing to do that.

11 MEMBER HINZE: Well, I think that --

12 CHAIR RYAN: Oh, there's Tim. I looked  
13 for the white face.

14 MR. McCARTIN: You are correct that I  
15 committed to that.

16 CHAIR RYAN: Are you still good with it?

17 MR. McCARTIN: We're still good with it.

18 CHAIR RYAN: Okay. And, you know, I'm not  
19 saying, you know, you need to cover these five things  
20 or these ten things. But an exploration of that is,  
21 I think, very helpful for the Commission to understand  
22 where we are going to now take this stuff and think  
23 about it in terms of a risk perspective. And  
24 hopefully, you know, move from there. And if Tim is  
25 willing --

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1 MEMBER HINZE: Let me make this -- excuse  
2 me -- let me make a suggestion. Instead of saying  
3 looks forward, anticipates timely interaction.

4 CHAIR RYAN: I would even make it more  
5 explicit. The staff -- I mean the Committee  
6 understands that the staff plans to --

7 MEMBER HINZE: Okay, that's fine.

8 CHAIR RYAN: -- consider the alternate  
9 views on igneous activity in the attached report. And  
10 their evaluation of the importance -- you know and  
11 provide their risk insights relative to repository  
12 performance.

13 MEMBER HINZE: Well, what I have just  
14 heard from Tim is different than what I heard from Tim  
15 in his presentation.

16 CHAIR RYAN: Well, we'll let him amend his  
17 earlier comments.

18 MEMBER HINZE: Right. Because I thought  
19 that Tim was going back to his group and his  
20 management to look at this. And it wasn't clear to me  
21 that this was a fait accompli. But I understand from  
22 what Tim has just said that it is.

23 MR. McCARTIN: Yes, I am not aware of an  
24 issue that it shouldn't be done that I am aware of.  
25 There always is the competing resources and what is

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1 going on with the Commission that sometimes effects my  
2 schedule.

3 But we are certainly expecting to do what  
4 we would consider to be timely analyses with the newer  
5 version of the code that allows us, when it is  
6 complete and it is close, that allows us to look at a  
7 lot of different issues.

8 CHAIR RYAN: And I think the idea that you  
9 put forward and you have kind of confirmed today that  
10 we could explore the range of views on some of these  
11 topics related to igneous and hear your insights, man,  
12 that kind of puts it where it needs to be.

13 MR. McCARTIN: Yes, and I think when I --  
14 and I haven't perused the table in any detail, but the  
15 idea of your table, I think, lends itself to looking  
16 at particular things and trying to put some numbers  
17 with that.

18 CHAIR RYAN: And I'm not saying you have  
19 got to look at every single one.

20 MR. McCARTIN: Right, right.

21 CHAIR RYAN: We are not trying to nail it  
22 down to that level of detail. But I think the idea  
23 that we can tell the Commission that there are plans  
24 for an ongoing dialogue on the risk significance of  
25 the range of views is a very important step.

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1 MR. McCARTIN: Yes, absolutely, yes, yes.

2 MEMBER HINZE: And, you know, I think  
3 there is no question that this is an excellent  
4 modification.

5 CHAIR RYAN: And we've kind of got, you  
6 know, agreement here.

7 MEMBER HINZE: Right.

8 CHAIR RYAN: So let's make it explicit in  
9 that regard. And we'll move forward. Okay. Thanks.  
10 I think that helps a lot.

11 MEMBER HINZE: Yes, that helps.

12 VICE CHAIR CROFF: Well, I am still a  
13 little concerned about the second sentence. You have  
14 been working on the first one.

15 CHAIR RYAN: Okay. I'm done.

16 VICE CHAIR CROFF: Well, my concern on the  
17 second one is I think we are sort of presupposing the  
18 results of the analysis you have just finished  
19 discussing. In other words, my reading of everything  
20 I've seen is that there is enough conservatisms in the  
21 existing analysis.

22 And it is far enough below the limit, that  
23 it would be fairly incredible for these alternative  
24 models to get the factor of, you know, 100 to 1,000  
25 increase that would bring it up in the range of, you

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1 know, approaching this limit.

2 MR. McCARTIN: Yes, one thing you talked  
3 about .03 millirem. I'm not --

4 VICE CHAIR CROFF: Is my memory bad there?

5 MR. McCARTIN: I'm -- well, I mean mine  
6 may be also. I thought the numbers were closer to  
7 around one millirem.

8 VICE CHAIR CROFF: Well, I'm remembering  
9 some curve in the white paper that I don't have before  
10 me.

11 MR. McCARTIN: Okay.

12 VICE CHAIR CROFF: So I'm --

13 MR. McCARTIN: Okay, yes.

14 MEMBER HINZE: I think what Allen is  
15 remembering is the increase of scenarios.

16 MR. McCARTIN: Oh, okay. Sure. Sure.

17 CHAIR RYAN: Again, if we made it more  
18 explicit, I think we are okay. In addition, the  
19 Committee will follow the staff's continued  
20 development of information on the analyses related to  
21 igneous activity at the proposed repository.

22 VICE CHAIR CROFF: I think I would like to  
23 hear the results of Tim's analysis before we commit to  
24 that. If it is not of risk significance, why would we  
25 follow it?

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1 CHAIR RYAN: Well, you know, you could say  
2 it that way, too, you know. If we are satisfied the  
3 risk significance questions have been answered, we'll  
4 declare victory here.

5 VICE CHAIR CROFF: Or rewrite the sentence  
6 something like, you know, in addition, the Committee  
7 will follow and risk significant things that come out  
8 of the thing in the preceding sentence.

9 MEMBER HINZE: Yes, that's good. Yes.

10 CHAIR RYAN: Could you work with Bill and  
11 maybe --

12 VICE CHAIR CROFF: Sure.

13 MEMBER HINZE: It's very simple to put in  
14 risk significant. And I don't see how anyone can  
15 disagree with that.

16 CHAIR RYAN: Well, that's good.

17 VICE CHAIR CROFF: Okay.

18 CHAIR RYAN: Good point.

19 VICE CHAIR CROFF: So now what are we  
20 doing process-wise?

21 CHAIR RYAN: Well, I think we've read the  
22 letter out and I think we are at the point where with  
23 those couple of corrections, are we done?

24 MEMBER WEINER: Do you want me to read  
25 what I -- you may not be able to read my --

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1 CHAIR RYAN: Because we don't have it on  
2 the screen to work on.

3 MEMBER WEINER: Okay.

4 MEMBER HINZE: Ruth has suggested adding  
5 at the end of the first paragraph, the NRC staff has  
6 participated in ongoing dialogue with the ACNWM  
7 regarding the alternate views on igneous activity  
8 presented in this report.

9 CHAIR RYAN: And I, quite frankly, think  
10 you ought to say and is appreciated by the Committee.  
11 They put in a lot of work and a lot of time and we  
12 ought to recognize that in a positive way.

13 MEMBER HINZE: Okay, okay. And we will  
14 get appreciated -- fine, we'll put that in.

15 CHAIR RYAN: Okay.

16 VICE CHAIR CROFF: What are we doing now?  
17 Voting?

18 MEMBER HINZE: I hope so.

19 CHAIR RYAN: Yes. We are. We are voting  
20 the report and the letter out. These are the  
21 corrections. All in favor, aye. We're done. Subject  
22 to the usual technical editing comment.

23 MEMBER HINZE: And flexible editing on the  
24 report, which is still going on.

25 CHAIR RYAN: Wordsmithing just like

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1 grammar and punctuation.

2 MEMBER HINZE: Right, right, that's all.  
3 That is all that we are worried about, you know. High  
4 level is hyphenated in one place and not the other, et  
5 cetera. This is trivialities.

6 I want to thank the Committee and most of  
7 all I want to thank Neil and Bruce Marsh and Ruth for  
8 being so focused on this project. And all of their  
9 great work. It has really been wonderful working with  
10 them. And I appreciate it.

11 CHAIR RYAN: Well, Bill, we all owe you a  
12 debt for, you know, taking this up and bringing it  
13 forward. And I think everybody -- I want to thank the  
14 staff personally for their ongoing involvement, the  
15 folks at the Center, I don't know if we have them on  
16 the phone or not but there are a lot of those folks  
17 that have participated.

18 And we have wrestled with lots of  
19 questions. Professor Marsh and others have  
20 participated. We have had numerous working groups  
21 over years now dealing with all the various parts and  
22 pieces.

23 And I hope we have been true to our  
24 mission here of trying to accurately and fairly  
25 explore the range of views and give the Commission

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1 things to think about. And staff as well. And us as  
2 well.

3 So I just want to offer my thanks to  
4 everybody who participated. So I appreciate it.

5 VICE CHAIR CROFF: A lot of work.

6 CHAIR RYAN: And you, in particular, Bill,  
7 you have put in an awful lot of time and effort. And  
8 we really appreciate your efforts quite a lot. So  
9 thanks.

10 With that, I don't know that we have  
11 anything else at this juncture. We are going to meet  
12 -- I'm going to ask the Committee not to wander off  
13 too far. And be here no later than say 11:15 or so  
14 because Commissioner Merrifield will be here. And I  
15 hope we will have other folks that want to hear his  
16 comments. And we will see him shortly.

17 So let's take a pause in the record and we  
18 will break until 11:15.

19 MEMBER HINZE: We'll go and massage this  
20 letter with those suggestions.

21 CHAIR RYAN: Thank you.

22 (Whereupon, the foregoing  
23 matter went off the record at  
24 11:01 a.m. and went back on the  
25 record at 11:29 a.m.)

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1 CHAIR RYAN: We'll go ahead and start the  
2 record please.

3 It is my pleasure to welcome to the  
4 Committee Commissioner Jeffrey Merrifield who is going  
5 to share with us his views of things past and perhaps  
6 views of things ahead. And we appreciate his advice  
7 and counsel and insights.

8 Commission Merrifield, let me turn the  
9 microphone over to you.

10 COMMISSIONER MERRIFIELD: Mr. Chairman, I  
11 appreciate the kind invitation to come in and sit with  
12 you for a few minutes in the final opportunity I will  
13 have to do so as a member of the Commission.

14 As I was preparing to sit down today, I  
15 was thinking back on where we have come in the years  
16 that we have been working on these issues. In the  
17 spring of 1998, I was still a staffer up in the Senate  
18 Environment and Public Works Committee. And we were  
19 looking forward to an application to be coming down  
20 the road from the Department of Energy for Yucca  
21 Mountain.

22 And here we sit almost nine years later.  
23 And that application remains to be seen although the  
24 promise is that we all will see it in June of 2008.  
25 But the proof will be in the actual receipt of the

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1 application.

2 At that point, we were engaging, as an  
3 agency, with the notion of having to decommission a  
4 number of the reactors that we had under operations.  
5 It had not been very long before we had had -- in that  
6 time period, we had had Maine Yankee, we had had  
7 Rancho Seco, we had Zion, and a variety of other  
8 reactors that had shut down.

9 And I remember quite distinctly coming on  
10 board as a Commissioner in 1998 our real focus at that  
11 point was how many reactors of the current fleet would  
12 also shut down? And what would that mean for those  
13 folks in the agency, in NMSS, who were responsible for  
14 decommissioning? What kind of work load would that  
15 engender for them?

16 We had very little notion at that point  
17 that we would have new reactors although we were  
18 continuing on our efforts to work on design  
19 certifications, on early site permits, and things of  
20 that nature. But I think very few people at that  
21 point had any realistic expectation that within any  
22 reasonable period of time we would see new reactor  
23 orders.

24 Well, as is quite obvious, you know, some  
25 things haven't changed. We are still looking forward

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1 to a Yucca Mountain application. But in terms of  
2 decommissioning activities, we obviously do not expect  
3 any new reactors, any of the current fleet of reactors  
4 I should say, to decommission any time soon.

5 Forty-eight of the 104 operating reactors  
6 have received license renewals. I fully expect that  
7 virtually all of the remaining reactors will at least  
8 apply for license extension. Whether they will  
9 granted is an open question but certainly they will  
10 apply for license extension.

11 And the economic and technical and safety  
12 issues that were involved with the shut down of plants  
13 like Maine Yankee and Rancho Seco and Zion and others  
14 do not present themselves today in nearly the way that  
15 they did back in that nine or ten year time frame that  
16 we looked back previously.

17 One of the challenges when I met early on  
18 with this body was urging this group to get more  
19 involved in the issue of decommissioning. And I  
20 credit the members and some of your predecessors for  
21 having actively engaged in that effort.

22 I think the work that we, as an agency,  
23 have conducted and the work that has been accomplished  
24 by our licensees in the decommissioning activities of  
25 the previously shut down reactors has been

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1       extraordinarily good.

2                       While there were issues early on with the  
3       management of some contracts and some money issues and  
4       some technical issues, I think today the degree to  
5       which many of those reactors have completed  
6       decommissioning and now are greenfield sites, ala  
7       places like Big Rock Point, I think is a real  
8       testament to the ability of this agency to oversee  
9       those decommissioning activities, for those activities  
10      to be undertaken by our licensees.

11                      And I think it is also a testament to the  
12      fact that this group has focused on attempting to  
13      identify where there are areas where improvements  
14      could be made. And where there are lessons learned  
15      that we could document in a way that would allow  
16      future reactor decommissionings, albeit perhaps 20-  
17      plus years down the line, to take advantage of those  
18      activities to do so in a way that would be smooth and  
19      reflective of dollars and people's time and effort.

20                      I am very proud of what our agency, I  
21      think, has shown by that activity in demonstrating  
22      that we can close the cycle. When you look back when  
23      many of these reactors were built, particularly some  
24      of the oldest of the reactors, Yankee Row and Big Rock  
25      Point and even the Saxton unit that was recently

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1 completed a year or two ago, there wasn't a lot of  
2 thought given to what would ultimately happen to those  
3 reactor sites when the reactors shut down.

4           There was a lot of effort to get the  
5 reactors built but there wasn't a lot of attention to  
6 what was going to happen with the back end of the  
7 cycle. And I think that the work that we have done  
8 and accomplished helps to resolve those concerns.

9           So as we are entering a time period during  
10 which communities are now talking about hosting new  
11 reactor facilities, I think one of the issues that we  
12 can certainly take off the table is can you resolve  
13 these issues at the back end of the cycle?

14           I think that part of it, in terms of  
15 cleaning up those sites and bringing them back in a  
16 viable economic reuse has been demonstrated by the  
17 work that has been accomplished at Big Rock Point and  
18 Maine Yankee and others down the line.

19           Looking forward for our agency, obviously  
20 the issue of new reactors is going to be an  
21 extraordinary one and a significant amount of work  
22 going forward. And I think over the course of the  
23 last year the efforts that the Commission has  
24 undertaken to identify a new format for the agency,  
25 i.e., an Office of New Reactors, the efforts that we

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1 have undertaken to obtain new office space, and the  
2 efforts we have ongoing to ratchet up the number of  
3 staff that we have to manage these programs I think  
4 has really been a very consuming effort on the part of  
5 the Commission.

6 What is important, however, and I think  
7 some forget and certainly you all, I know, do not is  
8 it isn't as if there is one data point. We are just  
9 going to build a bunch of new reactors and everything  
10 else stays the same. The fact is in a rising tide,  
11 all of the boats are raised.

12 And so going forward, I think for this  
13 group, we will see a significant number of activities  
14 throughout the fuel cycle arena that will be certainly  
15 needing the attention of this Committee to make sure  
16 that the Commission has the advice and counsel it  
17 needs to make the decisions it has going down the  
18 line.

19 One need look no further that the  
20 extraordinary increase in the number of prospecting  
21 claims that are being made at mining sites in the  
22 western United States.

23 The significant activity in the mining  
24 arena, including transactions and sales of formerly  
25 operated mills, formerly operated mines to demonstrate

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1 that the increasing utilization of nuclear power and  
2 the trigger that that has had on the price of uranium  
3 prices has had a further trigger on the great interest  
4 in re-engaging in prospecting, mining, and milling  
5 uranium product in the United States.

6 And that will mean, it seems to me, a  
7 significant amount of activity that this group will  
8 have to engage on relative to both in situ leach  
9 mining, the limited aspects of conventional mining  
10 that we touch on, and clearly issues associated with  
11 milling operations facilities going down the road.

12 Likewise, while we have had some  
13 activities already that you have been engaged upon,  
14 centrifuge facilities, for example, the agency has, I  
15 think we will see increasing interest in that arena as  
16 well.

17 Now only does that incorporate the issues  
18 associated with Urenco, which has the LES facility,  
19 and US Enrichment Corporation, which has a facility  
20 it is proposing to build in Portsmouth, Ohio, but I  
21 think the news of Areva's interest in perhaps getting  
22 into the field of enrichment in the United States, and  
23 clearly GE's more recent announcement that it wants to  
24 seek laser enrichment of isotopes clearly means that  
25 that part of the arena will be busy as well.

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1           One item I missed but I think probably  
2 shouldn't have is the issue of conversion. We, as a  
3 country, rely, for the most part, on the facilities in  
4 Metropolis in Illinois to convert yellow cake into a  
5 gas that can be utilized in enrichment. That facility  
6 is limited in terms of the throughput it can provide.

7           Similar limitations occur at the Port Hope  
8 facility of Cameco in Canada and the facilities that  
9 are in Europe, although there is greater capacity,  
10 perhaps, in Russia. But that, too, may be an area  
11 where increased interest either by existing licensees  
12 or additional licensees of getting into the conversion  
13 business could certainly touch on the work this Board  
14 may need to be involved with.

15           New fuel production, we went through a  
16 period of time over the course of the last 15 years  
17 where we were reducing the number of entities involved  
18 in the U.S. marketplace that were producing fuel.  
19 Today, we have really remaining Areva, Westinghouse,  
20 GE, and, to a different extent, BWXT and NFS Erwin.

21           It is certainly plausible that those  
22 entities, sensing the new scope of reactors that may  
23 be out there, may seek to increase the scope of  
24 operations that they have. And alternatively, I  
25 believe that there are other parties which are

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1 currently not part of the U.S. mix that may likewise  
2 seek to enter the U.S. market for the creation of new  
3 facilities for the production of fuel.

4 So, again, I think an area where this body  
5 could certainly have some attention on and an  
6 increased focus.

7 GNEP, that is going to be, I think, a real  
8 challenge for our agency. The notion of reprocessing  
9 is obviously not new to this country. We invented  
10 reprocessing in the United States after all. It is  
11 just that we haven't done very much of it here for a  
12 long period of time.

13 I think our staff will be challenged to  
14 create a new regime to oversee that. Obviously the  
15 work we have done previously is replicable but in the  
16 changes in technology the DOE is talking about, with  
17 some of the potential activities for reprocessing,  
18 will obviously provide some additional burden for our  
19 staff in terms of preparing for that and ultimately  
20 that lapses over into the work that you all will be  
21 overseeing on behalf of the Commission.

22 Sitting aside of that, the back end of the  
23 cycle, which doesn't fall as much on you all but  
24 obviously for the purposes of our reactor folks,  
25 advanced burnup reactors could be a significant

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1 challenge for the agency as a whole. But obviously  
2 that would, in turn, have fuel cycle facilities  
3 associated with that. So we will see where all that  
4 goes.

5 My personal view is, I think, GNEP is a  
6 longer-term project. I think there are many other  
7 items you are going to have in a more immediate sense  
8 to be challenged with.

9 Waste cycle issues, obviously the biggest  
10 issue on your plate is going to be issues associated  
11 with Yucca Mountain. But, as you have been involved  
12 and will continue to be involved in issues associated  
13 with low-level waste, given changes undertaken by the  
14 State of South Carolina, given the uncertain  
15 marketplace in other states, I think there are a lot  
16 of questions about where will we put waste material  
17 over the course of the next ten years.

18 Clearly, utilities have been more involved  
19 lately with construction of facilities in anticipation  
20 of perhaps having to store some of the larger  
21 components on site. I think as a Commission, my  
22 fellow Commissioners going forward are going to have  
23 to grapple with some of their own opinions in  
24 interactions that they will be having with Congress  
25 about what are the views of the agency about how we,

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1 as a country, can deal with low-level waste.

2 My own personal viewpoint is that the Low-  
3 Level Waste Policy Act has probably been one of the  
4 least successful legislative enactments ever made by  
5 the United States Congress. And it has been  
6 incredibly wasteful of people's time and people's  
7 money. But nonetheless, there needs to be resolution.  
8 There needs to be some greater attention to how do we  
9 deal with that part of the cycle.

10 And I think Congress will be expecting the  
11 Commission to have an opinion on that. I think the  
12 Commission should have some opinions on that. And I  
13 think that those opinions will clearly need to be  
14 formed by the guidance that you all provide in your  
15 capacity on this group in giving the Commission some  
16 good ideas.

17 The final one I would touch on, and this  
18 is of lesser significance, but nonetheless I think is  
19 one that will engender activities on the part of this  
20 group is the issue of NARM materials. We have been  
21 given additional responsibility in the regulation of  
22 NARM for the purposes of commercial research in  
23 medical purposes.

24 And our staff is engaged with the states  
25 right now to put some degree of understanding about

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1 who has what responsibilities and how will we work  
2 forward on this. But I think this body again will  
3 have to work with our staff and advise the Commission  
4 in terms of making sure that having been given this  
5 responsibility by Congress, that we can safely,  
6 securely, and appropriately mandate those uses and  
7 oversee those uses going down the road.

8 And so, as I said, I think the guidance of  
9 this group will be important in helping the Commission  
10 grapple with those areas.

11 That, on a high range, was among the  
12 issues that I wanted to chat with you and sort of open  
13 it up. As I did previously and I think in the  
14 discussions that I have had with the Chairman, I'm  
15 certainly open to engaging in some areas that you all  
16 would like to talk about. And since this will  
17 probably be the last opportunity, at least as a member  
18 of the Commission, we will be able to engage in this  
19 way, I certainly want to open it up for areas of  
20 dialogue that you would like to get into.

21 With that, I turn it back to you, Mr.  
22 Chairman.

23 CHAIR RYAN: Thank you, Commissioner, I  
24 appreciate your introductory remarks and look forward  
25 to the dialogue as well.

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1           Let me start by saying I think there is an  
2 interesting theme that is emerging to us on several of  
3 the topical areas. We find that if you think about  
4 reprocessing, the classification of wastes, and the  
5 waste acceptance criteria at one facility or another,  
6 drive how you ultimately process waste.

7           When you look at a disposal setting,  
8 obviously the waste acceptance criteria granted under  
9 the license dictate how customers prepare waste,  
10 package waste it, ship it, what mode, what method, and  
11 all of that.

12           When you decommission, very often you are  
13 thinking about what do we leave behind. And that is  
14 one aspect of, particularly environmental and public  
15 health and safety protection, but then how I manage  
16 what I'm taking out also is driven by waste acceptance  
17 criteria. And as we think about GNEP, we also  
18 recognize that in the world, every other country that  
19 does reprocessing has intermediate waste.

20           So it kind of raises the interesting  
21 thought: can you use our structure of high-level waste  
22 and low-level waste and then a variety of clauses that  
23 allow you to look at alternatives within that scheme?  
24 Or do you ever see that evolving into a scheme where  
25 we need an intermediate category or something

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1 different? We've bumped up on that a few times.

2 COMMISSIONER MERRIFIELD: Well, I think --  
3 you raise a variety of different issues there. And  
4 let me touch on some of them.

5 In a more immediate matter, as it relates  
6 to reactors, for example, the resolution of what is  
7 going to happen at Barnwell will seemingly quite  
8 critical. And the time period on that -- I don't know  
9 the exact date but obviously it is coming up soon.

10 CHAIR RYAN: June `08.

11 COMMISSIONER MERRIFIELD: June `08, one of  
12 the things that the Commission has in front of it  
13 right now -- I shouldn't say right now -- one of the  
14 things the staff is wrestling with now and it will  
15 come to the Commission is can we allow utilities to  
16 tap into the trust funds that are being saved for  
17 decommissioning for the purposes of removing large  
18 components from the site and getting those to a final  
19 resting place sooner rather than later.

20 The current practice right now is if you  
21 have, you know, at many sites if you have got a steam  
22 generator or you have got a vessel head, at some  
23 facilities those are being stored on site in a sort of  
24 limited -- I don't want to use the word repository  
25 because that has a different connotation to it -- but

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1 they are being placed in long-term storage.

2 And as things currently stand, we are not  
3 allowing the decommissioning funds to be used to pay  
4 for those materials to finally end up, whether it was  
5 Barnwell or someplace else.

6 My personal viewpoint is that that is not  
7 very well advised on our part. And I think it is  
8 possible to come up with the categorization of  
9 components for which it logically makes sense to get  
10 those offsite and in a final resting place sooner  
11 rather than later. And to allow the trust fund of the  
12 decommissioning trust funds to be utilized for that  
13 very same purpose.

14 I think that is clearly possible within  
15 our mandate. And something I think, frankly, we ought  
16 to do. Those issues are -- principally right now, I  
17 think the debate is more focused on the folks in NRR.  
18 But I think it would be helpful if this body had an  
19 opinion on that matter, for that opinion to be thrown  
20 into the mix.

21 I don't -- I fail to grasp the  
22 understanding of why it makes sense to build special  
23 facilities on site to hold large components for a 20-  
24 to 40-year time period before ultimate decommissioning  
25 takes place so everything can happen all at once.

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1           Vice if you can have a more clean site and  
2 get those materials to the final resting place, why  
3 shouldn't you be able to tap into the trust fund since  
4 pay me now, pay me later, you are still going to use  
5 the same money to accomplish the same goal.

6           But getting to the rest of your question,  
7 you know, do we need to think about a different  
8 framework other than spent fuel and low-level waste to  
9 grapple with some of these issues, I think that is a  
10 fair question. One of the things that folks asked me  
11 about was related to well, what happens in June 2008  
12 if we do not receive an application from DOE?

13           If that were to happen, the viewpoint that  
14 I have articulated in public is I think we really need  
15 to sort of start from scratch and really make a  
16 decision about whether we are going down the right  
17 road.

18           Now my personal viewpoint is I think as a  
19 country we would have been better off if we had gone  
20 the route of our Finnish and Swedish counterparts and  
21 allowed for the creation of a quasi-public entity that  
22 would have the responsibility for dealing with high-  
23 level waste and, presumably, lower activity waste.

24           That model, I think, is working for Sweden  
25 and Finland. And I think they are on the trajectory

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1 for identifying and being able to open a repository in  
2 a reasonable period of time. Those entities have a  
3 clear mandate.

4 And I think they receive some greater  
5 degree of insulation from the political process that  
6 we are currently engaged with given the framework that  
7 our nation has chosen giving this responsibility to  
8 DOE.

9 Those kinds of decisions, those kinds of  
10 questions, I think, need to get resolved, you know, if  
11 we don't get the application. If we don't get the  
12 application, I think we really need to go back to some  
13 baseline questions, how do we do this.

14 And I think at that very same time, I  
15 think it would be worthy to say okay, if we have to  
16 start afresh with a new approach to try to identify a  
17 high-level waste repository, maybe we ought to take  
18 that as an opportunity to really conduct a top to  
19 bottom review of how we dispose of waste in this  
20 country. And if there is a way that we can create a  
21 more logical framework than what we are grappling with  
22 today.

23 I'm hesitant to do a big top to bottom  
24 review in the absence of demonstration that the system  
25 is completely broken. You know right now I think DOE,

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1 from what I can tell, is on a trajectory to give us an  
2 application. And I think in fairness to the  
3 Department and the participants, I think we need to  
4 let that process work its way out.

5 But I think we do get closer and closer on  
6 many of these issues to the point where we really need  
7 to go back to some baseline principles and really ask  
8 the question have we created the most logical  
9 framework we can. And I think the heart of your  
10 question goes to that. And I think it is worthy of  
11 asking.

12 CHAIR RYAN: Well, that is encouraging  
13 because I think our current action plan and hopefully  
14 our future action plans really reflect our effort to  
15 look at key questions along that path. You know we  
16 have done a review of the low-level waste regulation  
17 history in the U.S. and documented that.

18 We are working on a recycle white paper,  
19 looking particularly at waste issues and some of those  
20 things. And, you know, Professor Clarke is looking at  
21 decommissioning and come of those strings that, you  
22 know, pull from the other directions. And Dr. Weiner  
23 is kind of on the front end, looking at all the  
24 uranium questions. So we are covering those bases.

25 And I think it is encouraging for us to

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1 hear that kind of the technical foundation pieces that  
2 might be helpful ultimately to a Commission asking  
3 those or similar questions to the one you just  
4 articulated will be helpful.

5 COMMISSIONER MERRIFIELD: Ultimately some  
6 of it goes well beyond, you know, your pay grade and  
7 my pay grade -- I should say my successor's pay grade.  
8 I think, you know, there is going to be the need,  
9 probably not too far down the road, of -- it may yet  
10 be a national Commission to really look at this in a  
11 very holistic way to say okay, we have saddled  
12 ourselves previously with a hodge-podge of laws to  
13 deal with this. We really need to have some folks  
14 come in and look at it in a much bigger way to come up  
15 with something that is going to hang together a bit  
16 better.

17 CHAIR RYAN: Great. Let me open it up for  
18 other comments or observations from members. So I'd  
19 like to start with your, Professor Hinze.

20 MEMBER HINZE: Well, I would like to thank  
21 you, Commissioner Merrifield, for helping me to learn  
22 to communicate better. And the more precise way on  
23 some issues. And it is on that topic that I would  
24 like to raise a question.

25 All of these issues that you have dealt

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1 with have their technical basis that this Committee  
2 can certainly help you with. But also the solution of  
3 these problems very much depends, as the Commission  
4 has certainly clearly expressed, depends upon the  
5 nation accepting some of the problems that we have or  
6 identifying some of the issues that we have with waste  
7 and accepting them.

8 And I'm -- the Committee represents  
9 diverse disciplines, diverse geographic areas, et  
10 cetera. And we can help perhaps with some of this.  
11 And I'm wondering if you see additional ways in which  
12 we, the Committee, or the Commission plans to help the  
13 public understand the issues associated with  
14 radioactive waste.

15 COMMISSIONER MERRIFIELD: Well, I  
16 appreciate those comments and the question. And I  
17 think, you know, to go back to my early days on the  
18 Commission, one of the things that I set as my own  
19 challenge was to try to assist this agency in doing a  
20 better job on communications. As part of that, during  
21 my time on the Commission, I had a task force that I  
22 led for Chairman Diaz to look at some of the ways in  
23 which we could communicate better as an agency. As  
24 you note, I've given my opinion to lots of folks on  
25 how we can communicate better in the way in which we

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1 present ourselves to the public.

2 Part of the vision I have, and I think we  
3 have made some progress but we have not gotten to  
4 where I see as skill, is I believe at the end of the  
5 day I think we have a role to be a non-biased source  
6 of information for the public about radiation and its  
7 uses.

8 One of the challenges, it seems to me,  
9 that we have always had as an agency is that we get  
10 ourselves confused. We have a legal mandate that we  
11 are not supposed to be the promoters of, you know,  
12 nuclear power or things nuclear. We confuse that  
13 mandate with the notion that we need to remain quiet  
14 in terms of explaining those very same issues.

15 My vision has been -- and, again, I think  
16 we have made some progress -- is that students,  
17 teachers, public citizens who have questions about  
18 nuclear power, this agency ought to be the website of  
19 choice and the source of choice for information about  
20 those issues.

21 I think the biggest challenge that we have  
22 as a nation in really grappling with what we want to  
23 do as a country in our harnessing of the atom is that  
24 the information and education available -- that has  
25 been made available over the years to the American

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1 public, is sparse at best. And we are constantly  
2 challenged with a public and with a government that  
3 really don't understand radiation and have an  
4 unnatural fear of it.

5 Now we could talk all morning long about  
6 the sources of that but it is what it is. And I think  
7 the Commission hopefully is engaged in an effort which  
8 will continue to challenge our staff with meeting what  
9 would be my vision to try and improve our website, to  
10 improve our materials, to improve our interactions  
11 with the public to provide a greater source of non-  
12 biased information about the materials that we  
13 regulate and the way in which they are used in our  
14 society.

15 Getting back to your point, I think ACNW  
16 certainly has a role to play in terms of assisting our  
17 staff in helping to guide how we can achieve that kind  
18 of vision. And making sure that the information that  
19 we put out there is, in fact, valid and accurate and  
20 meaningful to individuals who don't have scientific  
21 training but nonetheless want to understand how these  
22 materials effect their lives and may effect their  
23 children.

24 MEMBER HINZE: Thank you.

25 CHAIR RYAN: Allen?

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1                   VICE CHAIR CROFF: The Department of  
2 Energy is on a path to propose some kind of a  
3 disposition for greater than Class C waste in the  
4 country. And they are, I think, in an EIS stage at  
5 this point. And that facility will be licensed by the  
6 Nuclear Regulatory Commission.

7                   Do you see that as possibly being part of  
8 the solution to the issue the Chairman raised on a  
9 disposal endpoint for the greater than Class C waste  
10 or intermediate-level waste, whatever we want to call  
11 them. Does that look promising? Or is maybe that  
12 just another patch on the dike?

13                  COMMISSIONER MERRIFIELD: Well, I have to  
14 say I don't have a full understanding of the direction  
15 that they are proposing to go with that concept. I  
16 would hope it is more than a patch in the dike. And  
17 it certainly, I think, will engender the possibility  
18 of a good dialogue that the Commission can have in  
19 terms of how that fits into the matrix that we are  
20 currently faced with.

21                  It is plausible that can be used as an  
22 opportunity to leverage greater benefit in potentially  
23 greater than just Class C. And in the absence of  
24 specific Congressional legislation telling us what to  
25 do, clearly the Commission does have authority to have

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1 some broader rush of engaging on issues. And perhaps  
2 the Commission can try to do that.

3 You know so I think as you all are  
4 reviewing that proposal and considering how the  
5 Commission may need to respond to it, I would hazard  
6 that simply limiting yourselves to the four corners  
7 may not be in the best interest of advising the  
8 Commission.

9 You know the commissions that I have been  
10 on always like to have options. You know there is  
11 nothing worse for the staff than giving us one option.  
12 Any number of the staff members in the room who have  
13 dealt with that can sort of smile. The Commission  
14 likes to get options.

15 And I think as it relates to that one  
16 issue, I think having a broader view and perhaps some  
17 opportunities would be helpful.

18 VICE CHAIR CROFF: Thanks.

19 CHAIR RYAN: John?

20 MEMBER CLARKE: Thank you, Commission. I  
21 appreciate your --

22 COMMISSIONER MERRIFIELD: You are saving  
23 the best for last, right?

24 CHAIR RYAN: That's right. But we never  
25 use the same order twice. Everybody has to stay

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1 sharp.

2 MEMBER WEINER: It is always a surprise.

3 COMMISSIONER MERRIFIELD: Okay. You know  
4 we saw this at the Commission. We have a regularized  
5 order so we take turns as to who goes first. And it  
6 as worked for us pretty well. It hasn't stopped us  
7 from limiting the amount of time that we use but  
8 nonetheless --

9 MEMBER CLARKE: Thank you for your  
10 comments. Whenever I find myself thinking about these  
11 issues, I find myself going back to the many years I  
12 spent dealing with investigating and remediating  
13 contaminated sites, sites contaminated with chemicals.  
14 And I think there are striking parallels and there are  
15 striking disconnects between how we manage chemicals  
16 in the environment and how we manage radioactive  
17 materials.

18 The idea of a top to bottom review of how  
19 we manage waste, I think is just a tremendous idea.  
20 I really think its time has come. And I would suggest  
21 that we challenge fundamental assumptions that we are  
22 making and that we strive to rethink this in a way  
23 that gives us waste management practices that are  
24 sustainable.

25 And I find myself thinking that many of

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1 the things that I did year after year employing  
2 technologies, evaluating technologies, designing  
3 engineered barriers, they are not sustainable. We are  
4 working against nature. We are working against the  
5 second law of thermodynamics. We are spending a lot  
6 of energy, a lot of money, and a lot of time trying to  
7 keep stuff in a place where it doesn't want to be  
8 necessarily.

9 So I just wanted to respond to that. I  
10 think that it is a terrific suggestion. I would love  
11 to hear your thoughts. This top to bottom review, I  
12 think, would really need to integrate chemical waste  
13 and radioactive waste, lessons learned from chemical  
14 waste, lessons learned from radioactive waste.

15 And it strikes me that the first site that  
16 is going in for a license termination for a restricted  
17 release is proposing technologies that are virtually  
18 accepted in the chemical waste arena in a state that  
19 has tens of sites that have taken the same approach  
20 for material that is in many respects probably a lot  
21 more dangerous.

22 So, you know, going back to what Bill said  
23 about the communication, what you said about the  
24 communication, and getting people, I guess,  
25 appreciating some of these things. And just getting

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1 us to rethink some fundamental assumptions about what  
2 is the best way to manage chemical and radioactive  
3 waste. I think it would just be terrific. And I want  
4 to thank you for that.

5 COMMISSIONER MERRIFIELD: Well, I think  
6 one of the reasons that we -- I think people take  
7 chemicals in their lives much more for granted. You  
8 know we all have bleach in our closet or ammonia in  
9 our closet.

10 So that the notion of chemicals being in  
11 our everyday lifestyle is something that people have  
12 accepted even though, you know, persistent exposure to  
13 some of that stuff obviously can have some detrimental  
14 effects depending upon its use and storage and what  
15 not.

16 Superfund, you dealt with chemical  
17 cleanups. Superfund was the act that I wrestled with  
18 before I got to the Commission. And I don't -- I  
19 completely agree with you. I mean there are instances  
20 where you have sites for which there is limited use of  
21 those sites because of the underlying chemical  
22 contamination. But people have moved on.

23 I mean I always use the example of --  
24 there is a Superfund site in New Jersey which exists in  
25 Elizabeth, New Jersey where there is a large Ikea

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1 right on the roadway. If you go up the New Jersey  
2 Turnpike, you'll see it. It is not too far from  
3 Newark Airport. That site was a Superfund site.

4 It was a brown field redevelopment. And  
5 it is now a very thriving facility. They basically  
6 paved it over and much of the contaminations remains  
7 underground but that is accepted.

8 It would be a much greater battle if it  
9 were radiological material even if there were  
10 absolutely no difference in the overall risk to the  
11 individuals involved. And it is because of the  
12 perception issues.

13 I think a lot of Americans fail to  
14 understand the ubiquitous uses of radiation in our  
15 society that are to the betterment of the American  
16 people. But, you know, we sort of know it and we  
17 don't really explain it very well.

18 Looking back at some of the activities we  
19 had, I'll use two examples of why we've got challenges  
20 but there are possibilities of success. And I'll  
21 start with the success side of it, at least from a  
22 chronological standpoint. And that was Big Rock  
23 Point. I think I've talked about that issue with this  
24 Committee previously.

25 Large amount of relatively slightly

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1 contaminated material ended up in a Subtitle D  
2 landfill in Michigan. And the reason that they were  
3 able to do that was the utility spent the money to  
4 build the portal monitoring facilities both as the  
5 material was exported from Big Rock Point and similar  
6 facilities that were at the host site, the Subtitle D  
7 site, where it would come in and there could be some  
8 degree of confidence that the materials going into the  
9 landfill were not of a high level.

10 The utility also paid for a contractor to  
11 work with the host city to make sure that they were  
12 assuring that the material going in wasn't going to be  
13 a problem. The end result was that very large amounts  
14 of slightly contaminated material ended up being put  
15 in a very large landfill. And when you looked at the  
16 total additional contribution of radiation to the  
17 overall radiation base within that landfill as a  
18 whole, it was, you know, at the margin.

19 And I think Consumer's Energy is to be  
20 credited with having worked through the host  
21 community, having worked with the landfill operator,  
22 having worked with the folks in the Big Rock Point  
23 area to walk them through this is what this really  
24 means, this is what this material is, and this is what  
25 this material is not. The end result of which is that

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1 the company saved significant amounts of money in  
2 disposal but yet had it in a safe place, which was  
3 perfectly appropriate.

4 Now the flip example, it seems to me, I  
5 was out at the Energy Solutions site in Clive, Utah  
6 not too long ago. I credit them, the company has done  
7 a lot to improve the nature of how they manage  
8 operations out there. It looked much improved from  
9 what I had seen during my last visit five or six years  
10 ago.

11 But they are accepting very large amount  
12 of slightly contaminated material from licensees  
13 because in some respects it is more efficient to just  
14 simply throw all on to one large series of train  
15 transports and ship it out to Clive.

16 Well, the question that one might ask --  
17 and that is a business relationship. And we need not  
18 get ourselves into business relationships but given  
19 the limited amount of facilities available for  
20 disposal of these materials, do we really want to fill  
21 us, you know, one of our few Class A facilities with  
22 material that clearly falls much less than Class A.

23 And I think that is a real conundrum.  
24 Part of that decision was based on the fact, you know,  
25 grappling with the public and grappling with the

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1 various pieces of the process rather than  
2 decontaminating certain portions of the reactor --  
3 just tear all down, throw it in a truck, and get it  
4 out there.

5 You know those examples really show me  
6 some of the issues that we really grapple with. If  
7 you do it up front and you communicate the right way,  
8 it does give you some areas where you can dispose of  
9 it which currently aren't available.

10 On the other end, you have got limited  
11 areas where you can dispose of material right now.  
12 And are we going to have sufficient space to conduct  
13 all these disposal activities 20, 40 years hence? And  
14 there are business relationships in that, too.

15 So it is a tough conundrum and one I think  
16 is going to require the continued attention of the  
17 Committee. And I think, as I said, I think the  
18 Commission can benefit from your thoughts and  
19 concerns.

20 CHAIR RYAN: Ruth?

21 MEMBER WEINER: Thank you.

22 Thank you for coming to talk to us,  
23 Commissioner. This is always enlightening for us as  
24 a Committee.

25 And I have a couple -- actually two

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1 questions and they are really, really different. The  
2 first is how do you, yourself, as a Commissioner view  
3 this whole question of conservatism in assessments and  
4 conservatism in regulations as opposed to more  
5 realistic assessments and more realistic regulations?

6 And the second question is a real quickie.  
7 It is do you get what you need from our Committee?  
8 Are we -- is there a way in which we can improve our  
9 communication and our advice and the way we present it  
10 to you?

11 COMMISSIONER MERRIFIELD: Well, I think  
12 those questions are easier dealt in the opposite of  
13 their being asked. The second question, I think, is  
14 a lot simpler. Now I have been satisfied with the  
15 activities that this body has been involved with.

16 And I think the communications have  
17 clearly improved over the time I have been on the  
18 Commission. I think the level of interaction between  
19 the Commission and the Board is as good today as it  
20 has ever been. And I think the methodology that is  
21 being used to translate that information to the  
22 Commission has been helpful.

23 And I always remember, you know, as sort  
24 of a young attorney, you know, I asked one of the  
25 senior partners, you know, I had done some work

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1 product for them and I said, you know, well, how did  
2 you like it?

3 And he said, well, my evaluation for the  
4 work that you do for me is really based on is this  
5 work product useful -- useful and can be used. As  
6 long as you meet those criterion, you are in the right  
7 band.

8 And so to answer your question, I think  
9 that the information and guidance provided by this  
10 Committee is useful. And I think it is used by the  
11 Commission. And as long as you can stay within that  
12 criteria, I think you are in the right place.

13 I do credit -- I have had some more recent  
14 interactions with Frank who has come on board. I  
15 credit -- I think Frank is doing a very good job on  
16 your behalf of communicating with the Commission in  
17 trying to make sure there is some alignment.

18 And I would certainly encourage you to  
19 encourage him to keep that up because I think it  
20 enhances the ability of this body and your sister  
21 body, ACRS, to keep that level of vitality with the  
22 interest of the Commission.

23 Getting to the first issue of  
24 conservatism, you know I have sort of two reactions to  
25 that one. The easy reaction is that when I came here,

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1 I think one of the big challenges for the Commission  
2 as a whole was trying to challenge our staff relative  
3 to the issue of that degree of conservatism.

4 And I remember, you know, one of the first  
5 I don't want to say lectures but I'll say discussions  
6 I had with Shirley Jackson was regarding our agency as  
7 being a risk-informed agency. Not risk-based but  
8 risk-informed.

9 And that we were going to use the risk  
10 tools available to us to look at our regulations and  
11 ensure that they were appropriately balanced, that  
12 they were not too conservative, they were not -- or  
13 that they lacked conservatism. That they were based  
14 on sound science, on the best information we had  
15 available, and were appropriately balanced.

16 And I think that the work that we  
17 collectively, as an agency, have accomplished over the  
18 last nine years has been very much mindful of that  
19 challenge. And it has been successful, I think, in  
20 that challenge. Now there is always more we can do.

21 There are areas I think the Commission  
22 would like to have more work accomplished on risk  
23 informing our regulations and maintaining that level  
24 of focus on making sure we are balanced. But I think  
25 we made a lot of progress.

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1           The harder of that question, to me  
2           however, seems to go to a much bigger question. And  
3           that is to the issue of how we, as a regulatory body,  
4           and we, as a nation, deal with conservatism in general  
5           as it relates to radiological matters.

6           And I somewhat hesitate to get too deep  
7           into the answer to that until after I leave the  
8           Commission.

9           (Laughter.)

10           COMMISSIONER MERRIFIELD: But perhaps I  
11           can telegraph slightly where I come from. My  
12           background on risk was based on the work I did in the  
13           Senate Environment Committee. At the time, I headed  
14           up -- I was Staff Director for that subcommittee.

15           We were the only subcommittee in Congress  
16           and I think remains so today, that actually had the  
17           word risk in the name of the subcommittee. It was the  
18           Subcommittee on Superfund, Waste Control, and Risk  
19           Assessment.

20           Risk assessment was very much a part of  
21           what I looked at as a staff member on that Committee.  
22           And so it was easy for me to embrace the notion of  
23           using risk tools and good risk information to  
24           appropriately balance the level of regulation and  
25           level of legislation one would need to focus on on

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1 issues, whether they were chemical in nature, whether  
2 they were radiological in nature, or otherwise.

3 But going even further, I think, we, as an  
4 agency, and our counterparts internationally grappled  
5 with a hypothesis that came to us as a consequence of  
6 having dropped the first two nuclear weapons. We,  
7 with others, embrace the linear no-threshold theory.  
8 Linear no-threshold is taken almost to the extent of  
9 dogma among regulators around the world.

10 And the nine years that I have had the  
11 opportunity to be on the Commission, I have been  
12 exposed -- no pun intended -- to an understanding of  
13 radiation that is a bit different than a mere bow to  
14 linear no-threshold would have otherwise given me.

15 I think that there is significant  
16 information available in the public fora. And  
17 significant information with great scientific validity  
18 that would at least provide some degree of challenge  
19 to the continuing validity of following the dogma of  
20 the linear no-threshold approach.

21 I think that the failure to challenge that  
22 and the failure to understand that is -- and could be  
23 taken as a disservice to the American people. If we  
24 are in a position where we are overly conservative  
25 about the regulation of various uses of radiological

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1 material, and as a result of that we deny an  
2 opportunity for the public to utilize radiation in  
3 ways in which it is beneficial, then for the greater  
4 good of the American people, we may not have done the  
5 best thing.

6 That theory underscores, underlies, and  
7 forms a foundation for all of which we do. And if it  
8 is wrong and, in fact, if some additional amount of  
9 radiation may actually have some beneficial impact on  
10 public health -- and there are studies which would  
11 suggest that -- by unnecessarily limiting public  
12 exposure levels, one could theoretically -- and I'm  
13 not saying this is my viewpoint -- but one could  
14 theoretically argue that, in fact, there may be  
15 negative health consequences from some of the things  
16 we may do.

17 That is a very controversial theory. But  
18 I think in the interest of providing the best  
19 information that we can to the public, I think it is  
20 a topic that we should discuss. And I think simply to  
21 embrace what is arguably a dogma and a given, without  
22 providing an opportunity for further scientific review  
23 and debate, is not necessarily in the interest of what  
24 we ought to be doing as a regulator.

25 I don't know if that is in line with what

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1 you were asking but I think it is.

2 MEMBER WEINER: That was very much -- and  
3 you went much further than I had intended. But thank  
4 you very much for that answer because your view is --  
5 you see the whole picture from a vantage point that we  
6 don't have. And that makes your response very  
7 valuable. Thank you.

8 COMMISSIONER MERRIFIELD: I appreciate  
9 that.

10 CHAIR RYAN: Commissioner, I really  
11 appreciate your generosity with your time and your  
12 thoughts today. I am energized by the fact that many  
13 of the things you see as important to the Commission  
14 and important to the agency and the country as a whole  
15 are on our action plan. So I am pleased that we are  
16 aligned with you.

17 COMMISSIONER MERRIFIELD: I'm pleased we  
18 are aligned, too.

19 (Laughter.)

20 CHAIR RYAN: And the other Commissioners  
21 I'm sure agree.

22 COMMISSIONER MERRIFIELD: I can certainly  
23 give you my further thoughts if you want them but --

24 CHAIR RYAN: Absolutely.

25 COMMISSIONER MERRIFIELD: -- they would be

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1 about as useful as blank sheets of paper I suppose.

2 CHAIR RYAN: These are always, I think,  
3 interesting sessions. It is helpful for us to hear  
4 and I think for the public to hear the Commissioners  
5 interact with us. And we really appreciate your time.

6 And I think on behalf of the staff and the  
7 Committee, we want to wish you every success in your  
8 future endeavors. And please don't be a stranger.  
9 And any time you have got something to say, come on  
10 back. We'd love to hear from you.

11 COMMISSIONER MERRIFIELD: Well, I  
12 appreciate those kind comments. And I would say, as  
13 a general matter, I don't know what I'm doing right  
14 now when I leave the Commission. I have no  
15 announcements to make. I would suspect it would be in  
16 some area that may have some continuing involvement in  
17 the issues associated with those that I have done as  
18 a Commissioner. But that may or may not be the case.

19 I certainly would welcome, if you would  
20 like to get my further views on things as I leave the  
21 Commission, I am always happy to do that whether it is  
22 the Board as a whole or any of you who wish to contact  
23 me as a public citizen, private citizen, I should say.  
24 I'm always happy for those engagements as well.

25 So while I leave the Commission on June

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1 30th, I don't expect to leave the universe, I do  
2 expect to be somewhere not too far down the line. And  
3 would certainly welcome further engagement in that  
4 regard as well.

5 CHAIR RYAN: We really appreciate it.  
6 Thank you very much.

7 COMMISSIONER MERRIFIELD: Thank you.

8 CHAIR RYAN: Thank you.

9 With that, we will close the record on our  
10 morning session. Thank you all very much. And we'll  
11 come back -- let's make it 1:10.

12 (Whereupon, the foregoing matter went off  
13 the record at 12:23 p.m. to be reconvened in the  
14 afternoon.)

15 CHAIR RYAN: Everybody seems to be in  
16 place, so we'll go ahead and reconvene, and come to  
17 order, please. I think I pointed this out before, but  
18 let me re-emphasize it. We now have sensitive  
19 microphones in the entire room, so there's no such  
20 thing as a private conversation or comment anywhere in  
21 the room, so let me just advise everybody of that.

22 Our presentation this afternoon is on pre-  
23 closure licensing activities for Yucca Mountain, and  
24 Robert Johnson is here with us. Robert, welcome.

25 MR. JOHNSON: Thank you. Good afternoon.

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1 My name is Robert Johnson. I'm with the High-Level  
2 Waste Repository Safety Division in NMSS. I'm here to  
3 talk to the committee about pre-licensing activities,  
4 specifically, to address the questions of readiness  
5 and preparedness. What I'd like to do at this point  
6 is identify the stamp, or really essentially using a  
7 structured, integrated, and risk-informed approach to  
8 prepare for the licensing review. And I've got a  
9 whole discussion on activities, preparatory activities  
10 that will sort of lay that out. What I would like to  
11 do at this point is point out that I have a number of  
12 technical staff in the room that are going to assist  
13 me if there's need to get into the technical details.  
14 I will try and step through it at a reasonable level.

15 The last pre-closure briefing was in  
16 August of 2005, and that's been about -- it's about  
17 two years. Since then, there's been a tremendous  
18 amount of activity. There's a lot of stuff that's  
19 been going on. We've had activity as far as DOE  
20 changing their design. We had a lot of interactions  
21 with DOE, and we have a lot of independent activities  
22 that are going on. So what I'm going to do with that  
23 is go ahead and go to slide 2, talk about the outline.

24 I think it's essential, at least today, to  
25 start off and talk about -- to start off the briefing

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1 by addressing some of the staff challenges, the key  
2 challenges that are facing the staff to give you an  
3 idea of what we're thinking about, and where we're  
4 focusing, and why we're focusing there.

5 I want to take some time to talk about the  
6 pre-licensing activities, which there are a lot of  
7 them, so bear with us. And I also want to take some  
8 time to talk about pre-licensing activities.

9 This discussion, obviously, will help you  
10 see that the staff are preparing for reviewing DOE's  
11 license application, and focusing on risk-significant  
12 issues, that the staff are heading in the right  
13 direction, and are prepared for the review if it were  
14 to come in today. And, further, that the staff has a  
15 full plate of pre-licensing activities now until DOE  
16 actually submits the license application.

17 With that, I'm going to go to slide 3.  
18 Okay. Slide 3 addresses the staff challenges. Like  
19 I said, I think it's important when you're considering  
20 staff readiness to understand what challenges we're  
21 facing now. And the first one that I've identified,  
22 and you've heard it before, but the fact is, it's a  
23 first-of-a-kind licensing application. We're  
24 reviewing the license application under 10 CFR Part  
25 63. This is a first-of-a-kind licensing activity

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1 because it's risk-informed and performance-based.

2 DOE will perform the pre-closure safety  
3 analysis to demonstrate compliance with the  
4 performance objectives identified under 10 CFR Part  
5 63-111, and they'll be using the PCSA to identify ITS  
6 SSCs. Some aspects of the risk-informed performance-  
7 based nature under Part 63 that present potential  
8 challenges, and we'd run into this, and had a lot of  
9 discussion with DOE in the past, is the level of  
10 information that's necessary to support the PCSA, and  
11 a subject that you guys now have heard about for, I  
12 think, the last three or four meetings, and that's  
13 pre-closure design and seismic performance. I believe  
14 that DOE has been, the staff has been in, and EPRI, I  
15 believe, has been in to brief you guys in those areas,  
16 but those are examples.

17 The other challenges that are facing us  
18 now are pretty straightforward. DOE has not completed  
19 the design. We've had an opportunity to interact with  
20 them, and see how they've changed the design as a  
21 result of the CD-1 process. There was a public  
22 technical exchange on CD-1. We're going to have  
23 another technical exchange on facility layout and  
24 design that's going to be focusing on the container  
25 receipt enclosure facility at the end of this month,

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1 on May 30<sup>th</sup>. And then, in addition to that, they're  
2 not going to complete the PCSA until the end of this  
3 year, as well. They have to have design information  
4 to complete the PCSA, and then they have to go through  
5 their process, and then we'll have an opportunity to  
6 take a look in a public forum. So the three  
7 challenges are that it's a first-of-a-kind licensing  
8 activity, and DOE's design and PCSA are not complete  
9 yet, and they're not expected until the end of the  
10 year.

11 Okay. With that, I'm going to go to slide  
12 4. This gets us right into the pre-closure licensing  
13 activities. There are enough of them, I think, that  
14 merit discussion that I've got a lead-in slide. And,  
15 essentially, the slide outlines the activities the  
16 staff are undertaking to address the challenges that  
17 we've just discussed, or that were on the previous  
18 slide.

19 All of the activities are risk-informed  
20 based on staff experience, and understanding of DOE's  
21 approach to the pre-closure facility design and  
22 operations, and what we understand of their PCSA at  
23 this point. They're also intended to focus the staff  
24 review. And as I said, the following slides actually  
25 go into details on each of the activities.

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1           One of the take-aways from the slide is,  
2 we're actually going through and conducting a lot of  
3 independent activities on our own. There are  
4 activities that are depending on DOE. There are  
5 activities that we are working on our own to step  
6 forward, and I'll kind of highlight those as we go.

7           With that, I'd like to move to slide 5.  
8 Okay. I wanted to start the discussion here by going  
9 back to the August 5<sup>th</sup> meeting. When Tim Kobetz was  
10 here in August of '05, he laid out a number of pre-  
11 licensing technical issues, and had an opportunity to  
12 briefly discuss them with you guys. That was the plan  
13 that was identified at the time based on our knowledge  
14 and understanding of how DOE was approaching it at  
15 that time. And, again, that was still their fuel  
16 handling in a hot cell, so what I've done is I've  
17 listed these activities. These issues included  
18 aircraft hazards, seismic hazards, design performance,  
19 source terms and consequences, facility design,  
20 criticality event sequences, aging facility  
21 performance, technical bases for the PCSA. Again,  
22 these topics were based on our understanding of DOE's  
23 proposed design at the time. Our staff experienced  
24 the expertise and risk-assessment and understanding of  
25 operations and facilities, risk-significance more in

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1 the qualitative sense based on our experience at this  
2 point, because we didn't have the full system to  
3 model, and based simply on the fact that some of this  
4 - some information at the time was limited. We didn't  
5 have a lot of information at the time.

6           Essentially, what we did at that point is  
7 we developed a plan to address the issues that were  
8 identified. We've addressed each of them, and you'll  
9 see how we've done that in the following slides, and  
10 we continue to address them. We continue to update  
11 the list where it's necessary. Obviously, now they  
12 have the TAD canister, and we have staff looking at  
13 that, the design and how that impacts handling, and so  
14 forth.

15           So with that, I'm going to go ahead and  
16 step to slide 6. I'd like to start off, as I  
17 mentioned earlier, we've had a number, I think, of  
18 interactions with DOE in the recent past, and I've  
19 been the pre-closure PM now for about a year, and  
20 we've had a number of valuable interactions with them.  
21 What I've done here is, I've listed the different  
22 interactions. Before I get there, I want to lay out  
23 sort of a process change that we developed about a  
24 year ago, maybe a little bit before that.

25           As a result of how we've had technical

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1 exchanges in the past, we looked at ways to improve  
2 them. We sat down and thought about it, and for each  
3 technical exchange now, we've gone through and tried  
4 to lay out, actually, we've laid out key messages that  
5 identify staff expectations, or regulatory  
6 requirements, or regulatory expectations.

7 We convey those. Right now, we try and  
8 get those to DOE and the public four weeks before the  
9 technical exchange is to take place. The key messages  
10 are intended to focus DOE on what we're interested in,  
11 as well as to help explain to them what our  
12 expectations are.

13 As a part of this process, in the  
14 technical exchange itself, we actually present on the  
15 key messages. We set aside time up front to lay out  
16 what these expectations are, and how we hope the  
17 meeting will proceed. And then the last part of it  
18 is, and this is similar, but I wanted to point out, we  
19 summarize the meetings. And I think ACNW is copied on  
20 all of the letters, or all of the steps that we just  
21 talked about.

22 With that, what I'm going to do is go  
23 ahead and step into the different technical exchanges  
24 that we've had. I'm just going to touch briefly now  
25 on the topics, there are a lot of them. We could be

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1 here all afternoon, I think, if we got right into it,  
2 so what I'm going to do is lay them out.

3 In May of 2006, we talked about -- we had  
4 an opportunity to meet in a public technical exchange  
5 with DOE on pre-closure safety analysis and supporting  
6 information. June of 2006, we had an opportunity to  
7 talk, have a public technical exchange on pre-closure  
8 seismic design methodology and performance. In August  
9 2006, we had a public technical exchange on design  
10 changes through DOE's CD-1 process, or Critical  
11 Decision-1 process. Really, the design changes that  
12 resulted as a result of that change.

13 In November, we had a large - actually, a  
14 meeting that covered a whole bunch of technical  
15 topics. I've listed them there. It was a public  
16 technical exchange in Nevada where we talked about  
17 aircraft hazards, source terms and consequences,  
18 reliability methodology, again, human reliability  
19 analysis, licensing specifications, training and  
20 criticality.

21 Now some of these topics we had an  
22 opportunity to talk about in the past, and we had a  
23 need to lay out key messages and interact with them  
24 again to address specific technical issues. We  
25 presented on these topics at each of the technical

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1 exchanges, and had another beneficial interaction with  
2 them.

3 I have included the May 2007, the May  
4 30<sup>th</sup>, 2007 facility lay out and operations. This is  
5 a status update of their design. It's going to cover  
6 the container receipt enclosure facility, design up to  
7 this point now. It's to give us information, the  
8 latest information about the facility design. And  
9 also address some of the wet handling facility,  
10 because that's another area that is of interest to the  
11 staff.

12 Bear with me. Okay. With that, I'm going  
13 to go ahead and move to slide 7. Now, in addition to  
14 that, we have a multitude of proposed TEs. These have  
15 been on -- they're sort of waiting in the wings until  
16 DOE is ready to talk about the activities. We had  
17 tried to set up an interaction on criticality in  
18 November. They were in the process of developing  
19 their methodology report, and what we did in that  
20 technical exchange was convey our key messages to  
21 them, and had an opportunity to interact at the  
22 technical exchange. They didn't present there. They  
23 wanted to get feedback from the DOE criticality safety  
24 support group, and incorporate that, and I believe  
25 they're working on that now. So we should have a pre-

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1 closure, and possibly a pre and post closure TE coming  
2 up in the future.

3 The other interactions - again, the idea  
4 here is to enhance the staff understanding of DOE's  
5 proposed design and approach, to add to the staff  
6 experience as far as what we know is coming in, the  
7 opportunity to look at similar types of facilities  
8 once we know what design they've laid out, to get  
9 additional insights on risk-significance of the SSCs  
10 that they've identified as important safety, and any  
11 that we might identify or be interested in.

12 In addition to the topics that are listed,  
13 and there's a pre-closure design and operations,  
14 another TE identified here, that's to address the rest  
15 of the pre-closure facilities, the design. Right now,  
16 they're ready to talk about the container receipt  
17 enclosure facility, and they're ready to talk a little  
18 bit about the wet handling facility, so we have that  
19 on the agenda, but the rest of the operations, the  
20 subsurface, all of the rest of the surface facilities  
21 will have to come at some point. We would like to  
22 actually have an idea of what the facility design is  
23 before they submit the license application, and it  
24 looks like there's going to be an opportunity at the  
25 end of the year in a public forum.

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1           We also are very interested in DOE's  
2 hazard identification, their event sequence  
3 development, how they're categorizing those event  
4 sequences. We are particularly, obviously, interested  
5 in the design of their ITS SSCs. They're important to  
6 safety structures, systems, and components, and there  
7 are questions about source terms and consequences that  
8 we would like to entertain at a public technical  
9 exchange.

10           And if -- there's one other area we're  
11 also interested, and it's not on the agenda yet, but  
12 once they've completed the pre-closure safety analysis  
13 and the design, we're interested in having a technical  
14 exchange where we can talk about how the whole thing  
15 fits together, not just pieces of it now, not looking  
16 at this facility's Important to Safety SSC,  
17 structures, systems, and components, but looking at  
18 the whole picture, and starting to weigh where the  
19 real risk significance is, what really is important  
20 and how they got to that point.

21           With that, I'd like to move to slide 7.  
22 Okay. In addition to the DOE-NRC interactions, and in  
23 addition to all the pre-licensing activities that we  
24 identified, during this process, we went through and  
25 identified several areas where we felt the need to

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1 update or clarify information that's in the Yucca  
2 Mountain Review Plan, and the need to go through and  
3 develop several interim staff guidance documents.  
4 I've listed them here. Again, the process - we tried  
5 to make sure that we got it to as broad an audience as  
6 possible. They were issued publicly through a Federal  
7 Register notice for public comment. I believe there  
8 was a 45-day public comment period. I think that we  
9 had copied, or made sure that copies were coming  
10 through to the ACNW on the final versions.

11 At this point, I'm going to step briefly  
12 through the ISGs. Interim Staff Guidance-01, Review  
13 Methodology for Seismically Initiated Event Sequences.  
14 I'm just going to -- I'm not going to discuss much on  
15 that, because this topic has been through, I think you  
16 guys have had staff briefings on it. DOE had a  
17 briefing on it, and NEI also, I think, came in. So I  
18 think, unless there are additional questions, I'm  
19 going to move to the next one.

20 I want to take a few minutes to discuss  
21 the High-Level Waste Repository Safety ISG-02. This  
22 is on the Pre-closure Safety Analysis Level of  
23 Information and Reliability Estimates. It addressed  
24 the level of information that -- well, actually, let  
25 me step back. Level of Information has been a

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1 longstanding issue between DOE and NRC, as far as what  
2 our expectations are, what we should be looking for in  
3 a license application.

4 We went through the process of developing  
5 ISG-02 to convey to the staff - provide guidance to  
6 the staff on what we would be expecting with respect  
7 to level of information in a risk-informed  
8 performance-based regulatory framework, and the level  
9 of information that's necessary to support it, again,  
10 because of the risk-informed performance-based context  
11 of the rule.

12 What the ISG did, it provided staff  
13 guidance on level of information needed for SSCs that  
14 are important to safety versus those that are not  
15 important to safety. We also went through and  
16 identified reliability estimates, and appropriate  
17 approaches for reliability estimates, including  
18 modeling, empirical analysis, and engineering  
19 practice. And we went through and actually included  
20 examples in the appendices.

21 High-Level Waste ISG-03. I believe Sheena  
22 briefed the ACNW on that recently, as far as dose  
23 performance objection, and radiation protection, so  
24 I'm not going to take much time on that. I just wanted  
25 to point out that that was among the activities that

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1 we've been involved in. And then Dr. Tina Ghosh will  
2 be here tomorrow to talk about High-Level Waste ISG-04  
3 on human reliability analysis.

4 Move to slide 9. Okay. Another one of  
5 the pre-licensing activities, I think, that merits  
6 discussion here, at least to let you - to explain how  
7 the staff is getting prepared. And this is in an  
8 independent context. This is outside of interactions  
9 with DOE.

10 We've had the opportunity to take several  
11 site visits. I provided one principal example up  
12 front. In June of 2006, we were at INL. We had an  
13 opportunity to go out and talk to the operators at the  
14 independent spent fuel storage installation that's  
15 there. We had an opportunity, actually, to watch the  
16 canister handling operations, and as well as pool  
17 handling operations, which it appears there are going  
18 to be a number of pool handling operations in DOE's  
19 proposed facilities.

20 The benefit there is we actually saw them  
21 doing a handling operation. We saw the 60 foot  
22 lifting fixture that I'm sure they couldn't get the  
23 thing out of the pool. It was very helpful as far as  
24 our preparedness. We also, where possible, have staff  
25 participating in inspections. One of the staff

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1 members was able to participate in the heavy loads  
2 part of an inspection, and they were mocking up for a  
3 canister movement. And whenever those opportunities  
4 come around, we're trying to get involved in them.

5 CHAIR RYAN: Just a comment, Robert. I  
6 think that's fabulous that you're doing that, for the  
7 very reason that once you see it in real life, it  
8 makes a whole lot more sense when you're analyzing it  
9 in a computer code, so I'm sure we would all encourage  
10 you to continue that effort. That's great news.

11 MR. JOHNSON: We've had a number of trips  
12 out to INL. Previously, we've had trips to Hanford.  
13 I believe there's a trip to Hanford scheduled, or  
14 that's in the works now, now that we can interact  
15 again with DOE. There are other trips, where  
16 possible. We had an opportunity to go down, just a  
17 couple of weeks ago, and meet with Areva to talk about  
18 their operating experience with respect to heavy  
19 loads. We had an opportunity in the past, and we  
20 briefed you about a trip to LaHague. Again, we were  
21 looking at the hot cell and bare fuel handling at that  
22 point. Now we're actually shifting, obviously,  
23 looking predominantly at canister handling activities.  
24 And we were able to gain some valuable information  
25 just by hopping on the Metro going down the street, so

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1 there are other activities planned. We've been doing  
2 a lot. I put two on here because of the - to get it  
3 in context.

4 CHAIR RYAN: That's fine. That's great.

5 MR. JOHNSON: Slide 9. Okay. Another one  
6 of the pre-closure/pre-licensing activities, I think  
7 that's important to talk about at this point are some  
8 of the technical work, the independent technical work  
9 that the staff is doing. And I'm sort of highlighting  
10 that.

11 In some instances, we're depending on DOE  
12 for design information and public technical exchanges  
13 to gather this type of information. And where we  
14 can't gain that information, we're going out on our  
15 own and trying to come up with what we can. I think  
16 that's going a long way to staff preparedness.

17 This slide provides examples of how staff  
18 preparatory activities have focused on qualitative  
19 risk-significant issues. The first bullet there, we  
20 had started the last time we briefed ACNW, we had  
21 started a pre-closure safety analysis exercise on the  
22 bare fuel handling activities. And shortly into that  
23 process, they changed their design.

24 What we did gain from that was a  
25 tremendous amount of experience in thinking about how

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1 the systems work, and it benefitted the staff in that  
2 we were able to ask very pertinent questions of DOE on  
3 their proposed design, as well as the information that  
4 they were providing about it. It had us primed and  
5 ready to ask where we had questions or concerns about  
6 technical bases for reliability estimates, and these  
7 types of things. They changed the design, so that  
8 part has moved over.

9 We are currently working on another  
10 version, call it Phase 2, of PCSA exercise to look at  
11 canister handling. It's a hypothetical canister  
12 handling facility. The intent here is to gain an  
13 understanding of operations that are similar to those  
14 that we expect at Yucca Mountain, to develop  
15 capability, to review a license application, to give  
16 us something now to be working on and preparing,  
17 developing that review capability. And it also - one  
18 of the other keys is -- one of the other outcomes from  
19 it is to help us gain qualitative, and possibly some  
20 quantitative risk insights with respect based on the  
21 analysis of similar facilities, something that we can  
22 apply to the canister handling facility, or the wet  
23 handling facility that DOE is proposing.

24 The next one that I wanted to point out is  
25 operating experience. This is similar to, in some

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1 respects, to the PCSA exercise; however, I need to  
2 talk through it a little bit more. We're also  
3 conducting a review of multiple sources of operating  
4 experience information from various sources,  
5 databases, actual operator experience, interviews at  
6 existing nuclear facilities to gain risk insights that  
7 are applicable to the operations we expect at Yucca  
8 Mountain. And, again, this is in the real world  
9 facilities, what has been observed, and what can we  
10 learn from the operating experience that's out there  
11 for facilities that we expect to see at Yucca  
12 Mountain? Again, it's going toward our preparedness,  
13 our preparatory activities.

14 Those are two of the key activities. I  
15 also, because of the fact that we had them on our  
16 activities list, and we'd identified these particular  
17 areas as being of interest in the past, we've gone  
18 through and conducted independent technical analyses  
19 for seismic, to address seismic hazards, and aircraft  
20 hazards.

21 Okay. And with that, now I'd like to go  
22 ahead and get into and discuss the independent review  
23 capability, and go to slide 11. Now, this is dealing  
24 with independent review capability, and there are  
25 multiple - there are all sorts of technical

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1 capabilities that the staff have. But what I wanted  
2 to do is focus, or provide one example of an  
3 independent review capability that we have, and that's  
4 the pre-closure safety analysis tool.

5 The tool itself provides flexibility to  
6 perform independent calculations and support reviews.  
7 We can evaluate selected assumptions and data, we can  
8 develop event sequences, we can go through - it  
9 enhances our understanding of DOE's PCSA in that we  
10 can literally pull out and look at the significance or  
11 sensitivity of different analyses, we can perform  
12 importance analyses, true importance analyses using  
13 the SAPHIRE capability that's built into the tool.  
14 And we can take a look at selected facilities and  
15 operations, or a broader aspect of that, if we had the  
16 time, and the design information.

17 Now, it's important at this point to point  
18 out that NRC is not -- there's not a regulatory  
19 requirement for us to perform a pre-closure safety  
20 analysis. DOE is going to be developing the pre-  
21 closure safety analysis, and we're going to be looking  
22 at the most important, or what we think are the most  
23 important aspects of that.

24 I also wanted to point out, and I listed  
25 it explicitly in the last bullet, that the staff

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1 licensing decision is going to be based on what DOE  
2 submits in the license application as part of their  
3 PCSA and supporting information, and not on the  
4 independent analyses that we're doing. This  
5 capability allows us to understand, it enhances our  
6 understanding and it gives analytical capability.

7 In addition to this, there are multiple -  
8 there are all sorts of technical codes, MACCS, seismic  
9 codes. I can provide a list at some point, if you're  
10 interested.

11 Okay. Bear with me. Okay. Now I'd like  
12 to take a minute to talk about pre-licensing  
13 preparation, and that's on slide 12. Okay. With  
14 this, we are establishing, or we have already gone  
15 through and established review teams for pre-closure  
16 based on the WMRP and the SER structure, so we've gone  
17 from the technical issues right into what we expect,  
18 or how we expect to perform our review. There are  
19 teams, the teams consist both of -- well, actually,  
20 I'm getting ahead of myself.

21 Real quickly, I want to point out that  
22 we've established pre-closure review teams. Section  
23 2.2.1 through 2.1.8 are on the pre-closure safety  
24 analysis itself. Those are the Yucca Mountain review  
25 sections that are applicable to the pre-closure safety

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1 analysis, itself. In addition, I've listed a couple  
2 of other sections that are under the pre-closure  
3 program. We're also developing, or we've established  
4 review teams there.

5 We also have a key role that we're going  
6 to be playing in the review of Section 2.5 of the  
7 Yucca Mountain review plan, and that has to do with  
8 licensing specifications, training, several aspects I  
9 think that are critical, or critically important to  
10 safety.

11 The attempt here with that, and I alluded  
12 to it earlier, the pre-closure review teams actually  
13 break the review itself into logical review areas  
14 based on the YMRP and the SER structure. And we have  
15 integrated the Center and the NRC into these review  
16 teams. There are staff from both the Center and the  
17 NRC on each of these teams. There are technical leads  
18 here and at the Center, and we've had success in  
19 working through and using these review teams.

20 CHAIR RYAN: Robert, just so folks get a  
21 feel for the scope, how many members on all these  
22 teams? How many folks are involved in all these  
23 teams? Is it 50, 100, or can you --

24 MR. JOHNSON: No, no, no. Ten, fifteen,  
25 some of them are more limited, some of them - for

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1 instance, ALARA, that section is very focused on HPs,  
2 and that's -- I don't think there are -- there may be  
3 five to ten people there.

4 CHAIR RYAN: That team.

5 MR. JOHNSON: Correct.

6 CHAIR RYAN: And some folks may overlap  
7 with one team or another.

8 MR. JOHNSON: Correct.

9 CHAIR RYAN: Okay. So that just gives us  
10 a feel for the scope.

11 MR. JOHNSON: I mean, there -- we,  
12 actually - I wasn't really going to get into it, but  
13 we went through -- before we went in and established  
14 the review teams based on the SER. We also, at the  
15 same time, went through and looked at skills, and  
16 disciplines, and staffing needs, and included that in  
17 the discussion, so their assignments -- I mean, one of  
18 the benefits from going through this process is to lay  
19 out the roles and responsibilities of the different  
20 reviewers, so you know which team you're on, what  
21 you're responsible for, and I'll get into that a  
22 little bit on the next slide.

23 CHAIR RYAN: Right.

24 MR. JOHNSON: It's very clear now. And  
25 one of the other take-aways is that it's augmented,

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1 it's a team that includes both Center and NRC staff.

2           Okay. I'd like to talk about integrated  
3 review strategies at this point. The staff are  
4 working right now on developing integrated review  
5 strategies. This is to take all of the activities  
6 that we've been involved with up to this point. The  
7 site visits, the ISGs, the interactions, all of the  
8 knowledge that we have up to this point, look at it on  
9 in a risk-informed perspective, and lay out an  
10 integrated review strategy.

11           And what I mean by an integrated review  
12 strategy is, we're developing several sections. The  
13 first of those is the scope, itself. We want you to  
14 make sure to be looking at it and understand it. This  
15 section actually summarizes the technical areas of the  
16 review that are to be addressed by the respective  
17 review teams, and it focuses on the regulatory  
18 requirements, and the evaluation findings that are  
19 identified in the Yucca Mountain Review Plan, so that  
20 you've got your focus.

21           Now, it also lays out or provides risk  
22 insights for a plan to attain risk insights. We  
23 either identify or summarize the most important  
24 aspects of the PCSA, the Pre-closure Safety Analysis,  
25 that should be reflected, or should be where the staff

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1 is focusing. The Integrated Review Strategies are  
2 also going to be looking at, and having us focus now,  
3 rather than when the license application comes in, on  
4 the integration between the review teams. Because  
5 we're dealing with a pre-closure safety analysis, and  
6 we have eight sections that cover different aspects of  
7 the analysis itself, we're going through and laying  
8 out, or focusing on the integration between these  
9 review teams. What inputs will I need to conduct my  
10 part of the review, and who is providing them, so I've  
11 already got that line of sight. And then, also,  
12 identifying what outputs, what my evaluation finding  
13 is, what the outputs are from my review, and where  
14 it's going, who gets it.

15 The review strategies also identify - or  
16 in the review strategies, and I've already alluded to  
17 it a little bit, we are identifying the roles and  
18 responsibilities of the staff, how you're going to  
19 accomplish your portion of the review, who's  
20 responsible for reviewing the different sections. And  
21 then, the last bullet is capturing the pre-licensing  
22 activities that we'd like to -- we think we'd benefit  
23 from conducting prior to receiving the license  
24 application.

25 I've listed the interactions that we have.

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1 We're working on milestones now for operating  
2 experience, and the pre-closure safety analysis  
3 exercise. That's where that type of information is  
4 captured right now, and it's a place to document or  
5 identify the things that we want to look at before it  
6 comes - the license application comes through the  
7 door.

8 Okay. With that, I'll go to the summary  
9 slide. Hopefully, based on the discussion that was  
10 presented, give you a clearer understanding of how the  
11 staff is using a structured, integrated, and risk-  
12 informed approach to prepare for the licensing review,  
13 or license application review.

14 I wanted to take an opportunity to go  
15 through the extensive listing of pre-licensing  
16 activities. There really is a lot going on, and  
17 there's a lot on the plate now to move forward. We  
18 have a lot of proposed interactions with DOE, and a  
19 lot of independent work that's going on. Actually, I  
20 covered the third bullet. We're going to continue to  
21 interact with DOE, as it's appropriate, in a public  
22 manner, to understand their pre-closure safety  
23 analysis, and the design. And we're going to continue  
24 to work on independent technical activity, and  
25 developing our analytical capabilities.

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1                   So with that, I would like to go ahead and  
2                   open it up for questions.

3                   CHAIR RYAN: Sure. Ruth, why don't you  
4                   start?

5                   DR. WEINER: Well, this is a lot of  
6                   information to digest, and there's -- I can see from  
7                   this what your plans are, and I want to commend you on  
8                   your plans. Why is this coming - maybe this is an  
9                   unfair question - but why is this coming so late in  
10                  the repository activity?

11                  MR. JOHNSON: Well, bear with me. I'm an  
12                  optimist. I'm not going to think that it's coming  
13                  late in the process. We had a licensing review plan  
14                  that was developed for 2004 when we thought DOE was  
15                  going to come in with a license application 2004. We  
16                  had the opportunity now to have additional time to  
17                  prepare for the license application, and we stepped  
18                  through and identified areas and activities that we  
19                  thought would be beneficial in the time that we had,  
20                  and we stepped through them. We laid out a plan, and  
21                  we stepped through them, and that's why you're seeing  
22                  this.

23                  Another element of that is, DOE, I think  
24                  in the past may have been either reluctant or not - I  
25                  need to say this in a positive manner. DOE is sharing

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1 a lot of information in public now at the public  
2 technical exchanges. We're having an opportunity to  
3 interact with them, and get beneficial information.

4 DR. WEINER: So that your one new aspect  
5 has been these public technical exchanges, that you're  
6 getting information from DOE that you really couldn't  
7 get earlier. Is that --

8 MR. JOHNSON: That's one, but I want to  
9 point out, I think in the additional time to prepare,  
10 we also said okay, now that we have the time and the  
11 staff, and we recognize that perhaps the Yucca  
12 Mountain Review Plan needs to be updated, or revised,  
13 we had the time to do it, we were thinking about the  
14 activities, we had the opportunity to interact with  
15 DOE. There are a lot of things that led to this  
16 activity. It's not just happening, of late.

17 DR. WEINER: Thanks for that explanation.

18 MR. CAMPBELL: Can I add something here?  
19 This is Andy Campbell, Chief of the Performance  
20 Assessment Branch. Robert mentioned it earlier a  
21 couple of times, and I'll reiterate. With the CD-1,  
22 DOE changed fundamentally their operating facility  
23 design for Yucca Mountain. Prior to that, that was in  
24 '05, they were looking at bare fuel handling, very  
25 different facility than the facility they are talking

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1 about now. So all of these design issues that Robert  
2 and the staff is dealing with at this point in time  
3 are issues that have essentially come up since the  
4 development of that CD-1, and they rolled that out to  
5 us, I think last September, if I'm not mistaken. And  
6 that was just the beginning of it. So this is an  
7 evolving process. It's an evolving design. We will  
8 hear more through the remainder of the year before we  
9 see a license application, but if you want to deal  
10 with that question, you maybe need to ask DOE the  
11 question of why did you fundamentally change your  
12 design. I think they have good reasons for it, but  
13 that is a key factor here.

14 DR. WEINER: Thank you, Andy, for  
15 anticipating the next question I was going to ask,  
16 which had to do with the change in DOE's approach. Is  
17 this the primary change that you saw going from  
18 handling bare fuel to handling canistered fuel? Is  
19 that the single biggest thing, or were there other  
20 factors that were similar?

21 MR. JOHNSON: That is, I think, the single  
22 biggest thing. They're going to have pool operations  
23 now, that's then added to the equation. The amount of  
24 fuel that'll be handled in that pool is a question  
25 that's still out there. I think there are estimates,

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1 I think, from -- well, I'm not going to guess, but  
2 there are questions as far as how much material will  
3 be in the pool, itself. So that's a new operation,  
4 and that's one that could potentially have an impact  
5 to worker safety.

6 DR. WEINER: Are there any changes that  
7 have made your review markedly more difficult, or  
8 markedly easier? Let me ask the other question, too.  
9 I was sort of thinking in the direction of, has this  
10 made the review process harder?

11 MR. JOHNSON: I don't believe it's made  
12 the review process harder. Handling canistered fuel  
13 is going to -- I think DOE's thought is that it's  
14 inherently safer, and it's going to reduce the number  
15 of event sequences. We'll have to see where they go  
16 with it, but it should focus on the event sequences of  
17 consequence.

18 DR. WEINER: So you should have fewer  
19 event sequences to deal with, and perhaps they would  
20 be more tractable.

21 MR. JOHNSON: I believe that's their  
22 thought process, yes.

23 CHAIR RYAN: Jim.

24 DR. CLARKE: Thanks, Robert. Just a  
25 couple of questions, clarify maybe a few things. One

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1 of the things I didn't see on your slides, and maybe  
2 it's implicit in the whole PCSA analysis, is the model  
3 that the DOE is using, the TSM model. Is that still  
4 going forward? I think we heard about that very  
5 briefly about a year ago.

6 MR. JOHNSON: Yes, they are using that  
7 model. They talked about that at the IMMM conference.  
8 There was a presentation on it in the public forum.  
9 My understanding is that they are using it, and that  
10 they're going to -- they're adjusting now the  
11 variables.

12 DR. CLARKE: Yes. And my understanding of  
13 that model is you would not only look at things  
14 important to safety, you would look at, what I would  
15 call technical risk, operations, material flow through  
16 the facility, some of the questions that you say  
17 haven't been answered yet. What do you do with stuff  
18 that doesn't come in in TADs, which I think is one of  
19 the reasons that they've added the pool, so that they  
20 can mix and match there, if it's not being blended at  
21 the utility. And so it's turned into probably not as  
22 simple an operation as maybe was originally intended.  
23 They're still going to have some fuel assembly  
24 handling in some cases, and is that model being used  
25 to try to bound some of those things?

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1 MR. JOHNSON: We haven't --

2 DR. CLARKE: I guess I'm just trying to  
3 find out a little more about the model.

4 MR. JOHNSON: I believe that they are  
5 using the model, but they haven't briefed us on it, or  
6 we haven't had a technical exchange recently that I  
7 know of, where we discussed the TSM model.

8 MR. CAMPBELL: We did ask for a briefing  
9 on that some time ago, and they weren't prepared at  
10 that time to do that. Maybe they will in the future.  
11 My understanding of the TSM model is that it is not a  
12 pre-closure safety analysis model. It does not end up  
13 in the same space that a pre-closure safety analysis  
14 model would stop.

15 DR. CLARKE: And my understanding, Andy,  
16 is it's more operational.

17 MR. CAMPBELL: Yes. It is to try and  
18 understand their operational system. It is not a  
19 model designed to comply with regulatory requirements.

20 DR. CLARKE: And the PCSA is being done by  
21 the DOE. The tool that you mentioned, however, is a  
22 tool that you've developed to help you review that.

23 MR. JOHNSON: Correct. It's an  
24 independent tool that was developed for us. It  
25 provides review capability. It has software

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1 integrated consequence capabilities. I have to go  
2 back to --

3 CHAIR RYAN: Robert, while you're on this  
4 very topic - and, Jim, if I may - I think it would be  
5 very helpful to the committee at some point if we  
6 could see a demonstration of the PCSA tool. Is that  
7 possible? Let me ask why. I mean, we're talking  
8 about evaluating risk-significant issues, and I'm sure  
9 there's capabilities in your modeling tool that you  
10 can use and demonstrate as to how you would go through  
11 a sequence, or look at a particular issue. And it  
12 doesn't necessarily have to be a detailed item that's  
13 under discussion with DOE. But if we could get a  
14 better sense of how it works, and how you exercise it  
15 in your evaluation protocols, that might be helpful.  
16 Just a thought.

17 MR. JOHNSON: We may be able to answer a  
18 little bit of that here. I'll take a stab at it sort  
19 of at a higher level. The tool provides capability  
20 for us to do independent calculations. SAPHIRE is a  
21 component of it, so all of the capability of SAPHIRE  
22 to develop event sequences, or do those types of  
23 calculations, lay out event trees, and fault trees, it  
24 has that capability. It has consequence codes that we  
25 can use, again, for independent --

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1 CHAIR RYAN: If we could maybe take a  
2 technical term, and not necessarily today, because I  
3 wouldn't want you to rush into something you hadn't  
4 prepared, but if we could kind of walk through that  
5 technical process that you would do to evaluate a  
6 problem, or even set up a problem. That, I think,  
7 would be helpful to the committee to see, and gain  
8 some insight as to how you would do the work you're  
9 describing to us today.

10 MR. JOHNSON: Okay.

11 MR. CAMPBELL: I think that from our  
12 perspective, we would have to work that into a  
13 schedule. In the past, we've given the committee  
14 multiple briefings on TPA code. We'd have to set  
15 something up in a time frame that works with staff's  
16 schedules and everything.

17 CHAIR RYAN: No problem. If it's not a  
18 reasonable thing, let me know, but I think it would  
19 enhance everybody's understanding of exactly what  
20 we're talking about. Even if it's kind of an  
21 abstracted version, just so they can see how these  
22 various elements get exercised, and what the thought  
23 process, and discussion process is for how a team  
24 would use that tool.

25 MR. CAMPBELL: In timing space, I think we

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1 would probably be looking at some time in the fall.

2 Would that work for the committee?

3 CHAIR RYAN: I don't think that's a  
4 problem, at all.

5 MR. CAMPBELL: Obviously, we would have to  
6 discuss that.

7 CHAIR RYAN: Again, I'm not looking for  
8 you to give us your soup to nuts. This is a real  
9 problem, and this is every step, but just some idea  
10 how the tool works, I think would help folks to see  
11 you use those on a routine basis.

12 DR. LEE: Just as a follow-up to what Dr.  
13 Ryan is asking for, maybe three years ago when - or  
14 maybe even longer when this tool was first being  
15 constructed, there was some discussion of when it was  
16 - once that tool was in place, and benchmarked, and  
17 worked out, you would come back and brief the  
18 committee, so I think this is just a follow-on to that  
19 earlier --

20 MR. CAMPBELL: What I would envision us  
21 doing, and, again, we will have to discuss this, but  
22 it would be some sort of status briefing of where  
23 we're at with the tool, what it's capabilities are.

24 CHAIR RYAN: Yes. And how it works --

25 MR. CAMPBELL: Be analogous to something

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1 we've done in the past on TPA.

2 CHAIR RYAN: Yes, that would be fine.

3 MR. CAMPBELL: Okay.

4 CHAIR RYAN: Because it's clear that  
5 you've thought a lot about it, and how it should be  
6 used, and how the structure of your whole program  
7 works, and I think that's central to what we're  
8 hearing today. That would just be an enhancement of  
9 this briefing.

10 MR. JOHNSON: Now one thing I'm going to  
11 -- there is a briefing that took place in 2003. That  
12 may help, because the flow and the concept was laid  
13 out at that point, so that would be good background  
14 information. Vis and I actually gave that  
15 presentation.

16 CHAIR RYAN: Right.

17 MR. JOHNSON: Also, I need to point out,  
18 the tool provides analytical capability. We are doing  
19 other activities. The pre-closure safety analysis  
20 exercise is something, for instance, that's outside of  
21 the tool, and we may use parts of the tool for  
22 different aspects of that exercise. We use the tool  
23 for parts of it. I just point that out. So the other  
24 things that are going on are independent activities,  
25 even from the tool, but when we need the calculator,

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1 we use it.

2 CHAIR RYAN: Sure. And I think we all  
3 appreciate the fact there are other calculational  
4 things that you need to do, and then that's an input  
5 to the assessment of the tool. All that's fine, but,  
6 frankly, it would be helpful, I think, for us, and  
7 also maybe our larger audience here from the public's  
8 standpoint, it gets an insight as to how you make  
9 these analyses, and how your thought process evolves.

10 MR. JOHNSON: Okay. Great. Thank you.

11 DR. CLARKE: Okay. That's kind of where  
12 I was headed. And if I understood what Andy said, you  
13 do expect a briefing at some point on the TSM, so  
14 we'll hear more about that.

15 MR. CAMPBELL: Well, we have not received  
16 confirmation from DOE. This was some time ago that we  
17 discussed it.

18 DR. CLARKE: And I guess the reason I keep  
19 bringing this up is I think there are operational  
20 issues that could impact safety, and things pile up,  
21 things go wrong, and things don't go exactly like they  
22 were planned to, so I was just curious about where  
23 that is. They are using that model to address some of  
24 those questions. And I agree with Mike, I think it  
25 would be helpful, at the appropriate time, we hear a

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1 little more about the tools that you're using to  
2 perform the review. And I'll stop there. Thanks.

3 MR. JOHNSON: One other point to point out  
4 is, we've got a lot of activities in the works, so we  
5 have a full plate.

6 MR. CAMPBELL: One quick point. Andy  
7 Campbell, again. It is DOE's tool. They do use it  
8 for operational purposes. It is not used for, as far  
9 as I can tell, any compliance issues. And, perhaps,  
10 DOE is the one that should give a briefing. I can't  
11 speak for them, but maybe they should talk about the  
12 TSM to the committee.

13 CHAIR RYAN: Well, we'll take an action  
14 and maybe follow-up, Mike, with them, and see if we  
15 can get --

16 DR. LEE: Well, I believe Chris Koons is  
17 coming in in June to talk about the total system model  
18 in TAD.

19 CHAIR RYAN: Oh, good. Great. Come on  
20 down.

21 DR. LEE: We'll be here, total system  
22 model in TAD.

23 DR. CLARKE: Okay. Thanks.

24 CHAIR RYAN: All right. Professor Hinze.

25 DR. HINZE: Robert, I'm sitting here

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1 looking at the recommendations that the committee made  
2 in the letter to the Commission in September of '05,  
3 and you'll be pleased to at least know that in my  
4 interpretation that you've covered most of these  
5 recommendations. However, I do note that one of them  
6 is the staff should add fire protection to the list of  
7 high priority pre-closure topics. Has that been  
8 incorporated?

9 MR. JOHNSON: At this point, we are  
10 considering fire hazards. We are aware of them, and  
11 we're looking where the possibility exists for fire  
12 hazards. Certainly, when we were looking at the fuel  
13 handling, or the bare fuel handling in an enclosed  
14 cell, we were looking at temperatures, fuel loading,  
15 ignition sources.

16 DR. HINZE: But it goes way beyond that.

17 MR. JOHNSON: Actually, I'm getting a nod.  
18 Albert, do you want to say a few -- Albert Wong from  
19 the technical staff.

20 MR. WONG: Hi, good afternoon. Albert  
21 Wong, I'm a member of the tech staff on the High-Level  
22 Waste. The answer is yes, and part -- if you recall  
23 from one of the slides Robert prepared, on the  
24 technical work, there's operating experience. And  
25 part of the operating experience that we're

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1 specifically looking at are fire and explosion  
2 hazards. And as part of that, we're also preparing  
3 our staff capability, in-house staff capability  
4 looking at those issues. So along that line, we have  
5 engaged in our efforts in NRR and NRO, and also our  
6 experts in the regions to, again, prepare for our  
7 capabilities. So the answer is yes.

8 DR. HINZE: So it would be appropriate to  
9 say that this has moved to a high priority  
10 consideration?

11 MR. WONG: It's part of the overall  
12 technical capability we're trying to build up, trying  
13 to prepare ourselves. Yes, the answer is yes. Along  
14 with other capabilities we're trying to build up.

15 DR. HINZE: Thank you very much.

16 MR. WONG: You're welcome.

17 MR. CAMPBELL: Let me add, Dr. Hinze -  
18 again, Andy Campbell.

19 DR. HINZE: Yes, Dr. Campbell.

20 MR. CAMPBELL: There's a difference  
21 between a high priority in terms of what we may be  
22 looking at for staff preparations, and anything that  
23 might be construed as risk-significance. Okay.  
24 There's a fundamental difference between those, and we  
25 want to make sure for the record that --

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1 DR. HINZE: What's the difference between  
2 a high priority and a --

3 MR. CAMPBELL: We don't have a pre-closure  
4 safety analysis with an identification of ITS systems  
5 that DOE has to produce for their license application.  
6 In that license application, they would identify any  
7 risk-significant components to the system on the basis  
8 of that pre-closure safety analysis. We haven't seen  
9 it, it's not done yet, and that will be the document  
10 which will present that type of information. So what  
11 we have to-date is, we're looking at operating  
12 experience, we're looking at effects of fire, and a  
13 variety of different hazards that could occur in a  
14 facility as a part of our preparation to review what  
15 DOE presents to us, so we don't know that they would  
16 come in and say it is risk-significant or not. We'll  
17 have enough information to be able to review what DOE  
18 sends to us.

19 DR. HINZE: High priority is the lower  
20 level, and as you are reviewing it at this point, and  
21 then you see the risk-significance as it is stated by  
22 DOE. Is that kind of your --

23 MR. CAMPBELL: Let me restate. The  
24 purpose of our pre-closure work is to prepare the  
25 staff to review DOE's license application. Obviously,

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1 we've gone through, on numerous occasions over the  
2 past few years, and included things in those  
3 activities, and not included things in those  
4 activities. So what you see, and what is ongoing is  
5 we feel the most important areas to continue looking  
6 at, given all the other areas we could look at, but  
7 that is not to be construed as necessarily going to  
8 end up being a risk-significant area of an LA.

9 DR. HINZE: Well, I guess that went to one  
10 of my other questions that I kind of jotted down here,  
11 is how do you -- how are you determining which are  
12 those high priority issues, if you aren't doing it  
13 from a risk-based point of view?

14 MR. CAMPBELL: We are a risk-informed  
15 organization, so we base it on not only things like  
16 what would come out of a model, but the operational  
17 experience reviews, what's gone on. The NRC has been  
18 licensing operational facilities for many decades at  
19 this point, and we have a pretty good idea of what the  
20 risk significant areas are. And we're working with  
21 other divisions in terms of understanding what those  
22 issues are, and focusing our efforts in those areas  
23 that past experience has shown can be potentially  
24 risk-significant, or could lead to other issues.

25 MR. JOHNSON: And to add to that, we're

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1 also using our expertise, our understanding of DOE's  
2 approach now, the things that they are leaning toward  
3 for ITS SSCs, things that they may have identified in  
4 public technical exchanges, where we have an  
5 opportunity. So we have a number of elements or  
6 things to put into the equation. It's not risk-based,  
7 is where he started, it's risk-informed. We're taking  
8 insights from our independent activities, we are  
9 looking at what DOE's approach is, what they might  
10 have identified as being important safety. Do we  
11 agree with that? If they've not identified it as  
12 important to safety, do we think it needs to be? So  
13 it's -- the real focus is going to be on what they  
14 identify as important to safety, and what we think may  
15 be important to safety. But I think the easy or the  
16 question, the answer to the question you're looking  
17 for is, are we considering fire hazards in the work  
18 we're doing? And the answer is yes, we're looking  
19 both for operating experience, and in the pre-closure  
20 safety analysis exercise, how --

21 DR. HINZE: Some quantification, as Dr.  
22 Campbell pointed out.

23 MR. JOHNSON: Yes. Is it likely? How  
24 likely is it? And what are the consequences? If  
25 there's not a lot of fuel, or it's not likely, then we

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1 would not spend a whole lot of time on it. But,  
2 again, DOE has to identify if the event sequences that  
3 would result from a fire hazard are categorized as  
4 Category 1 or Category 2 event sequences.

5 DR. HINZE: Let me move to your slide 13,  
6 integrated review strategies. I may have  
7 misunderstood, but this integration of review teams  
8 sounds really great. But what I think I heard was  
9 that the integration was largely on the input side of  
10 things, and I didn't hear anything about the output  
11 side. And integration has to be on both of those to  
12 be effective, and that's not a --

13 MR. JOHNSON: Well, at that point we were  
14 about 40 minutes into the presentation. I may not have  
15 clearly mentioned that. It is not only the inputs,  
16 what I need to be able to make the licensing decision,  
17 the regulatory finding in my section, but also, what  
18 I'm going to -- what the outputs are from that  
19 section.

20 DR. HINZE: Right.

21 MR. JOHNSON: And how that's handed off to  
22 the next part of the analysis, or the person that's  
23 doing the review of the next part of the analysis, so  
24 it actually is both. And there's a --

25 DR. HINZE: That's okay, Robert. I just

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1 didn't hear it, and I just wanted to make certain we  
2 were all on the same page on that.

3 MR. JOHNSON: And, actually, in addition  
4 to that, not only inside the PCSA or the pre-closure  
5 safety analysis itself, but we're also going to be  
6 looking at the integration. And I talked about  
7 licensing specifications, how they're going to  
8 demonstrate that they're going to operate safely, what  
9 controls they have to rely on, what the integration is  
10 between the event sequence development and  
11 categorization, and the SSCs that would be important,  
12 the structure, systems, or components that would be  
13 important to safety, and that link. So DOE has  
14 identified something as being important to safety, how  
15 are they putting together the licensing specs to  
16 ensure that that particular SSC performs its intended  
17 safety function, surveil, maintenance, training, the  
18 whole nine yards.

19 DR. HINZE: Let me move on to Interim  
20 Staff Guidance. Will there be any more ISGs related  
21 to pre-closure? Did I ask the right question, because  
22 I heard --

23 MR. JOHNSON: That's the right question,  
24 and I have the right answer.

25 DR. HINZE: There were going to be eight

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1 at one time.

2 MR. JOHNSON: At one time, there were a  
3 number of them. I can't remember whether it was  
4 eight, or more or less. Right now, I believe that  
5 there are none on the agenda. We have these four that  
6 are laid out. We are -- I think 04 is out, human  
7 reliability is out for public comment, and the period  
8 should be closing very soon. And ISG-03 is in the  
9 last part of the concurrence to have it be made final.  
10 And right now, there are none identified; however, in  
11 the time that we have, if we do identify the need to  
12 update the review plan, or to provide any clarity in  
13 it, clarifications to what's in there as a result of  
14 maybe a design change, or updated regulatory guidance,  
15 then we would go through that process.

16 DR. HINZE: You received a lot of comments  
17 on 1, both on the technical side and the process side.  
18 Forgetting the process side, what kind of a response,  
19 or comments have you had to your other ISGs, your  
20 draft ISGs?

21 MR. JOHNSON: Actually, it's been pretty  
22 limited. We have gotten feedback. We've provided it  
23 in the agency to Research and NRR, as well as Spent  
24 Fuel and whatever they're called now, Spent Fuel -  
25 Fuel Project Office.

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1 MR. CAMPBELL: Spent Fuel Storage and  
2 Transportation, SFST.

3 MR. JOHNSON: Okay. And Fuel Cycle. So  
4 it's going out internally, and it's going out for  
5 public comment. And I believe on 1, we received  
6 comments from DOE and NEI. On 2, we received comments  
7 from DOE and NEI. On 3, I believe we received  
8 comments from DOE and NEI. I'd have to double check  
9 that, so we're getting limited feedback, but the same  
10 general types of comments.

11 DR. HINZE: Concerning ISG-01, I attended  
12 your June of last year working meeting with NEI, and  
13 EPRI, and my impression at that point was that DOE had  
14 no problems with ISG-01. Is that still the case, with  
15 the review methodology that you have suggested as a  
16 possibility in 01?

17 MR. JOHNSON: I believe that that's still  
18 the case.

19 DR. HINZE: There were some items, though,  
20 and possible misunderstandings of some of the wording  
21 in that. Has that been clarified, at all, in ISG-01?

22 MR. JOHNSON: Fortunately, I have a couple  
23 of staff here that can probably answer that.

24 DR. HINZE: I think we were both in the  
25 meeting. We were sitting next to each other.

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1 MR. JOHNSON: As far as I understand it,  
2 and I am not a seismologist, I think that there are  
3 not problems, but I'm going to defer that to either  
4 Abou-Bakr, or Raj, or Chris.

5 MR. IBRAHIM: Abou-Bakr Ibrahim, High  
6 Level Waste. I don't think we have any problem with  
7 DOE in ISG-1, and they agreed with everything we  
8 stated in the ISG. The only thing was NEI, and we had  
9 a meeting with them, and we clarified that issue with  
10 seismology, to some extent, with our response to them.

11 DR. HINZE: Thank you very much, Dr.  
12 Ibrahim.

13 MR. JOHNSON: I would like to add  
14 something to that. We also, as a part of that  
15 process, NEI had requested public meetings to discuss,  
16 I believe, both ISG-01 and ISG-02.

17 DR. HINZE: If I may have a few more  
18 moments?

19 CHAIR RYAN: Please, Professor Hinze.

20 DR. HINZE: In your review teams, two,  
21 one, one, three, identification of hazards, and  
22 initiating events. I note that your initiating events  
23 are seismic hazards and aircraft hazards. And I'm  
24 wondering why volcanism isn't there, because it seems  
25 to be such a significant topic in the integrated issue

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1 status report of April 2005. There are several  
2 mentions of volcanic activity in this report, and I'm  
3 just wondering has that dropped off the radar screen?  
4 Is it unimportant? Has it been evaluated, et cetera?

5 MR. JOHNSON: Actually, I have several  
6 comments there. The first one is, when we -- I gave  
7 as examples on slide 10 initiating events, I just  
8 listed them. There's a lot of activity going on. I  
9 wanted, because of the interest in PFS and aircraft  
10 hazards, we are looking in that particular area, so  
11 this, again, is examples. And maybe I should have  
12 made that a little more clear. There are a number of  
13 activities that are going on. We will look at all of  
14 the hazards that DOE identifies as being important, or  
15 the ones that -- the hazards that they're going  
16 through the process and identifying. We will look at  
17 the event sequences that are developed with them, as  
18 well.

19 Now I think to get more specifically your  
20 question, volcanism may be an issue in post closure  
21 because of the Category 1 and Category 2 event  
22 sequences, and the likelihood. I'm not sure that it's  
23 a pre-closure issue. In the last -- when Paul  
24 Harrington gave the last briefing, I don't know  
25 whether that was two months ago.

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1 DR. HINZE: It was two months ago, and I  
2 asked him the same question, and he said that he was  
3 unprepared to answer it. I talked about, number one,  
4 the loading, the mass loading by the ash, and also,  
5 the ventilation problem.

6 MR. JOHNSON: I think there are two -- I  
7 think we can get through the two answers there. I  
8 think what we have heard from DOE, I think in public  
9 technical exchanges, and I think Paul mentioned it.  
10 I'd have to go back and look at the transcript, but  
11 they are going to design the roof loads for a specific  
12 ash load. They have to justify what that ash load is,  
13 and the likelihood of that event occurring.

14 We have done independent work, I believe,  
15 at the Center, and we have our thoughts on whether  
16 that event sequence is a Category 1, or a Category 2  
17 event sequence that needs to be considered in the pre-  
18 closure safety analysis.

19 DR. HINZE: How about the ventilation  
20 system, and the clogging of the system by ash, and the  
21 ramifications that might have through the entire  
22 process?

23 MR. JOHNSON: This is one -- I have not  
24 seen how DOE is planning to approach that. My first,  
25 my gut response is that they would be -- if this type

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1 of event occurred, they'd move into a safe mode of  
2 operation. They would shut down. I mean, they'd move  
3 -- the tech spec would say we're going to shut it  
4 down. We have to ensure that it provides this amount  
5 of recirculation and lay it out, so that, combined  
6 with the fact that the likelihood of this particular  
7 event happening on top of another event sequence that  
8 would result in a potential demand, or a release that  
9 you'd need the HVAC system for, would put it beyond  
10 Cat 2.

11 DR. HINZE: It just should be dealt with.  
12 That's my concern.

13 MR. JOHNSON: Okay.

14 DR. HINZE: Going to slide 10, I think  
15 this is just a repetition in the sense of what Dr.  
16 Ryan and Dr. Clarke had talked about, in terms of the  
17 operating experience. You talk about this being a  
18 first-of-a-kind, but there are other facilities that  
19 have many of the same concerns that you might have  
20 with the pre-closure facility. And do I understand  
21 correctly that you have applied your analysis to some  
22 other plants? Was that what I --

23 MR. JOHNSON: Yes, sir. We're actually -  
24 and you hit it right on. The regulatory context of  
25 the risk-informed performance-based rule is different.

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1 This is a first-of-a-kind regulatory activity. You  
2 are absolutely right, there are independent spent fuel  
3 storage installations out there. There are pools.  
4 We've been handling material. There are hot cells out  
5 there. There's quite a wide source of operating  
6 experience that gives us real world, or actual  
7 experience, or where we expect hazards, so we  
8 recognize that there are analog components out there,  
9 and we are looking at them, or we're looking at the  
10 experience with them.

11 We also recognize that some of the stuff  
12 that they're going to come in with could be unique,  
13 and we're trying -- that's why we're pushing to  
14 understand and interact with them on design as soon as  
15 we can, so that we can understand what the SSCs are,  
16 and what the ITS SSCs are. They have a transfer and  
17 placement vehicle which I think is going to be  
18 relatively unique, and they're going to have to come  
19 up with a reliability. I believe it's an ITS SSC, and  
20 they're going to have to justify the reliability of  
21 the system, or provide a technical basis for the  
22 reliability of the system. And that will be  
23 interesting to see.

24 DR. HINZE: Well, I assume that you have  
25 some examples of Lessons Learned from this kind of

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1 operating experience, if you will. And with your  
2 field site visits, this is being very helpful.

3 MR. JOHNSON: We're actually documenting  
4 --

5 DR. HINZE: I want to support that. I  
6 think the committee is supporting it, and we'd like to  
7 see an example of how it really does apply.

8 I'm going to take time, if I might, for  
9 just one more question. What's the status of  
10 evaluation of the aging pad? Are there any problems  
11 with the aging pad in terms of its location and  
12 proximity to faults on cut-and-fill property? Where  
13 are you and your colleagues in terms of evaluating the  
14 pad?

15 MR. JOHNSON: I'll start that off at a  
16 high level, and then let some of the structural people  
17 get in. We are looking at the pads for performance  
18 with respect to aircraft hazards. We're looking at  
19 seismic performance. There are different activities  
20 that are going on there.

21 Now, I think -- sorry. As far as the  
22 placement of the pads, I'm not sure that they're  
23 actually narrowed the pads, where they're going to put  
24 them, down yet in CD-1. We will have an opportunity,  
25 I believe at the end of the month on May 30<sup>th</sup>, to have

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1 public technical exchange in Nevada, where I believe  
2 they're going to be laying out facility layout, so we  
3 will get some idea of where it is. I'm not sure where  
4 they're putting the pad, yet.

5 DR. HINZE: Will you be having the dynamic  
6 information on the subsurface in that area then from  
7 them at the same time? That will help you to proceed  
8 with your work.

9 MR. JOHNSON: I'm not sure I can speak for  
10 DOE at this point, but one of the structural staff.  
11 Abou-Bakr.

12 MR. IBRAHIM: So far, DOE is still doing  
13 some measurement for identifying the structure surface  
14 and structure where the situation will, because as you  
15 know, they didn't decide exactly where the pad will be  
16 located. And it within next months, I think you may  
17 know Dr. Stucky is going to the field and try to  
18 collect more data for SSW, and they are doing also  
19 some drill holes, deep drill holes, and shallow drill  
20 holes to get the information for the geotechnical  
21 investigation.

22 DR. HINZE: Well, last month, or in March  
23 when Dr. Harrington was in, he showed an actual  
24 location of the pad. But you're saying that's up for  
25 grabs yet, because the analyses, and actually, the

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1 data collection isn't completed. Thank you very much,  
2 Buck. Dr. Ryan, I've taken my two minutes. Thank you  
3 very much.

4 CHAIR RYAN: Yes, thank you. Well spent.  
5 It seemed like 30, Bill, but it flew by.

6 (Laughter.)

7 CHAIR RYAN: No, that's fine, and I think  
8 we benefitted by the comments. Yes, Dr. Campbell.

9 MR. CAMPBELL: Just a point of  
10 information. The closing date for public comments on  
11 ISG-04, which is Human Reliability Analysis, is June  
12 4. And Dr. Tina Ghosh will make a presentation to the  
13 committee tomorrow morning at 11 a.m.

14 CHAIR RYAN: Great. Look forward to that.  
15 Thank you. Allen?

16 VICE CHAIR CROFF: My two minutes.  
17 Another two minutes, and then we can retire.

18 On your slide 12, there's a couple of  
19 items there, plans for retrieval and alternate storage  
20 of waste, and plans for permanent closure. I think I  
21 maybe know what those mean, but tell me what those  
22 cover.

23 MR. JOHNSON: Let me start off by saying,  
24 I wanted to make sure that you got the full picture,  
25 the full -- these are aspects of pre-closure review,

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1 so I went in and included them. This is where we're  
2 looking at their plans with respect to how -- there's  
3 a regulatory requirement that they have a plan to be  
4 able to retrieve a certain amount of waste in a given  
5 time. This is the process, this is the section of the  
6 review plan that steps through each of that, each part  
7 of the review plan.

8 And then as far as two and three, plans  
9 for permanent closure, this has to do with  
10 decontamination and demolition, or decontamination and  
11 decommissioning. Thank you. So that's where they're  
12 looking at those aspects of the pre-closure review.

13 VICE CHAIR CROFF: Okay. I guess what I'm  
14 reacting to here is, in many of our previous  
15 discussions, somehow we focused a lot on the surface  
16 facilities, and at least for me, it's gotten by me,  
17 the fact that your scope covers, I gather, emplacement  
18 operations, retrieval, which is sort of an Alternative  
19 B, and then actually closing this thing.

20 How are you going about preparing things,  
21 like inserting Titanium drip shields, and the  
22 possibility of backfill, and this kind of stuff?

23 MR. JOHNSON: Most of those are post  
24 closure aspects, I believe. Now let me step into this  
25 one. With respect to retrieval, DOE has to have a

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1 plan in hand when they submit the license application  
2 to be able to retrieve the waste in a timely manner.  
3 And we're not -- DOE is going to submit the plan for  
4 how they would achieve this, whether things -- and,  
5 certainly, they're going to be thinking about  
6 backfill. I believe that they're talking about drip  
7 shields in a long-term.

8 VICE CHAIR CROFF: But still pre-closure.

9 MR. JOHNSON: Correct.

10 VICE CHAIR CROFF: By definition.

11 MR. JOHNSON: So once they submit the  
12 license application, we'll have staff looking at these  
13 plans. We have staff assigned to it right now to be  
14 looking at the plans once they submit the license  
15 application for how they're going to be able to do  
16 this. And now, they'll weigh the benefits, or the  
17 merit --

18 VICE CHAIR CROFF: Well, first let me be  
19 clear on something. All of this is included in your  
20 review scope.

21 MR. JOHNSON: Correct.

22 VICE CHAIR CROFF: Okay. But it's a very  
23 different kind of a thing from --

24 MR. JOHNSON: It is.

25 VICE CHAIR CROFF: -- seismic analysis of

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1 a facility, or airplane crashes. And where are you  
2 going to get experience or background information on  
3 things like backfill, and emplacing Titanium shields  
4 in these little vehicles that are going to take the  
5 TADs or the canisters, whatever, down into the  
6 repository? That seems to take you down a whole  
7 different line of information needs, and experience  
8 needs.

9 MR. CAMPBELL: Let me take a stab at that.  
10 And Robert can correct me if I'm wrong, but in terms  
11 of pre-closure, our review is focused on Category 1  
12 event sequences, something that can happen at least  
13 once during the operational life of the facility, that  
14 would result in a dose to either workers or the  
15 public. Category 2 event sequences, I think is 1 in  
16 10,000 chance of occurring over the life of the  
17 facility, that could result in a significant dose to  
18 a member of the public outside the boundary of the  
19 facility. Anything beyond Category 2, if I understand  
20 correctly, does not have to be analyzed. So if the  
21 emplacement of the drip shields, or backfill, or any  
22 of that could result in a worker dose, they would have  
23 to, obviously, analyze that. If it's simply an  
24 operational thing, they would have to, obviously,  
25 consider how they're going to do that. But I'm not

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1 sure that would, necessarily, be a pre-closure safety  
2 analysis issue. And I think Tim can correct me if I'm  
3 wrong.

4 VICE CHAIR CROFF: I recognize you're  
5 still guessing at what sequences they're going to  
6 include there or not, but still, don't you have to be  
7 prepared to do some level of review. If they say it's  
8 not included because of the probability, you have to  
9 have enough expertise to either validate that, or say  
10 no, we don't accept that? And how would you go about  
11 -- I mean, this is about preparation for the review.  
12 How do you go about preparing for the review of those  
13 things?

14 MR. CAMPBELL: Well, again, DOE has to  
15 make the case of whether this - any sort of accident  
16 could occur with this that would result in either a  
17 Cat 1, or a Cat 2, or if it's beyond Cat 2, they don't  
18 have to analyze it, beyond maybe an initial pre-  
19 closure analysis, or they've screened it out. That's  
20 up to them. We don't know exactly how they would do  
21 that.

22 VICE CHAIR CROFF: Yes, but how are you  
23 preparing to review it?

24 MR. McCARTIN: I guess from a -- I mean,  
25 there are certain aspects of Yucca Mountain that are

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1 a first-of-a kind. Installing drip shields, I don't  
2 think anyone has ever done that in this kind of  
3 environment. They will have to present how they plan  
4 to do it, and the design. We will review that using  
5 our engineering judgment, and that pretty much is it.  
6 I mean, there are no corollaries to this that we have.  
7 However, the flip side of it for operations, remember,  
8 we are there inspecting and enforcing the regulations,  
9 so as things are being done, we will be there to  
10 examine, watch, oversee, and so early-on, the review  
11 will be based -- you know, something like the drip  
12 shields, yes, it's going to be based on engineering  
13 judgment, and what we consider to be reasonable for  
14 the feasibility of their design and their operations.  
15 However, we will be there to watch the operations.  
16 But I don't know what -- I'm trying to get a sense of  
17 what the concern is --

18 VICE CHAIR CROFF: Well, let me pick maybe  
19 a more typical example, and that is, the possibility  
20 of a rock fall. Now you've got a bunch of TADs lined  
21 up, and the rock comes tumbling down. How are you  
22 preparing to review that?

23 MR. JOHNSON: The first -- I think it  
24 comes back to the -- the first part of that is, is  
25 this rock fall and event sequence that fits in either

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1 as a Category 1 or Category 2 event sequence? And if  
2 it is, is there a potential to get a consequence to a  
3 worker or outside of the repository? So if the event  
4 sequence is Cat 1 or Cat 2, does it result in a dose,  
5 and does the dose exceed performance objectives? And,  
6 at that point, if it does, you have to determine  
7 whether you need ITS SSCs.

8 VICE CHAIR CROFF: I understand that. I'm  
9 not making my question clear. My question is, how are  
10 you now preparing to review that?

11 MR. JOHNSON: Well, we have the technical  
12 staff, both operational and seismic structural, all of  
13 the structural staff that are looking at drift  
14 degradation.

15 VICE CHAIR CROFF: You're stating to get  
16 to what I have in mind. I've heard a lot of  
17 discussion about surface facilities in more than one  
18 meeting here. I've heard essentially nothing about  
19 the subsurface operations, and the review of them.  
20 And my first sense, out of ignorance, is that most of  
21 the attention is being paid in the surface, and maybe  
22 not enough in the subsurface.

23 MR. JOHNSON: I can clear part of that up.

24 VICE CHAIR CROFF: And you gave examples  
25 of going and touring facilities, and this kind of

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1 thing. I'm asking what you're doing related to  
2 subsurface.

3 MR. JOHNSON: Okay. We have people here  
4 and at the Center that are looking at drift  
5 degradation. We also have operational staff that  
6 would be looking at event sequences if, again, they're  
7 categorized as Category 1 or Category 2 event  
8 sequence, and there's a potential dose consequence.  
9 If there's not a dose consequence, then what DOE is  
10 going to have to do is figure out how they'll retrieve  
11 it, and that's another -- I think that moves into a  
12 different space, but we are -- we have a team that's  
13 set up and comprised of technical staff that can look  
14 at both the operational aspects, as well as the  
15 engineering aspects associated with drift degradation.  
16 They are going to be developing, or in the processing  
17 of developing a review strategy to lay out, I think  
18 what you're asking for, you're looking for. And so,  
19 I think it's not that you're not hearing about it,  
20 it's that there are not many event sequences that  
21 result in a dose either to worker, or public for this.

22 VICE CHAIR CROFF: But I'm seeing a bit of  
23 circularity here, and that is, you're saying most of  
24 them don't, but you haven't reviewed them yet, so how  
25 do you know they don't?

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1 MR. McCARTIN: Tim McCartin, NRC staff.  
2 I mean, there, I didn't know you were getting at how,  
3 say, the mined openings degrade over time. And there,  
4 there is a lot of experience with operating mines  
5 throughout the world. In addition, at Yucca Mountain,  
6 they have, obviously, the ESF that has been there for  
7 quite a while. There are certain supports done for  
8 maintaining that, watching that, and that is --

9 there's been earthquakes, not huge ones, but  
10 earthquakes at Yucca Mountain with that tunnel open,  
11 and so that kind of behavior is more well known. If  
12 the concern is as much with the stability of  
13 underground openings, we do have the expertise, and  
14 there is experience out there with respect to the  
15 safety of underground openings.

16 VICE CHAIR CROFF: I don't mean to pick on  
17 any particular sequence, and I don't want to get  
18 focused on it, because that isn't my point. If DOE  
19 comes in and says it's a Cat 1 or Cat 2, you have to  
20 review it. DOE says it's not, you've got to review  
21 the justification for them saying it's not, and agree  
22 with it.

23 MR. McCARTIN: Correct. And the  
24 underground openings are a part of that.

25 VICE CHAIR CROFF: Well, I understand, but

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1 that's a specific. In general, you've got to be  
2 prepared for a wide variety of subsurface areas. I  
3 guess at some point - I mean, you've taken a cut at a  
4 work breakdown, let me call it, the 2.1.1s and  
5 whatever. I'd be interested in seeing at some point  
6 maybe a crosscut of this, not broken down by this kind  
7 of thing, but by facility, or operation, or surface  
8 and subsurface, or something, just to see what's being  
9 addressed there.

10 MR. JOHNSON: Okay. That is a good point.

11 VICE CHAIR CROFF: Okay. Enough.

12 CHAIR RYAN: That's your two minutes.

13 VICE CHAIR CROFF: That's my two minutes.

14 Go for it.

15 CHAIR RYAN: I think some of the aspects  
16 of what you had in the last two or four minutes,  
17 really would be enhanced by the kind of thing I asked  
18 about a little earlier, which is, if we could see a  
19 demonstration, it would be clearer, perhaps, to kind  
20 of separate. And I appreciate the difference between  
21 what the applicant must provide, and what your tact is  
22 on being prepared to review what might be within the  
23 range of what an application might actually be when it  
24 gets in front of you. So there's a little bit of that  
25 element, I think, in this discussion, which is good,

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1 because it makes us all think about what we want to  
2 see, and what we'll be looking for, and how we'll look  
3 at it once we see it. So, an example or two that  
4 maybe talks about that a bit, again, in the context of  
5 sort of a real case review on the board, and they'll  
6 recognize the limitations of that kind of a  
7 presentation right up front, but that might help give  
8 folks comfort as to the separate question of what  
9 might be in an application on a particular topic or  
10 sub-topic, and then how you have prepared to review  
11 the range of issues that might reasonably, and I use  
12 that word carefully, reasonably come up in your  
13 assessment of that topic. So that might get us off of  
14 the centerline here a little bit.

15 MR. JOHNSON: Okay.

16 CHAIR RYAN: And with that, I had a  
17 request from Dr. Weiner for a follow-up question.

18 DR. WEINER: Thanks very much. If we  
19 could go back a moment to your slide 12. 2.1.2, the  
20 review team for plans for retrieval - many years ago  
21 when this project first got started, there was some  
22 discussion as to whether retrieval meant positive  
23 plans so the waste could be retrieved, or whether it  
24 meant just don't do something dumb so that the waste  
25 can't be retrieved. And my question is, which aspect

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1 are you reviewing? Is it that you want to see  
2 positive plans for retrieval, or you want to make sure  
3 that you could, if you had to?

4 MR. JOHNSON: I'll ask Tim to follow-up on  
5 this, but I believe that both the 2.1.2 and 2.1.3 are  
6 plans - well, let me step back. The plans for  
7 retrieval under 2.1.2 is not as a convenience, or  
8 perhaps for - I don't think it was intended to address  
9 a recycling issue. It's a plan in case something  
10 significant happens, and you have the need to pull the  
11 stuff back out of the ground, and re-evaluate how DOE  
12 is doing it. There's something that merits now  
13 pulling it back out. It's not a convenience, or a --

14 DR. WEINER: It's not - go ahead.

15 MR. JOHNSON: -- recycling type. I  
16 believe it's a catastrophic problem.

17 MR. McCARTIN: Yes. Tim McCartin. Yes,  
18 it definitely is not a recycling issue. It is one, if  
19 you learn at some point during the performance  
20 confirmation period prior to closure that it is no  
21 longer safe, you have an option to remove the waste  
22 and take it somewhere else. And it's looked on in a  
23 very -- this would be an unusual circumstance, and the  
24 requirement is not even that retrievability is easy,  
25 that it's not impractical. And so it doesn't have to

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1 be easy, and so the bar is, it's not -- it was never  
2 intended for, say, gee, you might learn 100 years from  
3 now you want to go in there, and oh, do we want to use  
4 this now? It was never intended for that, and so it's  
5 solely a safety aspect for the program. And you can  
6 see the rationale behind it, is basically this - let's  
7 say 100 to 300 years is the NRC's final decision on  
8 whether it's safe to close the repository. Well, if,  
9 for whatever reason, oh, 50 years prior to that  
10 something happened, and you now feel it's not safe to  
11 close it, but we have no way of getting the waste out  
12 - well, that decision for closure is basically  
13 rendered moot. The performance confirmation program  
14 is rendered moot if, indeed, you get to a point where  
15 well, we've done this great performance confirmation  
16 program. We are surprised, but we don't believe it's  
17 going to be safe. If you couldn't retrieve, well, it  
18 sort of defeats the whole purpose of that. And so the  
19 retrieval is really supporting - the Commission wants  
20 the flexibility up to the time of final closure, in  
21 making full use of all the performance confirmation  
22 information prior to making that last decision where  
23 you then walk away. But it is clear that it's - the  
24 retrievability capability, it's not rendered  
25 impractical.

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1 DR. WEINER: Thanks very much for that  
2 clarification.

3 CHAIR RYAN: Mike Lee.

4 DR. LEE: Yes. I just have one question.  
5 And, first, thank you, Robert, for being here today to  
6 brief the committee, bringing in staff from upstairs,  
7 and also having San Antonio on line. The committee  
8 really appreciates it.

9 I have an impression from this  
10 presentation and other presentations, and I just want  
11 to share that with you, and get your reaction to it,  
12 if I'm right, or if I'm wrong. But for three decades  
13 in post closure space, the staff had been doing full  
14 performance assessments based on a conceptual design  
15 that DOE first advanced, and then over time more  
16 details have become available regarding that design.  
17 And I guess in the last decade or so, the design has  
18 become more stable. And the Pas have been able to  
19 produce, performed by both NRC, DOE, and others, some  
20 information regarding how the system is sensitive to  
21 certain perturbations in terms of scenarios and things  
22 like that.

23 In pre-closure space, is it fair to say  
24 that the ability of the staff to do a, for lack of a  
25 better description, a full-blown pre-closure

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1 integrated safety assessment, is more sensitive to  
2 having a design in place? Do you really -- I mean,  
3 you need that level of detail in order to make that  
4 type of an evaluation, and then from that evaluation,  
5 get some insights as to what is important and not  
6 important. This is kind of a follow-on to the  
7 conversation or the dialogue between Drs. Campbell and  
8 Hinze.

9 MR. JOHNSON: That's -- well, I believe  
10 you're absolutely correct.

11 DR. LEE: Okay.

12 MR. JOHNSON: The hypothetical facility  
13 that you would lay out is very sensitive. The  
14 importance, the --

15 DR. LEE: Time in motion issues.

16 MR. JOHNSON: -- that you would get from  
17 the facility are applicable to the hypothetical  
18 facility that you've laid out. If the assumptions  
19 change, if they go to bare fuel, or if they go to pool  
20 operations, or canister handling, it directly impacts  
21 the insights you're getting, as well as the specific  
22 types of event sequences that are going to be of  
23 interest.

24 DR. LEE: So both NRC and DOE can make  
25 some generalizations about past nuclear facility

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1 operational experience, and kind of identify some --

2 CHAIR RYAN: Just as a perspective here,  
3 I did a little quick dumb guy calculation. There's  
4 3,000 years of fuel pool experience in the United  
5 States on which these guys are drawing, 3,000 years of  
6 fuel pool experience. That's just the U.S. I don't  
7 even want to try and calculate the number of cask  
8 handling events that are in the database at 104 power  
9 plants around the country. So just as a little  
10 perspective, this is not something that isn't without  
11 foundation. By the way, my 3,000 is my round-off of  
12 30 years of 100 power plants. It's probably more than  
13 that.

14 DR. LEE: That's a more quantitative way  
15 of going where my question was leading to, is that --

16 CHAIR RYAN: Okay. I just want to get  
17 there soon, Mike.

18 DR. LEE: Sure. Okay. So, I guess,  
19 you're not -- I mean, is it fair to say that although  
20 there are known unknowns, based on this past  
21 operational experience, you don't see any -- I mean,  
22 do you see any problems coming up, or are there any  
23 issues that need to be brought to anyone's attention?  
24 I mean, given the fact that DOE is kind of behind the  
25 --

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1 MR. JOHNSON: Well, let me -- I need to  
2 answer that a couple of -- I need to step in. There  
3 are a couple of thoughts I want to add. Again, I have  
4 to point out, DOE has the requirement, the regulatory  
5 requirement to do the PCSA. We don't. We have the  
6 capability to look at pieces of it. What I've tried  
7 to do in the presentation was lay out where I thought  
8 there were challenges and why, and to explain how I  
9 thought we were prepared, and what we were doing to  
10 make sure that we were prepared. We're looking at, I  
11 think, the relevant aspects of the facility now, and  
12 we have a capability to incorporate the pre-licensing  
13 activities that we already have on the table into the  
14 review strategies. And, eventually, is something new  
15 comes up, it'll get incorporated into it. So, right  
16 now, I think we have the areas that are of interest  
17 laid out, and we are marching - we have a plan, and  
18 we've been stepping to it, and will continue to do  
19 that.

20 DR. LEE: I'll let you get back to your  
21 plan. I'm done.

22 CHAIR RYAN: Great. Any other questions  
23 or comments? Hearing none -- sorry, John.

24 MR. FLACK: John Flack, ACNWM. Two  
25 minutes, do I get two minutes?

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1 CHAIR RYAN: You get my two minutes, not  
2 Professor Hinze's two minutes.

3 (Laughter.)

4 MR. FLACK: Okay. Just going back to page  
5 12, it was such a popular page - I was looking at the  
6 review teams, and a lot of these questions that come  
7 up have to do with actually mitigation, if it's fires,  
8 if it's degradation of tunnels, and so on; yet, I  
9 didn't see a team -- I saw teams on accident  
10 initiation, I saw a team on consequence analysis, but  
11 I didn't see any on accident mitigation. And I was  
12 wondering, is someone looking at the ability to  
13 mitigate accidents once you know what they're going to  
14 be, whether there's anything else you can do about  
15 them, in that context as being a team, looking at  
16 these significant events.

17 MR. JOHNSON: The short answer to that is  
18 yes. DOE has got to go through and identify the event  
19 sequences that are Category 1, Category 2, or those  
20 that could potentially be.

21 MR. FLACK: Right.

22 MR. JOHNSON: They have to identify -- and  
23 using the pre-closure safety analysis, they then  
24 identify the SSC, the structures, systems, and  
25 components that are important to safety. Those SSCs

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1 that are required to prevent the event sequence from  
2 occurring, or the systems that they're going to rely  
3 on to mitigate that event sequence. So they have to  
4 do that.

5 We, also, will be looking at the event  
6 sequences that are of interest to us right now, based  
7 on our understanding of where they are, or what the  
8 design is, and the analog facilities that we talked  
9 about, and we have some ideas and thoughts about what  
10 we think is important to safety. Now, DOE has the  
11 flexibility to identify whatever preventative or  
12 mitigative feature they need to reduce the likelihood,  
13 or reduce the consequences, if necessary.

14 MR. FLACK: Does this include human  
15 recovery actions, because what you're mentioning is a  
16 lot of hardware, systems, structures, and components,  
17 but now we get into the recovery mode, human actions,  
18 and human reliability, what they can do, for example,  
19 in fire fighting, or responses to events that we were  
20 discussing before.

21 MR. JOHNSON: Recovery, that's a little  
22 more difficult. They are required to identify the  
23 event sequences that are either Category 1 or Category  
24 2. Once the event sequence occurs, is the consequence  
25 - does it exceed the performance objectives? They can

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1 choose, at that point, to prevent it, or mitigate it.  
2 But once it's occurred, I'm not sure about  
3 requirements for mitigation. Tim, can you --

4 MR. McCARTIN: Yes. Tim McCartin. I  
5 think you correctly -- the event sequences, there  
6 could be actions taken and procedures they have in  
7 that sequence of events that they can take credit for,  
8 for mitigating some of the consequences. Certainly,  
9 that's fair in the event sequences.

10 Now after an accident has ended, in terms  
11 of there could be some recovery to get back to normal  
12 conditions, but that would not be the event sequence,  
13 as we understand it. But I will say one thing, with  
14 respect to fires and explosions, I mean, I'll say I  
15 was the project manager for a pre-closure assessment  
16 in, I think, 1982. It was done by General Atomic for  
17 the NRC, and I know they did point to fires and -- the  
18 one thing they were worried about is fires and  
19 explosions for the operations. You need an energy  
20 source to get significant doses from something that is  
21 basically just sitting there. And fires and  
22 explosions was the biggest thing they were worried  
23 about. But, clearly, that's one of the things that  
24 DOE designed - well, where are you storing the diesel  
25 fuel for the equipment? And, hopefully, it's not next

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1 to the spent fuel handling building. But you can see,  
2 there are certain things that can make the problem  
3 very big, or very small. And that's where part of the  
4 design is important to this, but, certainly, we are  
5 considering things, but the event sequence, there are  
6 things there - and you're right, I think Tina Ghosh  
7 will be talking about that tomorrow, about in terms of  
8 human reliability, when you start talking about human  
9 actions, be it a crane operator, be it other types of  
10 things.

11 CHAIR RYAN: And, again, I guess I'd like  
12 to emphasize the staff's database is not without  
13 examples. There's Brown's Ferry and others, the ACRS  
14 and other parts of the organization have combed these  
15 things over with as fine a tooth comb as I think you  
16 possibly can do. And there's a huge database on which  
17 the staff certainly can draw, both in terms of, at  
18 least some folks that are around the organization  
19 still, and clearly the record. There's a lot to draw  
20 on. I think that's a fair comment to make.

21 Hi. Would you like to ask one question?

22 MR. DIAS: It's not a question, it's a  
23 comment. Antonio Dias from the ACNW staff. I kind of  
24 heard, and I heard from several people, it kind of  
25 gave me the idea that you're ready to review whatever

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1 DOE brings. But I think it's very important to bring  
2 to point that you are a reviewer and the regulator.  
3 You should be ready not also to look at what DOE  
4 brings, but also to question, if they have, indeed,  
5 embraced everything that can actually happen. There  
6 was a moment, and I'm sure I'm causing -- they were  
7 talking about initiating events. And basically said,  
8 whatever they identify, we're ready to look at. Uh-  
9 uh. You have to think outside of that box, and see  
10 have they really addressed everything that can happen,  
11 because it's going to be on your shoulder, that  
12 responsibility as a regulator.

13 MR. JOHNSON: That's a good point, but  
14 I've tried. I tried to make sure that I got it in  
15 there. If we identify any event sequences that we  
16 think are important to safety that maybe they've  
17 missed, we will certainly be interacting on that.

18 MR. DIAS: But time is running out, and  
19 you basically said that you may not know the final  
20 design, when it's time for the license application to  
21 come in. Are you going to handle that then?

22 CHAIR RYAN: You know, I, frankly, think  
23 we've circled this enough. The staff has certainly  
24 indicated their willingness to be open to anything  
25 they see, and to challenge and question it. And we're

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1 arguing about the egg that's not been hatched, so  
2 let's stop trying to presuppose something that's not  
3 going to happen.

4 MR. DIAS: No, I'm just -- it's a comment.

5 CHAIR RYAN: I appreciate the comment. I  
6 think the staff has certainly said, and the way I took  
7 the comment, Antonio, is just as you suggested they  
8 should be ready to do. They could look at any range  
9 of anything they get, and they're open-minded about  
10 anything from soup to nuts. That's what your comment  
11 is, and that's the way I took Robert's assessment, was  
12 that we're ready for anything. Well, that's pretty  
13 much ready for everything. So I took as they're  
14 trying to think in that fashion. Would you like to  
15 say anything in your own defense?

16 MR. CAMPBELL: The importance here is that  
17 we have a risk-informed regulation. A risk-informed  
18 regulation means we look at those things that are  
19 going to result in consequences to either the workers,  
20 or to the public. And so, yes, we are going to look  
21 at how DOE has screened things out, and is that  
22 appropriate, and should it be screened in? Have they  
23 screened something as a Category 2 event sequence,  
24 which really should be a Category 1 event sequence  
25 given the uncertainties? Those are the kinds of

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1 things that we have to do as part of our review, so do  
2 not construe from the issues that we are not prepared  
3 to do that, but we will do it in a risk-informed  
4 manner, which means when things drop off the list,  
5 we're going to focus on those things that are still on  
6 the list, and make sure that those things that have  
7 dropped off the list, really belong there, and don't  
8 belong on the list, if you will. Does that address  
9 your concern?

10 MR. DIAS: That's fine. That's great.

11 MR. CAMPBELL: Okay.

12 CHAIR RYAN: Thank you, Andy. With that,  
13 I want to recommend that we close this session. The  
14 committee will take a 15-minute break. We'll end our  
15 record for the day here. We're going to have a brief  
16 session on consideration of letters and letter writing  
17 after we reconvene at 3:15, and that will be a  
18 relatively short session, but any and all are welcome  
19 to stay and attend, and we'll reconvene at 3:15.  
20 Thank you very much.

21 (Whereupon, the proceedings went off the  
22 record at 2:56 p.m.)

23

24

25

