

Official Transcript of Proceedings ACNWT-0183

**NUCLEAR REGULATORY COMMISSION**

Title: Advisory Committee on Nuclear Waste  
163rd Meeting

Docket Number: (not applicable)

PROCESS USING ADAMS  
TEMPLATE: ACRS/ACNW-005

SISP - REVIEW COMPLETE

Location: Las Vegas, Nevada

Date: Tuesday, September 20, 2005

Work Order No.: NRC-614

Pages 1-190

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UNITED STATES NUCLEAR REGULATORY COMMISSION'S  
ADVISORY COMMITTEE ON NUCLEAR WASTE

September 20, 2005

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

+ + + + +

163rd MEETING

+ + + + +

TUESDAY,

SEPTEMBER 20, 2005

+ + + + +

LAS VEGAS, NEVADA

+ + + + +

The Advisory Committee met at Pacific  
Enterprise Plaza Building One, 3250 Pepper Lane, Las  
Vegas, Nevada, at 9:45 a.m., Michael T. Ryan,  
Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL T. RYAN, Chairman

ALLEN G. CROFF, Vice Chairman

JAMES H. CLARKE, Member

WILLIAM J. HINZE, Member

RUTH F. WEINER, Member

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## 1     ACRS/ACNW STAFF:

2             NEIL M. COLEMAN, ACNW Staff

3             JOHN FLACK, ACNW/ACRS Staff

4             LATIF HAMDAN, ACNW Staff

5             MICHELE KELTON, ACNW Staff

6             JOHN T. LARKINS, Executive Director,

7                 ACNW/ACRS Staff

8             MICHAEL LEE, ACNW Staff

9             RICHARD K. MAJOR, ACNW Staff

10            RICHARD SAVIO, ACNW Staff

11            MICHAEL SCOTT, ACNW/ACRS Staff

12            SHARON A. STEELE, ACNW Staff, Designated

13                 Federal Official

14            ASHOK THADANI, ACNW/ACRS Staff

15  
16     ALSO PRESENT:

17            MICK APTED, Monitor Scientific

18            DEBORAH BARR, DOE

19            JO ANN BIGGS, Hunton &amp; Williams

20            CHRIS BINZER, Robison/Seidler

21            BOB BRADBURY, MTS

22            COURTNEY BROOKS, Nye County

23            JEFF CIOCCO, NRB

24            RAY CLARK, EPA

25            ELMO COLLINS, NRC

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1 ALSO PRESENT: (cont'd)

2 J. RUSSELL DYER, DOE/ORD

3 LEIF ERIKSSON, Waste Control Specialists, LLC

4 STEVE FRISHMAN, State of Nevada

5 ROBERT GAMBLE, MTS/Booz Allen

6 APRIL GIL, DOE

7 ALI HAGHI, BSC

8 DALE HAMMERMEISTER, Nye County

9 CAROL HANLON, DOE/ORD

10 NORM HENDERSON, BSC

11 GEORGE HELLSTROM, DOE

12 CHRISTIN HITIRIS, NMSS/HLWRS

13 DONALD HOOPER, CNWRA

14 JOHN KESSLER, EPRI

15 TIM KOBETZ, NMSS/HLWRS

16 MATT KOZAK, Monitor Scientific

17 GARY LeCAIN, USGS/DOE

18 BRUCE MARSH, Johns Hopkins University

19 TOMIANN McDANIEL, USALE

20 JACOB PAZ

21 GENE PETERS, NMSS/HLWRS

22 MYRLE RICE, Lincoln/White Pine Counties

23 SOLEDAD SIFUENTES, Cogema Engineering

24 ERIC SMISTAD, DOE

25

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1 ALSO PRESENT: (cont'd)

2 JUDY TREICHEL, Nevada Nuclear Waste Task

3 Force

4 DOUG WEAVER, BSC/Los Alamos National Lab

5 DON WOMELDORF, Southwestern LLRW Commission

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

(9:50 a.m.)

CHAIRMAN RYAN: We'll go ahead and get started.

This is the first day of the 163rd meeting of the Advisory Committee on Nuclear Waste. My name is Michael Ryan, Chairman of the ACNW. The other members of the committee present are Allen Croff, Vice Chair, Ruth Weiner, James Clarke, and William Hinze.

Today the committee will discuss the preparation of ACNW reports and letters, be briefed by a representative from the Department of Energy on the overview from the status of the Yucca Mountain projects, be briefed by a DOE representative on the 2005 update for the DOE Performance Confirmation Program Plan, be briefed by an NRC staff representative on the NRC project plan for the Yucca Mountain License Application Review, discuss progress on the development of a proposed White Paper on low-level radioactive waste management issues, and hear a report from an ACNW member and consultant who participated in the 2005 DOE probabilistic volcanic hazards analysis expert elicitation update.

Sharon Steele is the designated federal official for this -- for today's session.

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1           The meeting is being conducted in  
2 accordance with the provisions of the Federal Advisory  
3 Act. We have received two requests to make verbal  
4 comments, which we'll do as we conclude our letter-  
5 writing session this morning at approximately 11:45  
6 from Dr. Paz and Dr. Elzeftawy. So we'll hear from  
7 these gentlemen later this morning.

8           We have received no written comments.  
9 Should anyone, in addition, wish to address the  
10 committee, please make your wishes known to one of the  
11 committee staff.

12           It is requested that speakers use one of  
13 the microphones, identify themselves, and speak with  
14 sufficient clarity and volume so that they can be  
15 readily heard. It is also requested that if you have  
16 cell phones or pagers you kindly turn them off while  
17 in the meeting room.

18           Thank you very much.

19           (Whereupon, the proceedings in the  
20 foregoing matter were off the record from  
21 9:52 a.m. until 11:06 a.m. for the  
22 letter-writing session.)

23           CHAIRMAN RYAN: With that in mind, we've  
24 had a few additional requests for folks to make  
25 comments to the committee this morning, and I want to

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1 try and be as efficient and respectful of their time  
2 as we can. So I'll take them in kind of the order  
3 they've been presented to me.

4 Dr. Paz, you are first up for a few  
5 minutes, please, sir. Could you tell us who you are  
6 or who you represent?

7 DR. PAZ: My name is Dr. Jacob Paz. I  
8 will make my comment. I can attend all of the  
9 sessions. Particularly, I'd like the committee to  
10 look very closely at the potential or the probability  
11 that Yucca Mountain might become a mixed waste site  
12 due to potential or probability of metal and  
13 radionuclides will make sometimes in the future, and  
14 the lack of applicable large-scale study or small  
15 study.

16 Second, about two years ago I made  
17 comments about the general instability in radiation  
18 waste standards, and I recommended that the committee  
19 should look at it very close, develop literature, and  
20 make a recommendation to the NRC how to set the  
21 standard for Yucca Mountain on radiation-based  
22 standard effect.

23 Particularly, it's in light in the future  
24 what's coming up that metal, such as depleted uranium,  
25 chromium, nickel, and titanium, can produce genomic

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1       instability. No study has been done in human implant.  
2       But, nevertheless, that can have an effect when  
3       eventually will come.

4               Striking me is that chromium+3 has been  
5       found to be a mutagenic at the dose of 260 micrograms.  
6       This is a very serious issue, and I think the  
7       committee should look not just on the radiation but to  
8       look at much more broader effect because of license  
9       application.

10              And also, this will have an implication,  
11       which I made a comment like around sometimes in the  
12       future on setting up the standards. It has an effect  
13       on the standard on people -- workers who are  
14       employees.

15              And the last, I'd like to make an analogy,  
16       in my opinion, of Yucca Mountain. In 1906, the State  
17       of Missouri sued the State of Illinois due to the fact  
18       they were dumping sewage into the river reaching St.  
19       Louis, and they claimed it was increasing in typhoid  
20       fever. They lost their appeal to the Supreme Court in  
21       1906 due to the facts of lack of applicable study.

22              I can make an analogy to Yucca Mountain.  
23       We don't have enough study when it comes to risk  
24       assessment. And I raised the issue before, both to  
25       the technical, the board committee, and two years ago.

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1 I have to give credit when the credit was given to the  
2 NRC that they told me to submit a written proposal on  
3 the risk assessment of bystander effect, which I plan  
4 to submit.

5 Thank you very much. I'll give you just  
6 two papers to abstract from the literature, which I  
7 gather on the bystander effect of metals, and one is  
8 on APA, which stated the chemical name be more  
9 important than ever we thought.

10 Thank you.

11 CHAIRMAN RYAN: Thank you, Dr. Paz.

12 Dr. Elzeftawy?

13 DR. ELZEFTAWY: Good morning. I think  
14 it's still good morning. Can you hear me?

15 CHAIRMAN RYAN: Good morning. Just a  
16 little bit closer, please, sir.

17 DR. ELZEFTAWY: A little bit closer. When  
18 I sit in the back, there's a lot of echoes here, so  
19 I'm not sure.

20 My name is Atef Elzeftawy, and I'm here to  
21 represent the Las Vegas Parute Tribe.

22 Number one, I just want to say thank-you,  
23 Mr. Chairman, for allowing me to be here for a second  
24 or two -- maybe more. And, number two, thank you for  
25 coming to Las Vegas. This is the time for people to

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1 come to Las Vegas, when the weather is nice and  
2 reasonable. We got you some cool temperatures. Don't  
3 come when it's 117. You know, it's funny, everybody  
4 comes around with their children, and so on, when it's  
5 110 and all that.

6 So we live here, and we know that you need  
7 to do it like the tourists. When it's 117, you need  
8 to go under the ground, cover yourself a little bit.

9 I just wanted to make a comment or two to  
10 you with regard to your goal and your mission, and so  
11 on. And I was just looking at this particular  
12 publication by the NRC in January of 2000, and this  
13 gentleman was talking about -- doing the history here  
14 and he said, "Much of the past has little meaning or  
15 importance for the present. And, deservedly, it  
16 remains forgotten in the dust bin of history."

17 I think if I were him, even though he is  
18 the Secretary of the office, the historian office of  
19 the Secretary of the NRC, I would disagree with that.  
20 Originally coming from Egypt, I think history can tell  
21 us a whole lot. So this is one point.

22 The second point, since I enjoyed very  
23 much the lunch with Commissioner Merrifield, Jeffrey  
24 Merrifield, whose picture is here in this book, it's  
25 amazing how his attitude and his demeanor and his

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1 position as a member of the Commission was so humble  
2 to listen to some of the nonsense that we had to say  
3 to him when he was here visiting the Valley about --  
4 I don't know -- I think it's five years ago. I'm not  
5 sure. Five or maybe six years ago.

6 I'm not sure if he is still a member of  
7 the Commission or not. But if he is, tell him Las  
8 Vegas Parute Tribe would love to invite you back, and  
9 come and have a bite to eat with us.

10 But here is what the Chairperson would  
11 say. Before -- and I recommend that. Before 9/11, we  
12 had a different perspective on the so-called  
13 repository of high-level waste. Maybe we could argue  
14 about the science and how safe it is, and so on, but  
15 I think 9/11 has changed the picture.

16 We did not see it, as far as 9/11 coming  
17 to us, and it came as a surprise to everybody, even  
18 though that we had some reason to believe that there's  
19 something out there. So what happened? Communication  
20 between federal agencies went haywire. We had a  
21 problem.

22 Now, we're still into another problem. So  
23 the Federal Government -- all of you, and you are a  
24 member of that program -- have done a whole lot of  
25 rethinking, and so on, to safeguard the whole nation.

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1 Well, Katrina came. I don't know if Rita  
2 is going to be here, in the same spot or not, but  
3 Katrina came. A day before it landed I told my wife,  
4 you know, that day I was in San Francisco and I was  
5 looking at NOAA and that thing was heading straight  
6 for Mississippi/New Orleans. It was 180 miles per  
7 hour, according to the reconnaissance.

8 We had 24 hours. It's moving about 10  
9 miles per hour. We had 24 hours to do something.  
10 What happened? You know the rest of the story. I'm  
11 not criticizing. But I think this brings me to the  
12 point I wanted to make for all of you to -- to  
13 remember when you go home.

14 It's now the transportation of the spent  
15 fuel. It is no longer, to me as a scientist, is an  
16 issue as far as risk assessment, and this and this and  
17 this. It's the transportation of that particular  
18 waste from a different part of the country to come to  
19 Yucca Mountain.

20 I know we're going to fight. The tribe is  
21 going to fight for not having anything coming to Las  
22 Vegas, and the people who live in Las Vegas, because  
23 it's growing like crazy. Nothing is going to come  
24 through here. But I'm sure they're going to find  
25 another route to go someplace else.

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1           So in your letter to the Commission,  
2           please highlight that this kind of a situation that  
3           was published in 1987 -- I just picked it up. You  
4           know, the transportation of spent fuel published in  
5           March in 1987. That's the month that I left Neil  
6           Coleman and NRC and I came here to Vegas. That's '87.

7           I think we need, in the light of what we  
8           have been going through, one thing in your letter, Mr.  
9           Chairman, and the committee, is to highlight something  
10          with regard to the transportation. The Department of  
11          Energy is so huge, nothing is going to sink in the  
12          mind to move them like a carrier. We told them many  
13          times about that, technically and otherwise.

14          So you need to go to lunch. I realize  
15          that, so I'm not going to belabor the point. But  
16          think about it. If we had a dirty bomb in LA today,  
17          for whatever the reason is, are we going to be able to  
18          move those -- those five, six million people, if we  
19          had it here in Vegas? It's a million and a half, just  
20          like New Orleans.

21          Where are we going to go? We have a state  
22          planning document -- I have it in my office -- as far  
23          as emergency and all that will happen, but the point  
24          is it's not only in a piece of paper, please. It is  
25          when you conduct it, how are you going to tell your

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1 brain that your leg was cut?

2 So we need that kind of point to be  
3 highlighted by your letter, if you can, and that's the  
4 recommendation of the Chairperson of our tribe.

5 Thank you very much for your time. Enjoy  
6 your time. Don't waste a lot of money on gambling,  
7 and \$5 will be fine.

8 (Laughter.)

9 Good luck to you. There's a lot of good  
10 food here, and come back again.

11 CHAIRMAN RYAN: Thank you very much.

12 DR. ELZEFTAWY: Thank you for the  
13 opportunity and the privilege.

14 CHAIRMAN RYAN: Thank you very much.

15 Next on the sign-up sheet is -- forgive me  
16 if I pronounce it wrong. Is it Myrtle? M-Y-R-L-E.  
17 Myrle Rice. Is Myrle Rice here from the Lincoln and  
18 White Pine Counties? Is that you? Come on up.

19 MR. RICE: No, I'm not speaking.

20 CHAIRMAN RYAN: Oh, you're not speaking.  
21 Okay. It said to make oral statements on the sign-in  
22 sheet, so it was -- you were there -- wrong sheet.  
23 That's okay. Well, we're glad you're here. Thank you  
24 very much.

25 Let's see. I'll get to my other list

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1 here. We had a couple other individuals who I believe  
2 are here. Let's see. We had staff from Congressman  
3 Givens' office. Do we have somebody from Congressman  
4 Givens' office here today? It's actually listed for  
5 tomorrow, but I wanted to give this opportunity if  
6 somebody is here today. And also Mr. Danny Kaufman.  
7 Is Danny here today, or will he be here tomorrow? I  
8 guess he'll be here tomorrow.

9 Are there any other members of the public  
10 that wish to make a comment at this point, or not?

11 Okay. Well, with that in mind, I think  
12 we're prepared to do one of two things, either pick up  
13 another topic, or adjourn here for lunch and reconvene  
14 at the scheduled hour of 1:00.

15 DR. HAMDAN: Mike?

16 CHAIRMAN RYAN: Yes.

17 DR. HAMDAN: Let's have -- the SRB is  
18 being copied. You could come early and do that, if  
19 you have anyone that --

20 CHAIRMAN RYAN: Actually, we'll pick it up  
21 tomorrow in the scheduled letter-writing session, so  
22 everybody can participate. That way we're kind of on  
23 track with the published schedule.

24 That being said, we'll adjourn for a lunch  
25 break and reconvene promptly at 1:00. The meeting

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1 will stand in recess until then. Thank you very much.

2 (Whereupon, at 11:19 a.m., the  
3 proceedings in the foregoing matter  
4 recessed for lunch.)

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

2 (1:00 p.m.)

3 CHAIRMAN RYAN: The afternoon session will  
4 now come to order.

5 We are scheduled for three presentations  
6 this afternoon, and two discussion periods on other  
7 items the committee will take up. The first  
8 presentation is an overview of the status of Yucca  
9 Mountain. It's an update, and Dr. J. Russell Dyer  
10 will be presenting it. So without further ado, begin.

11 I know it's -- the acoustics we've been  
12 kind of struggling with during the day.

13 Let me also ask, for our Reporter's  
14 benefit, if you do speak into the microphone, speak as  
15 close as you can get, like that. And please don't  
16 drag the microphone across the table, because that  
17 sounds sort of like an airplane to his earphone. So  
18 if we could do that, that would be very helpful.

19 So without further ado, Dr. Dyer, welcome.

20 DR. DYER: Thank you, Mr. Chairman. Can  
21 everybody hear me okay? Is this all right?

22 First off, I'm sitting in for my boss,  
23 John Arthur, who would really like to be here, since  
24 he's being deposed in Washington right now. So given  
25 a choice of venues, he would much prefer to be here.

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1 But he's not avoiding you. He will try diligently to  
2 be back with you with the next ACNW meeting.

3 This is going to be a little different  
4 venue for me, because I'm usually a pacer and a  
5 pointer, and there's no place to pace here. And I  
6 really don't have anything to point at.

7 So I would urge everybody, if you don't  
8 have a copy of the presentation -- and they're in the  
9 back of the room, it's a little hard to see some of  
10 the screens in here. I'd urge you to pick up one of  
11 the -- one of the presentations, and I'll take about  
12 a two-minute break while people are going to do that.  
13 Well, I'll take about a 20-second break.

14 There's about five things that I want to  
15 cover here today. First off is this is generally a  
16 project update. There are some things that are  
17 general and specific about the project that we want to  
18 update you on, talk about an update of spent fuel  
19 status. We've updated some of the statistics on that.

20 Talk about the license application, status  
21 of the license application, and some of the things  
22 associated with that, such as the Licensing Support  
23 Network, talk about some of the survey results from a  
24 safety conscious work environment survey that we did,  
25 the second survey that we've done, and we've got some

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1 comparative results that I would like to discuss with  
2 you.

3 Talk a little bit about the probabilistic  
4 volcanic hazard analysis update, what we've done on  
5 that, and what we are doing, and then I'll close out  
6 with a little talk about -- or a little update on  
7 Nevada transportation.

8 In your handout, page 3, this is an  
9 updated slide, which shows the latest information we  
10 have on the status of discharges and projections of  
11 commercial spent fuel from reactors. And what you see  
12 -- the blue curve, the blue solid curve, is the actual  
13 discharges. This is current as of about December of  
14 '04; about 51,000 metric tons had been discharged at  
15 that time.

16 The annual discharge rate is on the order  
17 of about 2,000 tons a year. So the current inventory  
18 is probably something around close to 52,000 metric  
19 tons. The little dot that you see above it, current  
20 cool capacity of 61,000 metric tons, is a useful  
21 datum.

22 Projection into the future -- there are  
23 two scenarios that we use to project into the future.  
24 The dashed blue line looks at projected discharges  
25 from all reactors, but only looking at 35 license

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1 renewals. And the green line looks at the projected  
2 discharges, assuming that we have 104 license  
3 renewals. Neither case assumes any new reactors being  
4 built or any contribution to the waste stream from new  
5 reactor capacity.

6 Other lines on here. Down at the bottom  
7 there is a red line which shows the contribution from  
8 shutdown reactors, and the kind of orange line is --  
9 is the amount of spent fuel that's currently in dry  
10 cask storage at reactor sites. So that kind of sets  
11 the stage for the -- updating what the inventory is  
12 that needs to be dealt with by a nuclear waste  
13 management system.

14 Next slide is slide 4, repository program  
15 steps. Just to, again, kind of set the context of  
16 where we are and where we're headed, this is current.  
17 The last of these milestones that are listed on here  
18 that has been accomplished was the approval of the  
19 site for development as a repository by Congress in  
20 2002. The next major step is a license application,  
21 and then the hearings associated with the license  
22 application.

23 Should NRC grant authority to construct a  
24 repository, then we would have a construction  
25 authorization and proceed with construction, and then

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1 a subsequent licensing action to receive and possess  
2 an updated license application.

3 Page 5, a little bit about the Licensing  
4 Support Network. Of course, as you're well aware, our  
5 previous attempt to certify the Licensing Support  
6 Network a little over a year ago was overturned. We  
7 are in the process of following the directions of the  
8 PAPL Board of certifying -- I won't say recertifying,  
9 but certifying our contents of the Licensing Support  
10 Network.

11 We've got about 3.3 million documents in  
12 the collection. We've done a lot of improvements in  
13 processes, building quality into the processes.  
14 Building on some of the lessons learned from last  
15 year, we've done reviews of e-mails, we have done a  
16 lot more in the way of -- of discriminating between  
17 relevant and not relevant documents.

18 We found that a lot of the documents we  
19 thought would be on the system turn out not to be  
20 really relevant documents. There was a lot of  
21 conservatism that went into the initial estimates of  
22 how much material would be put in there.

23 We've looked at all of the documents that  
24 we think need a claim of privilege associated with  
25 them. Those have all been through manual review. And

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1 then, as I said, we've identified quite a number of  
2 non-relevant documents, duplicative documents, that  
3 we've been able to remove from the system.

4 The target is still for certification of  
5 the license -- of DOE's portion of the Licensing  
6 Support Network in the near term. John Arthur is back  
7 in D.C. working on that this week after he finishes  
8 his other task. I cannot give you a firm date as to  
9 when that will happen. It will happen when we're  
10 convinced and ready that it's ready to happen.

11 The license application, page 6, we've  
12 been looking at different versions of the draft  
13 license application, and this pyramid that you see on  
14 page 6 kind of captures the essence of the LA and all  
15 of the things that lie behind the LA, all of the  
16 supporting documentation and analysis, calculations,  
17 design drawings, etcetera.

18 And whenever we talk about the license  
19 application, it's not just the physical license  
20 application itself, which is around about 5,600 to  
21 6,000 pages of text, but the hundreds of thousands, if  
22 not millions, of pages of supporting documentation,  
23 the technical basis if you will, that lies behind it.

24 There are two main parts to the license  
25 application -- the general information section and the

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1 safety analysis report. The way that the license  
2 application is structured there are really two safety  
3 analysis reports. One deals with the operation or  
4 preclosure period, and the second deals with the post-  
5 closure period, the very long timeframe.

6 And what you see inside this pyramid is an  
7 attempt to convey some of the details of what the  
8 number of documents, kinds of documents and materials  
9 that support just the very top of the LA, the actual  
10 license application itself.

11 Page 7. Where do we stand in the license  
12 application process? Well, as I said, we're  
13 evaluating the draft license application. We've  
14 looked at a couple of versions to date. The science  
15 and design work in the LA is technically sound, and  
16 supports a robust safety analysis for the preclosure  
17 period.

18 First, we'll talk a little bit later about  
19 what the recent draft EPA rule does. There will be --  
20 need to be some additional things looked at in the  
21 license application to accommodate the new standard.

22 We've been very meticulous in going back  
23 and making sure that traceability and transparency in  
24 the LA is thorough and complete, making sure that  
25 everything in there can be cross-referenced or cross-

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1 walked between both the license application  
2 requirements in either 10 CFR 63 or in the Yucca  
3 Mountain review plan, and to make those crosswalks as  
4 transparent and explicit as possible.

5 We're in the process of looking at what it  
6 would take to accommodate and to address the draft EPA  
7 standard, and that's some work that will take us out  
8 in time. Of course, the draft standard was just  
9 released relatively recently.

10 Okay. Page 8. Let me shift subjects a  
11 little bit here. I had the pleasure of talking to  
12 this group. I think it was about 18 months ago when  
13 -- over at the Texas casino, and one of the things I  
14 talked about was an initial survey that we did looking  
15 at the safety conscious work environment within the  
16 project.

17 And we have gone through this cycle twice,  
18 and we have the results of the second survey, which  
19 was done a little less than a year ago. And I'd like  
20 to talk about some of those results, and that's what  
21 you see on this bar graph that's up on the screen and  
22 on page 8. But it's not terribly self-explanatory, so  
23 I'm going to add quite a bit to what is on this simple  
24 bar graph.

25 These are the results of the '04 survey,

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1 and in every area, save perhaps one, we saw an  
2 improvement over the results from '03. Now, let me  
3 back up a little bit, because safety conscious work  
4 environment is only one of the metrics that we were  
5 trying to get a -- some kind of benchmarking data  
6 against.

7 In our paradigm for a safety conscious  
8 work environment, there are really four things that  
9 contribute to the safety conscious work environment,  
10 or the SCWE. First is management support, second is  
11 effective normal problem resolution, third is an  
12 effective alternate problem resolution, and fourth is  
13 effective methods to detect and prevent retaliation.

14 So what we did was take existing surveys  
15 that had been used elsewhere in corporate America and  
16 add some elements that we hoped would allow us to  
17 figure out where we were in those specific areas. And  
18 that's what you see here is the total overall survey,  
19 which starts with a -- sort of a baseline survey that  
20 can be compared against Fortune 500 companies or  
21 federal research and technology programs.

22 And let's -- let me just walk down and  
23 tell you what's specific to our program and what are  
24 metrics that can be compared against other, let's say,  
25 research and technology programs. The first metric,

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1 SCWE culture, is unique to our program. The second,  
2 engagement, is something for which a baseline exists,  
3 and we can compare.

4 The same is true for teamwork,  
5 cooperation, and supervision. Retaliation is unique  
6 to us. Quality and safety emphasis, empowerment,  
7 goals and objectives, ethics and integrity, are all  
8 things that can be compared to other programs.

9 The Safety Conscious Work Environment  
10 Concerns Program is unique to us, while openness and  
11 communication and overall management are things that  
12 are -- can be compared to other programs.

13 If we look at the comparison to the  
14 federal research and technology programs on this  
15 scale, we are at or above the national norms in all of  
16 the categories that can be compared. If we compare  
17 against where we were last year, there's -- if you  
18 remember back to the original survey, one of the areas  
19 that we thought was very critical, that we had poor  
20 showings on, was the Corrective Action Program.

21 We put a lot of management emphasis into  
22 improvement in the Corrective Action Program. And  
23 what we saw was a nine-point improvement in the survey  
24 results from one year to the next. And the survey  
25 takers tell us that nine points is just about the

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1 maximum that you can credibly get as improvement in a  
2 program. So this suggests that the actions we took  
3 were effective and were recognized as being effective.

4 Now, after last year's survey, we learned  
5 a lot of lessons from that survey. Some of the  
6 lessons were that we were not very clear about some of  
7 the questions. There were different ways that the  
8 questions could be interpreted. And we also learned  
9 that with -- one of the shortcomings we had was that  
10 we didn't leave people a -- it was a -- just a  
11 multiple choice questionnaire. There was no room or  
12 accommodation within the questionnaire for somebody to  
13 provide written comments.

14 So this year, after the survey was  
15 complete, we did focus groups to go back and talk to  
16 the people that were involved in the survey and make  
17 sure that the comments and the dialogue that we  
18 established for them/with them would confirm what we  
19 thought we were getting out of the survey results.

20 So we did -- we did focus group followups  
21 with all of the organizations that were involved in  
22 the actual survey. And it was based on a combination  
23 of the survey results and the results of the focus  
24 group meetings that we came up with a set of actions,  
25 or objectives if you will. They are laid out on page

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1 9, which there's the focus of management attention for  
2 this cycle.

3 And if I can just walk down through those  
4 items on page 9, improve SCWE behaviors through human  
5 performance training, observation, and coaching. We  
6 brought in people and programs to help us with that.

7 Improve ease of use and employee  
8 confidence in the Corrective Action Program. We went  
9 -- we have done a lot of improvement in the  
10 effectiveness of the Corrective Action Program, but  
11 there is quite a ways to go. We are still very  
12 heavily focused on improving the Corrective Action  
13 Program.

14 Improve employee willingness to use the  
15 concerns program and maintain the confidence that  
16 concerns will be thoroughly investigated and  
17 confidentiality maintained -- a key pillar of the --  
18 our four pillars of the safety conscious work  
19 environment.

20 Improved confidence in the commitment to  
21 quality throughout the program. Develop and implement  
22 organization-specific action plans as warranted. One  
23 of the things that we didn't have from the first  
24 survey was demographics of the results, so that we  
25 could discern whether or not there were issues that

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1 were resident in specific organizations or  
2 departments, and now we have a little better  
3 demographic, so that we can kind of target corrective  
4 actions where they're needed.

5 And it may be giving people in a certain  
6 organization better information or better tools or  
7 better resources, and improve the survey instrument.

8 And, finally, one that's not on this list  
9 but which is also one of the objectives that we have  
10 is to complete alignment with NRC best practices to  
11 bring our survey tool into at least consistency with  
12 that.

13 Page 10. Let me touch briefly on the USGS  
14 e-mail issue, which came up in the course of some of  
15 the LSN reviews that we were doing. And I suspect  
16 everybody is familiar with at least the basic issue  
17 that happened, and let me just kind of jump to where  
18 we stand.

19 One of the things that we have -- are  
20 doing is a root cause analysis. There is an extent of  
21 conditions in a root cause analysis, and we expect to  
22 have those completed by mid-October.

23 We have corrective actions currently  
24 underway to replace or remediate the moisture  
25 infiltration work that was associated with the

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1 individuals that were the parties to those e-mails.

2 We have planning underway to do a self-  
3 assessment on the culture, if you will, the cultural  
4 environment that -- to find out if there's anything  
5 systemic in the way of program culture that might have  
6 led to this -- these occurrences, and if it still  
7 exists, and if it does, what we need to do to address  
8 it.

9 Page 11. Shifting gears yet again. This  
10 is the update of the probabilistic volcanic hazard  
11 analysis -- the PVHAU, probabilistic volcanic hazard  
12 analysis update. Just to refresh your memory, in  
13 1996, we did the original probabilistic volcanic  
14 hazard analysis.

15 Since that time, there has been a body of  
16 work that has accumulated. There were some ground  
17 magnetics that were done by the Center for Nuclear  
18 Waste Regulatory Analysis. There was an aeromag  
19 survey that the U.S. Geological Survey performed for  
20 Nye County in 1999.

21 These showed the potential for some varied  
22 anomalies that had not been considered in the original  
23 probabilistic volcanic hazard analysis. And as an  
24 update based on that information and some agreements  
25 that were reached with NRC staff through the key

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1 technical -- KTI agreement construct, there is a  
2 number of things that we agreed to do, which would  
3 provide more information that would allow us to go in  
4 and do an informed update of the probabilistic  
5 volcanic hazard analysis.

6 In 2003, we did a helicopter survey, high  
7 resolution aeromag survey, low altitude of this entire  
8 area, and we found some more anomalies beyond what was  
9 originally identified by the 1999 USGS aeromag  
10 anomaly.

11 In 2005, we started drilling of these  
12 anomalies. To date we've drilled two of 10, plan --  
13 we've got 10 boreholes targeted in the program. We've  
14 drilled two of those to date. Both of them have  
15 encountered basalt at depth.

16 We do not have any dates back yet on the  
17 basalts. That's one of the parts of the program is to  
18 get an age date on the basalts, and take that  
19 information back to the probabilistic volcanic hazard  
20 assessment team.

21 And we've been able to bring together  
22 almost the entire group that was the original  
23 assessment team of 1995/'96. There are a couple of  
24 people that were -- are not able to join, but we've --  
25 those have been replaced by very competent

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1 individuals.

2 We started the PVHAU process in 2004.  
3 We've have two meetings to date. The target is to  
4 have the information to feed the PVHA update in 2006,  
5 and close it out in late 2006. So have all of the  
6 information and have the assessments completed by the  
7 end of 2006.

8 Page 12. Let me move closely -- or let me  
9 move to transportation, Nevada Rail. And here we're  
10 only talking about the part of the transportation  
11 system that is associated with Nevada. And as you're  
12 aware, in the draft environmental impact statement --  
13 I'm sorry, in the environmental impact statement for  
14 the repository, DOE expressed a preference for a rail,  
15 primary rail access to a repository at Yucca Mountain.

16 And then, this year we came out with a  
17 preference for a particular corridor. That's the  
18 Caliente corridor. And we initiated efforts to  
19 develop an EIS to support that decision. Work on the  
20 EIS has been ongoing. The bottom of page 12 lies out  
21 -- lays out some of the things that have been done --  
22 geotechnical surveys, hydrology, aerial photography,  
23 etcetera.

24 What's important to note is that there has  
25 been no final decisions on whether to construct a rail

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1 or to construct the Caliente corridor. That's still  
2 a decision that is before us.

3 Page 13, just to kind of refresh your  
4 memory. The red line on page 13 is the Caliente  
5 corridor, the rail access from the town of Caliente in  
6 southern Lincoln County, Nevada, north-northeast of  
7 Las Vegas, coming north of the Nellis Range and the  
8 Nevada test site, skirting around near Tonopah,  
9 turning south and then coming into Yucca Mountain --  
10 about 330 miles of rail.

11 And where you see more than one red line  
12 on here, those are alternatives that are being  
13 examined to determine if there's one alternative that  
14 has more pros than cons for it.

15 For those of you who have driven much of  
16 Nevada, going east to west across Nevada, you go  
17 through the basin and range, and there's about seven  
18 ranges and basins that you go over. There was some  
19 question at some time whether this wouldn't be  
20 prohibitive in the -- or extremely inefficient as far  
21 as negotiating those up and down grades.

22 Page 14 is just a comparative, a  
23 topographic profile if you will, of the Caliente  
24 corridor from east to west, compared to some other  
25 existing rail lines. What's in the green is the

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1 profile from Denver going to the west over the  
2 Rockies. What you see in blue is Rogers Pass profile  
3 coming out of Calgary, over the Canadian Rockies.

4 What you see in Red is Cajon Pass, if you  
5 come up from L.A., up through Bakersfield -- or  
6 Barstow and Baker. That would be that profile. And  
7 then, finally, orange is the Donner Pass profile,  
8 coming over the Sierra Nevada.

9 So if you look at it in the context of  
10 some of the other things that have been done, done  
11 years ago, it looks reasonable.

12 Finally, page 15. In summary, we are  
13 addressing the work required for the Licensing Support  
14 Network certification. I'd like to say we are on  
15 short final for that. We'll see here over the next  
16 several weeks or months.

17 Of course, that is a precondition to the  
18 license application, and we're taking the time that we  
19 have to make sure that we have everything done to our  
20 satisfaction in the license application before we  
21 submit it.

22 The proposed radiation protection standard  
23 from EPA is currently in public review. We're looking  
24 at ourselves commenting in the comment period, and  
25 also looking at how we would implement that particular

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1 standard.

2 Finally, I would reiterate that the  
3 Department of Energy and the Office of Civilian  
4 Radioactive Waste Management is committed to safe  
5 disposal of U.S. spent nuclear fuel and high-level  
6 radioactive waste.

7 With that, Mr. Chairman, I'd like to  
8 answer any questions that the committee might have.

9 CHAIRMAN RYAN: Thank you, Russ.

10 Questions? Starting with Ruth.

11 MEMBER WEINER: I just have a couple, and  
12 they're disconnected. Who approves the documents for  
13 the Licensing Support Network? And who makes -- how  
14 is the decision made about what is relevant, what  
15 isn't relevant, beyond just documents that are repeats  
16 of other documents, verbatim repeats of other  
17 document? That's obvious.

18 DR. DYER: Let me try the first one, your  
19 first part of the question, because that's the one I  
20 didn't understand, which was who approves the  
21 documents.

22 MEMBER WEINER: Who decides what goes into  
23 the LSN?

24 DR. DYER: Okay. Individuals decide. And  
25 it is based on guidance that was provided by the

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1 Office of General Counsel. Everybody received a set  
2 of guidance that said, "These materials are  
3 potentially relevant." And it was up to each  
4 individual to identify, to look at everything that  
5 they had in their office, or that they had produced,  
6 and make a determination as to whether or not their  
7 materials that they had met these criteria for  
8 relevancy.

9 Some people were very conservative in  
10 their interpretation of the criteria, and ended up  
11 identifying a lot of things that went way above and  
12 beyond what the criteria actually called for.

13 MEMBER WEINER: So you say individuals.  
14 Who were these people who had commented?

15 DR. DYER: Everybody on the program who  
16 had materials in their office, the notice went out to  
17 everybody in the program, the contractors, the  
18 subcontractors, everybody should have been polled.  
19 And the managers from each organization were  
20 responsible for certifying that their organization had  
21 made a good faith effort to identify all of these  
22 materials and make them -- make them available.

23 MEMBER WEINER: How about members of the  
24 public, other organizations? I remember way back  
25 initially those documents were supposedly part of this

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1 system also.

2 DR. DYER: Well, only as far as like the  
3 public comment and response document for the EIS.  
4 That is a matter of public record, so that went into  
5 the LSN.

6 MEMBER WEINER: I see. I see. So where  
7 there was public response, it went in.

8 DR. DYER: Right. The other things that  
9 we polled were the records system, correspondence  
10 system, and it depends on what the nature of the  
11 correspondence is. Not every bit of correspondence  
12 with the public necessarily should be in the LSN.  
13 Somebody who is trying to sell us tires, for instance,  
14 we're not going to bog down. Although we tried to,  
15 we're not going to bog down the system with that kind  
16 of material.

17 MEMBER WEINER: My other questions relate  
18 to the transportation -- the draft EIS for the  
19 Caliente corridor. And, first of all, how does your  
20 new draft EIS differ from the FEIS for Yucca Mountain?  
21 Because I know that the Caliente corridor was  
22 considered, was looked at, environmental impacts of  
23 putting in a rail line are documented in that  
24 document.

25 DR. DYER: Well, but it was looked at as

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1 one of I think seven, which eventually got down to  
2 five, alternate routes. So there's not a level of  
3 detail that was in the FEIS that really would support  
4 the decision that we need to make as to whether or not  
5 to build that rail corridor there.

6 MEMBER WEINER: But when you do an EIS,  
7 it's supposed to look at alternatives, yes, but it is  
8 supposed to look at the environmental impact of what  
9 you're planning to do. Was there just greater detail?  
10 In other words, there must be some similarities.

11 DR. DYER: There are some similarities,  
12 but, remember, this was in the repository EIS. It was  
13 focused on the repository system.

14 MEMBER WEINER: Well, if you have a lot of  
15 differences, that's -- I mean, you're looking at the  
16 same corridor. And what I'm trying to get at is, was  
17 the -- was it just more detail? Were there real  
18 differences that you found when you went back and did  
19 another environmental assessment?

20 DR. DYER: Well, let me take one example.  
21 Archaeological surveys. We have -- prior to embarking  
22 on this, we, the Department, had conducted no  
23 archaeological surveys along that corridor. There is  
24 some information in the public record, but not nearly  
25 enough that would inform the decision that you need to

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1 make.

2 Now, we have a lot of information on  
3 archaeological -- archaeological information in  
4 proximity to the site, which is what the focus was.  
5 So there is a lot of other information that we had not  
6 really gathered, not just on that corridor, on any of  
7 those corridors. We mainly worked from existing  
8 public records for the information that was in the  
9 repository EIS.

10 MEMBER WEINER: Finally, if everything  
11 comes through -- well, let me rephrase that. Are you  
12 planning to have everything come through Caliente,  
13 even though it would be coming from, say, the  
14 northwest or Arizona or Idaho, or what? In other  
15 words, everything is going to be routed so that it  
16 goes through Caliente, or is there a plan for a north-  
17 south rail line?

18 DR. DYER: Well, by "everything," I  
19 presume you mean everything that is transported by  
20 rail.

21 MEMBER WEINER: Everything that is  
22 transported by rail. That's correct.

23 DR. DYER: And it would come through  
24 Caliente.

25 MEMBER WEINER: Yes. In other words,

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1 anything transported by rail from, say, the plants --  
2 powerplants at Hanford, WNP 2 or whatever it is now  
3 called, would come through south and then through  
4 Caliente.

5 DR. DYER: That's correct. There has been  
6 talk in the state for years about an alternate north-  
7 south rail route, but that's not -- it's not on the  
8 table in our planning considerations.

9 MEMBER WEINER: How about California? Or  
10 isn't there anything planned from California to the  
11 site by rail?

12 DR. DYER: I'm not aware of anything. I  
13 mean, certainly nothing that DOE has planned.

14 MEMBER WEINER: Okay. Thank you.

15 DR. DYER: Okay.

16 CHAIRMAN RYAN: Allen? Jim? Jim Clarke?

17 MEMBER CLARKE: A couple of questions  
18 about the survey, and I'm not sure if Ruth asked them  
19 or not. I'm having trouble hearing over here.

20 But the safety conscious work environment  
21 survey, if I understand this, you polled 1,650 people.  
22 Could you tell us a little more about who they were?

23 DR. DYER: Well, okay. We sent out 2,560  
24 surveys to everybody that was either a DOE employee,  
25 contractor, or subcontractor employee. Everybody that

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1 we could identify at a point in time was being paid  
2 for by the project.

3 MEMBER CLARKE: Okay.

4 DR. DYER: Not everybody was full-time on  
5 the project. Some of them were just part-time  
6 workers. We had a return rate of 65 percent, and  
7 that's the same return rate we got in 2003.

8 And it was spread pretty much evenly  
9 across organizations. There were some organizations  
10 that had a much better return rate than others.

11 MEMBER CLARKE: Okay. So it was a self-  
12 assessment. I think you said some categories improved  
13 from the earlier survey. Did you mention which ones  
14 those were?

15 DR. DYER: Well, the one that improved the  
16 most was the Corrective Action Program. It went up  
17 about nine points. And I've got a comparison here of  
18 last year's and this year's, somewhere in here. And  
19 it's not broken down the same way that it's  
20 represented there. This is broken down by individual  
21 questions.

22 After we get through, if you want to look  
23 through this --

24 MEMBER CLARKE: Sure.

25 DR. DYER: -- I'd be happy to discuss it

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1 with you. But --

2 MEMBER CLARKE: Just another quick  
3 question. Did you see any major differences between  
4 organizations as far as the responses went?

5 DR. DYER: We saw some organizations that  
6 were substantially lower than others, and that --  
7 those become management challenges. Some areas felt  
8 that they had been shorted in the way of resources, or  
9 that they had been ignored and misunderstood, and it  
10 shows in the survey results.

11 MEMBER CLARKE: Okay. Thank you.

12 MEMBER HINZE: Russ, I appreciate hearing  
13 directly from you, and also learning about what you  
14 feel are the important items in the update of the  
15 Yucca Mountain program. I do have a few questions.

16 We've talked about the LSN in terms of its  
17 completeness, and that's an important factor. But I'm  
18 wondering about how user-friendly it's going to be.  
19 I have not tried to use it even if I -- and I don't  
20 know whether it's even available to me.

21 There is not only the problem of is it  
22 complete, but how easy is it to find things in it?  
23 What are you doing to make certain that the LSN is  
24 user-friendly to people like me or to the  
25 stakeholders?

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1 DR. DYER: I'm afraid I'm going to have to  
2 point to the owners of the LSN, which is the Nuclear  
3 Regulatory Commission. We are providing the  
4 information to populate it with, but the tool itself  
5 and the search engine that's used is provided by NRC.

6 MEMBER HINZE: Well, have you had any  
7 experience with using it yourself? Have you found it  
8 user-friendly?

9 DR. DYER: I do have experience with  
10 trying to use it.

11 (Laughter.)

12 MEMBER HINZE: Okay.

13 DR. DYER: And, I mean, in my judgment,  
14 the search engine that's associated with it could be  
15 a lot more useful.

16 MEMBER HINZE: Okay. That answers my  
17 question.

18 On page 3, you show us this interesting  
19 chart, and one cannot help but reflect on the fact  
20 that in a decade that we're going to have enough spent  
21 nuclear fuel, even without the DOE high-level waste,  
22 to fill up the mandatory maximum of Congress.

23 What is the Department of Energy doing  
24 about thinking out ahead in terms of the availability  
25 of additional repository capabilities and capacities?

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1 DR. DYER: We are charged with going back  
2 to Congress in the 2008/2009 timeframe, making a  
3 recommendation to Congress at that time as to the need  
4 for an additional repository. I think it would be  
5 premature for me to second-guess what we're going to  
6 do some years down the pike.

7 MEMBER HINZE: Okay. You mentioned the  
8 PVHA. The instructions, I believe, to the PVHA  
9 panelists at one of the first meetings was that they  
10 were supposed to look at the probability over a  
11 10,000-year period of time. At the PVHA that was held  
12 a few weeks ago here in Las Vegas, the comment was  
13 made that this was being ratcheted up to a million  
14 years in anticipation of promulgating the new  
15 standards and new regulations.

16 And yet we heard from Bruce Crowe, who you  
17 knew very well and is more knowledgeable of the  
18 volcanism at Yucca Mountain than perhaps anyone,  
19 Bruce Crowe stated at that PVHA that the 10,000 years  
20 was a tough enough problem without going to a million  
21 years.

22 Where does the Department of Energy fall  
23 on this? What are you doing about limiting this to a  
24 10,000-year period, and extrapolating -- using those  
25 values and extrapolating out to a million years, as

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1 has been suggested in the draft of EPA 197?

2 DR. DYER: I want to turn to Eric Smistad,  
3 if he's in the audience. Eric is our manager for the  
4 PVHA.

5 MEMBER HINZE: This was one of the  
6 concerns of the people, some of the people, including  
7 me, in attendance at your recent PVHA. I'm just  
8 wondering where we're headed with that.

9 MR. SMISTAD: Yes. We had from the  
10 beginning asked the panel to consider a million years.  
11 We're asking them to do -- actually do that. We had  
12 -- what we're really asking now is we're asking for  
13 sort of a two-step in terms of the timing process  
14 here. We're asking them to come up with a value for  
15 10,000 years, and then another value for a million  
16 years.

17 MEMBER HINZE: So both. Okay. Thank you.

18 MR. SMISTAD: Yes.

19 MEMBER HINZE: That answers the question.

20 Let me ask another question. You referred  
21 to the e-mail -- USGS e-mail concerns. And the NRC  
22 has proposed in their draft regulation, as a surrogate  
23 for climate change, using a set flux, net flux, of  
24 moisture, water through the repository. And I'm  
25 wondering if you are doing any new work to look at the

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1 net flux in the post-10,000-year period of time. Are  
2 you conducting any new studies? Are you looking at  
3 your models? Is anything new being done?

4 DR. DYER: Certainly, we're looking at the  
5 models, reevaluating the models. Whether we can use  
6 the same model and just extrapolate it out for many  
7 periods of time -- as you're aware, in the previous  
8 TSPA we forced some climatic changes. And in the --  
9 we did something similar in the EIS. We did take the  
10 -- in the repository EIS, we took the calculations out  
11 to a period of peak dose -- well, a million years  
12 actually.

13 Whether the treatment we used in that, in  
14 the EIS treatment, is consistent with the  
15 recommendations or the elements of the proposed  
16 standard, I don't know yet, but that's one of the  
17 things that we're going to have to look at.

18 One of the things we are doing is  
19 relooking at the models, and the infiltration models  
20 in particular, and we may be putting new models in  
21 place.

22 MEMBER HINZE: Okay. Touching base with  
23 the USGS e-mail problem, once again, you stated that  
24 you are doing work, or work is underway, to replace  
25 and remediate the moisture measurements that were made

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1 by the principals.

2 DR. DYER: Correct.

3 MEMBER HINZE: My recollection of that is  
4 that that work was done over a decade ago, and it was  
5 at a time before I think there was general  
6 appreciation of the role of fracture flow. And I'm  
7 wondering if your experiments are in any way being  
8 modified to bring the work up to date with the current  
9 status of our knowledge of the site. Are the  
10 measurements just being repeated, or are they --

11 DR. DYER: What we're going -- what we're  
12 doing, first off, is going back and looking at the  
13 existing database, and looking at interpretation and  
14 models that you can apply to that database. What  
15 models are consistent with the observations?

16 Now, there was a recognition 10 or 15  
17 years ago that fracture flow had a very important role  
18 in infiltration. We also knew it was going to be  
19 difficult to quantify it very precisely. And until we  
20 have a new team come in and look at the infiltration  
21 models and go through that process, I can't tell you  
22 exactly what we're going to do.

23 MEMBER HINZE: Russ, the committee and the  
24 NRC are very much interested in the igneous activity  
25 issue and the potential risks from igneous activity.

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1 And we're looking at certain aspects of magma dynamics  
2 that might have an impact upon the risk-informing of  
3 that item, of that topic.

4 I've heard that you have a new AMR coming  
5 out on magma dynamics, which may impact -- have a  
6 strong impact upon what we are trying to learn. And  
7 I'm wondering if you have any information that -- on  
8 when that AMR might be available, and is that AMR  
9 covering the topics that were brought forth as a  
10 result of the igneous consequence peer review panel  
11 recommendations.

12 DR. DYER: I'm going to have to turn to  
13 Eric again, who assured me that we were almost through  
14 with our consequence analysis.

15 MR. SMISTAD: Yes, Bill, and that's a new  
16 AMR. In fact, an AMR has just been completed, and we  
17 are sending it out to the LSO here shortly. That AMR  
18 takes the analysis further, quite a bit further in  
19 detail, than the dike/drift AMR did, so you'll see a  
20 lot more analysis in that.

21 And that is -- I can't remember the second  
22 part of your question, but it is a new AMR that we've  
23 got.

24 MEMBER HINZE: Well, my question, the  
25 second part of it, was how much does it incorporate

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1 the kinds of studies that were recommended by the  
2 ICPR?

3 MR. SMISTAD: Right. Yes. There were  
4 several recommendations in that report, as you know.

5 MEMBER HINZE: Right.

6 MR. SMISTAD: This report certainly, or  
7 this AMR certainly, does, I'd say, a bulk of the  
8 modeling they were suggesting. They were suggesting  
9 more detailed modelings, and perhaps some 3-D  
10 modeling, that sort of thing, a little more emphasis  
11 perhaps on the multi-phased sort of looks. And this  
12 AMR does step into that --

13 MEMBER HINZE: Well, great. We're happy  
14 to learn that at -- that it's going to hit the street  
15 here shortly, because we'll be interested in it.

16 MS. GIL: Excuse me, Dr. Hinze. If I  
17 could just add something. April Gil, Department of  
18 Energy.

19 CHAIRMAN RYAN: Could you tell us who you  
20 are for the record, please?

21 MS. GIL: April Gil, Department of Energy.  
22 Let me just add to what Mr. Smistad had said. It's  
23 the Department's policy to put our analysis model  
24 reports on our website as they become issued. So I'll  
25 have to check on the specific schedule for the igneous

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1 report that Eric referred to, but it usually takes  
2 some weeks to a month for the reports to be on the  
3 website. So this will be publicly available on our  
4 web.

5 MEMBER HINZE: April, if you could give us  
6 a heads up when that might be available, it would be  
7 very helpful.

8 MS. GIL: Sure, I'll be happy to do that,  
9 Dr. Hinze.

10 MEMBER HINZE: Great. Great.

11 One final question, Russ. I assume that  
12 the geotechnical study of the Caliente corridor  
13 includes some faulting and seismicity. Is that right?

14 DR. DYER: I presume so, but I -- to be  
15 honest, I haven't been that --

16 MEMBER HINZE: Okay.

17 DR. DYER: -- involved with it.

18 MEMBER HINZE: Thanks very much, Russ.

19 DR. DYER: Mr. Chairman, could I respond  
20 to Mr. Clarke? I finally found the information he was  
21 looking for here. Compared to the 2003 versus the  
22 2004 survey, there were a number of areas that were  
23 better percentage-wise.

24 However, if you look at those areas that  
25 have a statistically significant change, there are

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1 two. One is the corrective action process, and the  
2 second is the rewards and recognition area. There is  
3 one area that is statistically significant lower, but  
4 there's a caveat on that, and that's the one called  
5 safety conscious work environment culture, which is  
6 the one at the very top of the screen and which had  
7 the highest overall positive rating.

8 In the 2003 survey, we had four questions  
9 that kind of made up that category. We expanded that  
10 to make up 10 questions, so I'm not sure that's really  
11 an apples and apples comparison.

12 MEMBER HINZE: Thank you.

13 DR. DYER: Sorry, sir.

14 CHAIRMAN RYAN: Okay, thanks. That's  
15 fine.

16 Any other questions or comments for us?

17 DR. LARKINS: Can I ask a quick question?

18 CHAIRMAN RYAN: Yes, please.

19 DR. LARKINS: You were just talking about  
20 the Corrective Action Program. What are the success  
21 measures for your Corrective Action Program? How do  
22 you know when it's successful and effective? What  
23 metrics are you using?

24 DR. DYER: I think there's a couple of  
25 metrics that you can use for it. One is perception

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1 and satisfaction of the users of the program. Do they  
2 feel that it is a program that has more value than  
3 cost, if you will? The second is to look at  
4 effectiveness metrics, such as what kind of repeat  
5 issues come up? And we look at both of those,  
6 obviously.

7 CHAIRMAN RYAN: We had John Flack first,  
8 and then Latif.

9 MR. FLACK: Yes, just to followup a little  
10 bit on that last question.

11 CHAIRMAN RYAN: Would you turn on the  
12 microphone, please, John?

13 MR. FLACK: Oh, I'm sorry.

14 CHAIRMAN RYAN: Thanks.

15 MR. FLACK: Yes. We're very interested  
16 for other reasons -- in other areas, like reactor  
17 areas, of the correlation between the Corrective  
18 Action Program and safety culture. Do you see a  
19 direct correlation between these two programs?

20 DR. DYER: Well, in our constructs, safety  
21 culture has many components to it, one critical part  
22 of which -- and a fundamental part -- is an effective  
23 correction -- Corrective Action Program. If you don't  
24 have that Corrective Action Program built into the  
25 culture, the tools, the processes, and the culture of

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1 using it, I think you're going to be sorely pressed to  
2 try to develop an overall safety conscious culture.

3 MR. FLACK: Yes. I guess I was  
4 questioning on when you're looking at, say,  
5 improvements in the Corrective Action Program, what  
6 degradations that they correlate, do you see a direct  
7 correlation with safety culture itself in the broader  
8 sense of the word, as an indicator of safety culture?

9 DR. DYER: It's an indicator, and so far  
10 we don't have -- I mean, we've got -- we've got two  
11 years of surveys, so it's not too much of a trend to  
12 look at. But we saw -- well, like I just told you, we  
13 saw a positive -- a very high positive increase in the  
14 Corrective Action Program, at least the perception of  
15 the effectiveness of the Corrective Action Program,  
16 yet we saw an overall apparently statistically  
17 significant decrease in the effectiveness of the  
18 safety conscious work environment overall.

19 MR. FLACK: But they're clearly different  
20 things, too, in a sense, right?

21 DR. DYER: Yes, I would agree.

22 MR. FLACK: Yes. Okay.

23 DR. DYER: But I guess, from your  
24 question, I would presume that you would look for a  
25 positive correlation. If one goes up, the other ought

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1 to go up. That isn't --

2 MR. FLACK: Okay.

3 DR. DYER: -- isn't apparently what we  
4 see, but I wouldn't want to draw a trend from one data  
5 point.

6 CHAIRMAN RYAN: And I guess, just to  
7 followup with that, I mean, when I heard you explain  
8 this and heard the questions, you've reported people's  
9 views on the systems and all of the --

10 DR. DYER: That's correct. That's  
11 correct.

12 CHAIRMAN RYAN: You haven't reported any  
13 analytical work to say that, you know, people's views  
14 correlate with actual response. And I think it's fair  
15 to say that, given that it's two years worth of data,  
16 that's tough to do in any circumstance.

17 DR. DYER: Right.

18 CHAIRMAN RYAN: So your secret is to be  
19 committed to a safety conscious work environment as an  
20 ongoing enterprise, not just a few or a couple, you  
21 know, years worth of data, and everything is in the  
22 green, and we're all set. So, I mean, I get the sense  
23 you're looking at this as an ongoing program.

24 DR. DYER: Oh, this is ongoing and very,  
25 very long term.

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1 CHAIRMAN RYAN: Right. Okay. Thanks.

2 Any other questions or comments? Yes,  
3 Latif?

4 DR. HAMDAN: Mr. Dyer, on slide 7, on the  
5 second bullet, you told us that DOE is preparing to  
6 address potential changes in the --

7 DR. LARKINS: Latif, you've got to speak  
8 into the mike.

9 DR. HAMDAN: Yes. You told us that you  
10 are preparing to address potential changes -- changes  
11 in the rule by the EPA. In fact, that doesn't tell me  
12 very much. It doesn't reveal much about what DOE is  
13 doing. Can you tell us if there were specific issues  
14 the DOE team has identified that will be significantly  
15 affected by the rule? And then, you know, how will  
16 that affect the license application overall?

17 DR. DYER: No, I can't tell you, because  
18 we haven't finished the analysis yet. Things that  
19 we've looked at were the features, events, and  
20 processes that are -- that we take credit for for  
21 10,000 years, and the arguments used to screen them  
22 out or screen them in. Are those still appropriate  
23 and adequate and correct if you -- if you use the same  
24 set of features, events, and processes for a million-  
25 year calculation?

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1 Have you captured all of the appropriate  
2 features, events, and processes? Or was there some a  
3 priori screening made?

4 DR. HAMDAN: Why would that change? That  
5 is not changing.

6 DR. DYER: I think we have to convince  
7 ourselves of that.

8 CHAIRMAN RYAN: Any other questions or  
9 comments?

10 Russ, thanks again for your update and  
11 your own view. We really appreciate your insights and  
12 you being with us today.

13 DR. DYER: My pleasure. And as I said,  
14 I'll make sure John is here next time.

15 CHAIRMAN RYAN: Okay. Well, we'll look  
16 forward to his participation.

17 Our next presentation is by Deborah Barr  
18 on the Performance Confirmation Program. Welcome,  
19 Deborah. And if you would please just pick up that  
20 microphone, and don't -- there you go. That's great.

21 MS. BARR: Good afternoon. Oh look, no  
22 clocks. Just like a casino.

23 CHAIRMAN RYAN: I'm going to have to ask  
24 you -- you're going to have to just get right on top  
25 of the microphone.

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1 MS. BARR: Okay. No, I was just  
2 commenting on the fact that there was no clocks  
3 around. So I may run over; let me know if I do.

4 This presentation is actually by two of  
5 us. There is myself, Debbie Barr, with Department of  
6 Energy, and Doug Weaver will be covering the second  
7 half of the presentation. So he'll join me up here  
8 when his portion comes up.

9 We appreciate the opportunity to come back  
10 before you and give you an update. It's been a little  
11 while since we were here.

12 On the slide number 2 -- we'll go ahead  
13 and start there -- this is the outline of what we'll  
14 be talking about today. I'm going to go over the  
15 evolution of the performance confirmation plan,  
16 meaning what has changed since we last spoke to you,  
17 a few years ago I think it was. And we were asked to  
18 address the issue of how risk insights were used in  
19 the development of the program, so I will talk about  
20 how a risk-informed approach was used in the  
21 development of the performance confirmation plan.

22 Oh, my goodness, everybody is leaving.

23 (Laughter.)

24 All right. Then, we were also asked to  
25 talk about how the results will be used in future

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1 performance assessments, and I'll talk about that as  
2 well.

3 And then, Doug will -- Doug Weaver, who is  
4 with the TCO, he is with Los Alamos, and he will be  
5 covering the rest of the agenda here. And he will  
6 talk about the summary of the currently planned  
7 activities, and the program response to change -- how  
8 flexible the program is and how it can adapt to  
9 changes as needed along the way. And then, he'll also  
10 talk about the path forward.

11 So on slide 3, let's go ahead and move  
12 forward here, just a little bit of a history of the  
13 timeline here. We met with the NRC. We had, on  
14 Appendix 7 I believe it was, in February of 2003, and  
15 at this meeting we talked about the process that we  
16 used in the development of the program. We talked  
17 about the multi-attribute utility analysis methodology  
18 that we used.

19 However, at the time we were still  
20 finalizing the final list of activities, and so we  
21 weren't able to share with them at that time the  
22 activities which were determined to be a part of the  
23 program at that point in time. So between February of  
24 2003 and July of 2003, when we spoke before this  
25 organization, we did finalize that list of activities,

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1 and we also had recently completed the version of the  
2 performance confirmation plan which was available at  
3 that time.

4 And so when we spoke to the ACNW in July  
5 of 2003, we covered a number of areas. We talked  
6 about the vision of the program, which was, you know,  
7 why are we doing it? It's defined in 10 CFR 63. It  
8 gives an explanation of the purpose and the rationale  
9 for it. What are the goals of such a program, the  
10 purposes, what's the definition of what performance  
11 confirmation means, and what should a good performance  
12 confirmation program accomplish? Those were some of  
13 the things that we talked about.

14 We also talked about, how does it differ  
15 from other testing and monitoring? Because we wanted  
16 to make it clear that performance confirmation is not  
17 the place where you will see all possible testing and  
18 monitoring. It has a very strict definition and a  
19 specific purpose, and we wanted to make sure that it  
20 was understood that there were other things which may  
21 or may not be occurring which were not a part of that  
22 program but may occur in some other program.

23 Then, during that meeting in July of 2003,  
24 we went through a really painful and excruciating  
25 description of the multi-attribute utility analysis

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1 that we did to develop the program. And it was  
2 lengthy, it was detailed, it was involved, it was very  
3 comprehensive, and I hope that it was meaningful, and  
4 that it was valuable to you, if you were there for  
5 that meeting.

6 And then, we also talked about -- we gave  
7 a brief description of the program, and the key  
8 components of it. We went through the activities that  
9 were a part of the program, that we had finalized as  
10 a part of the program at that time.

11 Slide 4. So, then, that was what -- where  
12 we were at as of the last meeting. So what has  
13 happened since then? Well, we do have an iterative  
14 process of reevaluating, you know, pretty much any  
15 aspect of the program. There is always the  
16 opportunity to look at something, see if there's ways  
17 to improve it or change it in a meaningful way.

18 And so, of course, we've done this over  
19 time with the Performance Confirmation Program, and  
20 there was a management review team which took a good  
21 look at the program and they incorporated things like  
22 programmatic considerations, and they use management  
23 judgment and things like that. And so there were some  
24 refinements along the way of the program, as there  
25 will undoubtedly be in the future as well until, you

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1 know, we finalize the program.

2 So the management review of the program  
3 had certain objectives when they started to look at  
4 the program at that time, and they used certain  
5 criteria. Those criteria were things like: is the  
6 activity necessary or sufficient for regulatory  
7 compliance? Does the activity contribute -- how does  
8 the activity contribute to the primary barriers? Are  
9 there ones that are closely related that can be  
10 combined?

11 And also, are there activities -- are  
12 these activities really confirmatory, or are they  
13 really fitting some other purpose, such as model  
14 refinement, supplemental data, or are they  
15 developmental in nature? And those, by definition,  
16 aren't really appropriate for a confirmatory program.  
17 So these were the criteria that were used at the time.

18 Slide 5. So as a part of that review of  
19 the program, there were certain outcomes that came out  
20 of it. And so, first off, there were quite a number  
21 of activities that were related or overlapping that  
22 were, in fact, combined. So we were consolidating and  
23 combining and streamlining things, and things like  
24 that.

25 Then, there were also some activities

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1 which were deemed to be model refinement,  
2 supplemental, developmental in nature, and so forth,  
3 and so in some cases these were deleted from the  
4 program. Well, in the cases where this was true, they  
5 were deleted from the program, and they may or may not  
6 have been considered for other -- you know, other  
7 programs, other testing or developmental programs.  
8 They may be captured elsewhere, or they may not,  
9 depending upon the appropriateness of that action.

10 And then, also, as a part of this  
11 management review of the program, there were three  
12 activities which were added in order to enhance our  
13 ability to meet the requirements, and these were  
14 construction effects monitoring, saturated zone  
15 alluvium testing, and waste form testing. So these  
16 were three new activities that you didn't hear about  
17 at that previous meeting where we spoke to you.

18 On slide 6, you can see -- these are the  
19 latest things that we added to the current version of  
20 the performance confirmation plan. This was just  
21 issued in November of 2004. It's Revision 5. And  
22 these are -- it's kind of a long list, and I apologize  
23 for the wordiness of the slide here. But there was a  
24 lot of material that was added or refined in this  
25 version of it, and I wanted to make sure and touch on

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1 these points.

2 One thing is there is a clear crosswalk of  
3 the requirements and the guidance in the YMRP. So  
4 between the activities and the requirements we have --  
5 we had some description in earlier versions. In this  
6 version, we have a much clearer crosswalk between the  
7 two.

8 For each of the activities there's  
9 expanded detail on those activities. There is also a  
10 general level of description in terms of test planning  
11 and implementation, but, again, at a general level.  
12 And we'll talk more a little bit later about where  
13 more information, more detailed logistical  
14 information, will be found.

15 There is also a high-level proposed  
16 schedule, which is included in Revision 5 of the  
17 performance confirmation plan. And as you're aware  
18 from the requirements of the regulations, we are  
19 required to define the ranges and the condition limits  
20 for the parameters that we measure, and there is  
21 guidance at a high level given for how that will be  
22 developed.

23 There is discussion of evaluation  
24 processes and also notification criteria. There are  
25 some wiring diagrams in terms of showing the flow of

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1     how we would make decisions in terms of whether we  
2     need to notify the NRC or not. There is a nice -- a  
3     few really nice diagrams in Revision 5 that walk  
4     through the steps that would be involved, should we  
5     need to consider notifying the NRC and what we do at  
6     the point that that happens, and what are all the  
7     steps that are involved.

8                     And then, there is a performance  
9     confirmation integration function in that this isn't  
10    purely just making measurements and then comparing the  
11    results against some, you know, strict ranges. There  
12    is an integration function to this as well. There  
13    will be an ongoing assessment of how all of this  
14    information fits together, what it all means together.

15                    If we are, you know, looking like we're  
16    heading in the direction of exceeding ranges, or we do  
17    actually exceed ranges, it obviously requires an  
18    integrated look at the information and what it's  
19    telling us, so that we can then decide whether or not,  
20    you know, there is truly an issue, or whether we need  
21    to -- you know, whether we didn't understand the  
22    processes well enough, whether we have a mistake, you  
23    know, somewhere along the line.

24                    Whatever the appropriate action is, there  
25    needs to be, and there will be, an integration

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1 function which looks at all of the information as a  
2 whole and doesn't just, you know, focus on the tree  
3 and miss the forest, or something like that.

4 Then, another thing that's in Revision 5  
5 is we did a qualitative comparison of the current  
6 program against the draft TSPA-LA model and report.  
7 And so this was one of those iterative steps, you  
8 know, like we talked about earlier, where we will  
9 consistently check back and make sure that we are  
10 consistent with our current licensing basis, or what  
11 we anticipate our licensing basis to be, since it is  
12 still draft at this point.

13 And so we have a series of checks along  
14 the way, such that we will make sure that this program  
15 will continue to be in line with those things that are  
16 deemed to be important to performance barrier and  
17 total system, as we approach licensing and as we reach  
18 it, if and when we do.

19 So, and then, the last thing here that we  
20 talk -- that I list on the table -- there's quite a  
21 bit more in the plan itself but -- is the performance  
22 confirmation test plans, and these are the places --  
23 this is the place where the detailed information would  
24 be found about specific activities.

25 The level of detail in the performance

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1 confirmation plan itself isn't anticipated to really  
2 change at any point now. This is the one that we  
3 anticipate will support us as -- for licensing, unless  
4 there's, you know, some reason to change some aspects  
5 of an activity based on a review like we talked about  
6 earlier.

7 But the detail, in terms of implementing  
8 the activities, in terms of the expected ranges, the  
9 reporting ranges, the methodology for accomplishing  
10 the tasks, things like that, these are in these  
11 performance confirmation test plans which are at a  
12 lower level than the performance confirmation plan.  
13 And they'll be developed at the appropriate times,  
14 such that they are -- they are there and ready to be  
15 implemented when the activity is implemented.

16 For ongoing activities, we have a staged  
17 approach of developing these plans, and then  
18 implementing them along the way. But for ones that --  
19 or for activities that wouldn't even begin until some  
20 point in the future, they'll be developed and  
21 implemented at an appropriate time for when they're  
22 needed.

23 On page 7, we were asked to talk about how  
24 risk insights were used in the development of the  
25 performance confirmation program. And if you recall

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1 much from the -- that meeting where we spoke to you  
2 before in 2003, it may just be a blur, you know,  
3 because there was so much we covered.

4 But we talked about how when you're making  
5 decisions in the face of risk and multiple criteria,  
6 there are certain methodologies that are normally and  
7 appropriately used. And one of them is the multi-  
8 attribute utility theory, and that is the one that we  
9 chose to use in the development of this program.

10 It's a well-known and well-established  
11 methodology for looking at something which is  
12 inherently risk-informed in the way that it does it,  
13 or at least you can make it risk-informed in the way  
14 you apply it. And so this is what we did in terms of  
15 our decision analysis process that we used to develop  
16 this program.

17 It was a rigorous process, and it was used  
18 to determine the complexity, extent, and number of  
19 activities that were used or that were developed as a  
20 part of the program. And so I'm going to walk through  
21 just a little bit of the detail, but not spend a lot  
22 of time on it, because we covered it before, and also  
23 if you would like to spend much time reading about it,  
24 the excruciating unabridged version is in Revision 2  
25 of the performance confirmation plan. And if you look

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1 back at that one, you'll see a quite extensive writeup  
2 in terms of all of the details of how this was done.

3 We didn't carry forward all of that  
4 information into later versions of the plan, because  
5 it was, you know, supporting information and it was a  
6 snapshot in time. But if you want to go back and look  
7 at that detail of how we took this approach, then that  
8 would be the place to find it is in Revision 2 of the  
9 performance confirmation plan.

10 So I'm just going to talk very briefly  
11 about a few of the points in it that I believe support  
12 the fact that we can say that we used risk insights in  
13 developing this program. We developed certain  
14 criteria as a part of the initial activity evaluation,  
15 and that criteria included sensitivity, confidence,  
16 and accuracy. And by that what I mean is sensitivity  
17 of the total system and the barriers to the parameter  
18 being measured or monitored.

19 So, for instance, if we were proposing to  
20 measure temperature of the waste package surface, we  
21 would then look at how sensitive is that parameter, or  
22 how sensitive is total system and barrier performance  
23 to that particular parameter.

24 The second one -- confidence -- is  
25 confidence in the current representation of the

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1 parameter being measured or monitored? And so, for  
2 instance, if we were to measure temperature of the  
3 waste package surface, how confident are we in our  
4 current representation in our licensing case that we  
5 have a good understanding of what waste package  
6 temperature is.

7 And so, for instance, if you have a lower  
8 confidence, that means there would be increased value  
9 in obtaining more information on this.

10 And then, the third one -- accuracy -- is  
11 accuracy of the proposed data acquisition method at  
12 measuring the parameter. So is it measurable? So if  
13 it's -- if you can make accurate and direct  
14 measurements, those are more valuable, if all other  
15 things are equal, than something which is not as  
16 accurate or not as direct.

17 And so the first two -- sensitivity and  
18 confidence -- that's -- those are basically assuming  
19 that you have perfect information, if it's possible,  
20 you know. Then, what is the value of collecting that  
21 information, if you were able to collect perfect  
22 information?

23 The third one -- accuracy -- is used to  
24 scale the value of the first two, and that gets at  
25 things like -- well, I mean, perfect information is

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1 rarely available, and so you need to modify your  
2 understanding of the first two in light of that second  
3 -- of that third point there.

4 So on the next slide, slide 8, I am not  
5 going to spend much time on this one, because this one  
6 was that was shown at the last meeting where we  
7 presented to you in 2003. And I don't want to get  
8 bogged down into too much detail on this, but I do  
9 want to, again, point out that if you look at the blue  
10 squares along the bottom, I believe that this helps to  
11 highlight the fact that risk insights were used in the  
12 development of this program, because this is the way  
13 the information rolls up into developing the overall  
14 utility or value of including a specific parameter.

15 And so the -- you can see from the boxes  
16 on the bottom that these are getting at things like  
17 sensitivity of system performance, or sensitivity of  
18 the barrier capability, our confidence in our current  
19 representation, our sensitivity of our conceptual  
20 models, and then how accurate are we in terms of  
21 temporal changes, spatial changes, and how direct can  
22 the measurement be made for a particular activity  
23 that's being considered.

24 So, let's go on to slide 9. Still on  
25 risk-informed -- I've probably beat this one to death

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1 -- but we -- we went through this activity evaluation.  
2 There were development processes, selection processes,  
3 refinements that occurred along the way, and so all of  
4 that rolled into this being a program which we believe  
5 is -- takes into consideration risk insights.

6 We will have a continuing process of  
7 reviewing the program against the information  
8 available in the current TSPA, as well as the process  
9 models that support it. And we'll continually check  
10 back against that information which goes into our  
11 licensing case, such that this program is up to date  
12 and represents those aspects of the program that are  
13 important.

14 On slide 10, just very briefly here on the  
15 second bullet here, I want to talk about a little bit  
16 -- this is what I talked about a little bit earlier.  
17 This was the qualitative evaluation that was done  
18 against the TSPA draft, and I wanted to go into a  
19 little bit of detail here, because it did result in a  
20 few changes to the program.

21 I mean, this wasn't some box we were  
22 checking where essentially we were looking -- you  
23 know, we were comparing against the TSPA-LA draft, and  
24 saying, "Yes, it looks good." We actually did in this  
25 case make a few changes to the program based on what

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1 we learned.

2 We determined in that qualitative  
3 evaluation that 17 of the current 20 activities were  
4 directly relevant to the technical basis. They fell  
5 into the area of medium to high significance in terms  
6 of TSPA-LA for importance or uncertainty. So we  
7 verified that 17 of those 20 activities did, in fact,  
8 address those things which were drivers for TSPA.

9 The remaining three activities -  
10 construction effects monitoring, drift inspection, and  
11 the thermally accelerated drift thermal-mechanical  
12 monitoring -- are related really to retrievability.  
13 That is the one preclosure aspect that we address in  
14 performance confirmation, and that is our ability to  
15 retrieve. And so these three activities for the most  
16 part really get at retrievability.

17 And so it wasn't so much surprising that  
18 they didn't rank high in terms of post-closure  
19 performance in the comparison against the TSPA-LA  
20 draft.

21 We didn't actually add any new activities  
22 at this point in time, but we did make a refinement of  
23 one activity and that was the waste form testing  
24 activity. We made a modification to that one to  
25 better confirm igneous scenario assumptions.

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1           On slide 11, we talked here on the  
2 previous slide about how we did a qualitative  
3 comparison against TSPA-LA draft. We also intend in  
4 the future to do a quantitative comparison against the  
5 TSPA-LA, and this is going to be in the form of  
6 sensitivity analyses, which will be done using the  
7 TSPA and the supporting models.

8           This will be following the completion of  
9 the TSPA-LA and the associated documentation that  
10 supports it. We'll do this systematic evaluation,  
11 which, again, you know, as I said, will involve  
12 sensitivity analysis, regression analysis, and we'll  
13 do those to confirm that the activities that we have  
14 in the performance confirmation program still are the  
15 ones that are getting at those things that are  
16 important to barrier and total system performance.

17           We'll also during those -- during that  
18 assessment look at both nominal and disruptive  
19 scenarios, so we want to be -- you know, we want to  
20 make sure that we address all things that are  
21 important here.

22           We were asked to talk in this update on  
23 how the results of the performance confirmation  
24 program would be used in future performance  
25 assessments.

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1                   In 10 CFR 63.51(a) (1), it talks about how  
2                   when we do an amendment to close that we would be  
3                   required to do a TSPA at that time, and it talks,  
4                   then, about how we would use information from the  
5                   Performance Confirmation Program as a part of that.

6                   So that is one explicit occurrence of a  
7                   performance assessment where PC -- performance  
8                   confirmation -- results will be used as a part of it.

9                   Other than that, as we are conducting the  
10                  Performance Confirmation Program, the actions that we  
11                  take as a result of the information we receive could  
12                  possibly, you know, go all the way up to having to run  
13                  another performance assessment.

14                  Now, we don't have any firm commitment to  
15                  do any at any specific times. But depending upon the  
16                  information that we collect and the recommendations,  
17                  you know, that come out of an integrated look at the  
18                  results of the program, we may feel that it's  
19                  appropriate to do a performance assessment with the  
20                  information that we receive, so that we better  
21                  understand the results of the information we're  
22                  collecting.

23                  So those are the only two scenarios that  
24                  I could think of in terms of how performance  
25                  confirmation data is used in future performance

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1 assessments.

2 So that is my portion of the presentation,  
3 and Doug Weaver now is going to talk about the rest.

4 MR. WEAVER: Thank you. In this section  
5 of the presentation, we'll go a little bit deeper into  
6 the question of what has changed since the last time  
7 this program was presented, and details associated  
8 with the 20 activities themselves.

9 Page 13, I've -- and the subsequent two  
10 slides afterwards, I've listed the 20 activities,  
11 sorted by the YMRP acceptance criteria, which is the  
12 way that they're laid out in the PC plan itself. I  
13 won't go through these at this time, because I go one  
14 by one a few slides down the road. But there you see  
15 bulletized on slides 13 and 14 the 20 activities.

16 I should mention that in the plan itself  
17 there is a lot more detail associated with the  
18 selection criteria of each activity, our current basis  
19 of understanding, and also our anticipated methodology  
20 as -- for each one of them. So here we're just  
21 hitting the highlights.

22 Slide 15, I've sorted the activities a  
23 little differently. It's a very busy figure, but it  
24 shows how these activities are mapped to the three  
25 barriers. There is more than 20 docs here. As you'll

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1 notice, several activities address more than one  
2 barrier, but I think it's just a good representation  
3 of how we're applying the program into which of the  
4 three barriers.

5 Page 16, I'm going to talk now about these  
6 activities sorted by -- in time phase, and that's how  
7 the rest of the presentation will go. The activity is  
8 really conducted in three phases -- those that are  
9 ongoing and are a continuation of activities or  
10 similar activities initiated during site  
11 characterization, as required by the reg.

12 Some of these activities, of course, might  
13 have a hiatus. A good example of those would be  
14 mapping. We conducted mapping, of course, of the ESF  
15 during site characterization. There is none of that  
16 activity going on at present, but will continue once  
17 new excavations are opened up.

18 There is a small set of activities that  
19 we'll start really as early as practicable, but likely  
20 during the construction phase of the project, and then  
21 another set that would be more -- would start during  
22 operations, largely because of their need for live  
23 waste.

24 And the bottom note illustrates, you know,  
25 it's not a guarantee that these activities would

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1 necessarily run during the complete preclosure period.  
2 Some of them may terminate early as applicable.

3 Page 17 is simply a graphic of that,  
4 everything on one page. I should note that the bottom  
5 line -- you should truncate that orange line at the  
6 middle vertical green line. That was a function of  
7 the graphic being split into landscape. But, again,  
8 it shows the activities, those of which we've started  
9 during site characterization in some form or fashion  
10 and are currently developing test plans for those in  
11 construction and in those to be initiated during  
12 operations.

13 So with that, I'll go into detail -- a  
14 little bit of detail of each of the 20 activities,  
15 beginning on page 18, starting with a simple one --  
16 precipitation monitoring. The intent of that activity  
17 is to measure quantity and composition of  
18 precipitation near the site. Its real purpose is to  
19 give the seepage monitoring activity found below some  
20 context.

21 Again, precipitation monitoring is an  
22 activity that's been going on sometime. It continues  
23 to this day. We've started the first of our test  
24 plans with that activity.

25 Seepage monitoring, as the title suggests,

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1 is that. We will look at sealed alcoves, sealed  
2 bulkheads on the uptake side of -- on the intake side  
3 of the repository, also in the thermal accelerator  
4 drifts, which I'll talk about in a little while,  
5 looking for evidence of -- if any, of seepage and to  
6 analyze any that's found.

7 Subsurface water and rock testing is an  
8 activity, as it suggests, collection of any water and  
9 rock throughout the repository, the underground  
10 forming assumptions of -- for fast paths being used  
11 currently in the UZ models. That would be things --  
12 you know, chemistry of the upper natural barrier,  
13 water, chloride 36, things of that nature.

14 Page 19, three more activities that in  
15 some form or fashion began during site  
16 characterization UZ testing. That would likely  
17 piggyback onto the alcoves used for seepage to --  
18 basically, as written, the field testing of transport  
19 and sorptive properties.

20 And we anticipate doing at least a test in  
21 the middle, and another in the lower left. It would  
22 be a tracer test to, you know, inject dye and collect  
23 -- in lower boreholes.

24 Saturated zone monitoring, which is using  
25 existing -- likely existing holes onsite, whether

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1 those be through Nye County or others that we have to  
2 -- measurements of water level, and so forth, as  
3 written, pH and things of that nature, SZ, alluvium  
4 testing as an activity. That's basically alluvial  
5 tracer complex, most likely, using multiple boreholes,  
6 both the crosshold pump and tracer tests for that  
7 activity.

8 Slide 20. Again, the ongoing --  
9 activities that are ongoing in site characterization,  
10 subsurface mapping as required by the reg. We will  
11 map the excavations as they're opened, likely behind  
12 the TBM, mapping of fractured faults, contacts, and so  
13 forth.

14 Seismicity monitoring -- that's monitoring  
15 of regional seismic and any observations of fault  
16 displacements, if there's a significant event. That's  
17 work that's currently ongoing largely by UNR at  
18 present.

19 Construction effects monitoring -- that's,  
20 again, behind -- as the excavations are opened up, as  
21 the measurements of construction deformation and  
22 confirmation of rock properties, largely for drift  
23 stability, it also relates, of course, to the  
24 preservation of the ability to retrieve, to ensure  
25 stable openings.

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1           Page 21, we're into some lab work, largely  
2 corrosion testing. That's lab testing of waste  
3 package pallet and drip shield materials for general  
4 corrosion and transformation, localized corrosion, and  
5 so forth. Waste form testing, which is also a lab  
6 activity, and the uniqueness here is the inclusion of  
7 a scale mockup waste package to confirm in-package  
8 expected conditions.

9           That concludes what we would see as the  
10 ones that are similar enough to activities that began  
11 during site characterization to include them as  
12 ongoing activities.

13           Two of them listed as those that would  
14 begin during the construction phase -- turn to page --  
15 slide 22 -- one of them would be saturated zone/fault  
16 zone hydrology testing, evaluating fault parameter  
17 assumptions that the SZ models use.

18           Again, we're talking boreholes with the  
19 packers, and so forth, across faults. And then, seals  
20 testing, which will test the effectiveness of any  
21 borehole seals, both in the lab and then a fuel  
22 component for shaft and ramp seals and backfill  
23 emplacement as appropriate.

24           Page 23, again, the list of those that  
25 would begin during the operations phase of the

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1 repository. There are seven of them -- drift  
2 inspection, which will be periodic inspection of  
3 emplacement drifts and the thermally accelerated  
4 drifts using remote techniques, obviously for those  
5 drifts with waste, also related to the retrieval and  
6 preservation.

7 Dust buildup monitoring activity that --  
8 as it's titled -- the collection of dust off EBS  
9 surfaces, collecting samples, and analyzing that  
10 composition. We've got waste package monitoring,  
11 which is the monitoring of the waste packages  
12 themselves, either visually and/or using some internal  
13 -- perhaps internal pressure techniques to confirm  
14 that the integrity of the packages are as expected.

15 On 24, there is the remaining four  
16 activities that we'd begin during operations. All  
17 four of these happen to also be part of the thermally  
18 accelerated drift component, which I'm going to show  
19 you a slide next.

20 That's the near-field monitoring and  
21 environmental monitoring of those drifts, the thermal-  
22 mechanical effects in the thermally accelerated  
23 drifts, and testing of -- corrosion testing, which  
24 will be the waste package materials in the drifts  
25 themselves taken later for laboratory testing.

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1                   Page 25 shows the concept of -- the two-  
2 drift concept of the thermally accelerated drift suite  
3 of tests.    The two-drift concept calls for an  
4 observation drift run out of the back end of alcove 5,  
5 underneath panel 1, parallel with emplacement drift 3,  
6 to interrogate two drifts, likely emplacement drifts  
7 3 and 4, to look specifically at peak temperatures  
8 over about a 15-year period. That will be done using  
9 loading similar to the remainder of the repository  
10 using ventilation to obtain those temperatures.

11                  The second drift would be looking at a  
12 situation sub-boiling and near boiling using, you  
13 know, a configuration of the waste packages to obtain  
14 those temperatures, which would require, obviously,  
15 some careful thermal management to achieve that --  
16 those goals.

17                  A little busy sketch, but it -- I think  
18 you can see there the observation drift and the two --  
19 and the two basin drifts overhead.

20                  On page 26 -- so that concludes, then,  
21 referring down the 20 activities and a little  
22 description, like mentioned before, a lot more details  
23 in the plans.

24                  Page 26, a question was asked, you know,  
25 how we respond to change. And, you know, we

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1 acknowledge that -- given that a lot of these  
2 activities are a ways out from beginning, obviously  
3 advances in technology will occur, and that our  
4 program has to be flexible enough to be able to accept  
5 new technologies and to perhaps revise the details of  
6 the activities accordingly.

7 I believe the program does permit the  
8 reevaluation and modification of these activities.  
9 Inherently, as Debbie mentioned earlier, one of the  
10 ways we'll look to ensure that we're capturing  
11 changes, both from technology and/or from other  
12 testing programs within, is through this integration  
13 function workshop approach that's described in the  
14 plan.

15 And very briefly here, basically it's to  
16 facilitate evaluation of new data and the program  
17 effectiveness as we move forward. That can include  
18 changes in technology. PC data will continually be  
19 reviewed and evaluated against current program status.

20 We'll do this both internally using  
21 participants from other areas of the project, whether  
22 it be through environmental or, you know, design  
23 testing, and so forth, to ensure that we're capturing  
24 the state of knowledge that the project currently is  
25 at.

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1           And expertise in other project areas,  
2           they're off project interfaces, again, to ensure that  
3           -- that we're not missing anything.

4           Page 27, it's a path forward from where  
5           we're at today. As Debbie mentioned, Rev. 5 of the  
6           plan was issued in November. Going forward now, we're  
7           analyzing and evaluating existing data from available  
8           sources to attempt to bound the parameters that are  
9           identified for each one of these activities, to give  
10          us our expected ranges and condition limits for each.  
11          That's done as we're developing PC test plans.

12          The program will begin to dedicate --  
13          develop dedicated procedures for this program. At  
14          present we're using existing project procedures for  
15          the planning and implementation of the ongoing  
16          activities. I mentioned we're developing two test  
17          plans at present for two of the ongoing activities.

18          We're continuing to engage the NRC in the  
19          program discussion, continuing to monitor tests,  
20          continuing the monitoring, testing, data collection  
21          for those activities that are ongoing in the field or  
22          in the lab.

23          We are continuing to integrate this  
24          program with design and construction as they move  
25          forward in their planning to ensure that the needs of

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1 this program are represented and accounted for.

2 We are -- the iteration with TSPA and the  
3 underlying process models continues, and might likely  
4 refine the program in the future, which then, of  
5 course, might result also in revisions to the plan  
6 itself.

7 So with that, we'll open it up for  
8 questions.

9 CHAIRMAN RYAN: Sure. Well, thank you  
10 both. That was an interesting and informative update  
11 to your planning.

12 To pick up on your last -- very last  
13 slide, if I may, Doug, it seems that the two  
14 confirmation test plans that you're drafting where all  
15 this will come --

16 MR. WEAVER: Right.

17 CHAIRMAN RYAN: -- will come together, it  
18 will be interesting to hear an update from you when  
19 those two are at a stage where we could hear about it,  
20 because that would kind of be the fruit of the work  
21 you've put in risk-informed things, and, you know, I  
22 think -- I don't think you explicitly said this, but  
23 you're going to be addressing, of course, issues of  
24 sensitivity, of measurement, of accuracy, of  
25 precision, and, you know, can you actually measure

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1 what you hope you want to measure, and all those kinds  
2 of things, which I think you've -- just because of the  
3 brevity of our time here, we couldn't go into a lot of  
4 detail, but it seems obvious you've thought about it.

5 That would be -- that would be a real  
6 test. Do you plan on submitting those test plans with  
7 the LA, or will that be separate, or --

8 MR. WEAVER: No. And I'll let Licensing  
9 jump in if I misspeak, but no, they are -- they are on  
10 the order of SITPs or the test plans that we did for  
11 site characterization. They do contain that level of  
12 detail, accuracy, frequency, all the specifics of the  
13 test itself. The uniqueness of the PC test plans are  
14 that they also will identify the specific parameters  
15 and the ranges by which we expect to be making these  
16 measurements in.

17 So unlike site characterization, where you  
18 basically collected data for data's sake --

19 CHAIRMAN RYAN: Right.

20 MR. WEAVER: -- this is more of a trigger  
21 that we are -- you know, if found outside of that  
22 range, then there would be a response. But no,  
23 they're not --

24 CHAIRMAN RYAN: Which two did you pick,  
25 and why?

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1 MR. WEAVER: The two we're currently  
2 working on is precipitation monitoring and  
3 construction effects monitoring, both because we felt  
4 they were -- yes, they were ongoing test activities,  
5 for one. They were maybe a bit simpler than some of  
6 the others to start with, and the staff that we had  
7 available were experts in that area.

8 MS. BARR: Let me just mention something  
9 briefly on that. Part of the rationale for the  
10 decision on that was that not only were these ongoing  
11 activities, but they were activities for which they  
12 were already occurring, in some cases, in places where  
13 -- like, for instance, we wouldn't want to develop a  
14 test plan for mapping now, because we aren't going to  
15 do any more mapping until we actually have emplacement  
16 drifts to map.

17 And so doing it now would just be to have  
18 it sit on the shelf and wait for, you know, when they  
19 actually were appropriate to start. And so in this  
20 case, these two activities were ones for which there  
21 was ongoing work that was in progress now that we  
22 could actually implement the test plan. So  
23 precipitation monitoring and --

24 CHAIRMAN RYAN: How did you rank these in  
25 terms of risk significance?

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1 MS. BARR: I'm sorry?

2 CHAIRMAN RYAN: Are they high-risk  
3 significance test plans, or low, or medium?

4 MS. BARR: Well, you know, precipitation  
5 monitoring, it's -- as Doug mentioned earlier -- and,  
6 actually, you know, I don't know if you recall, but  
7 when we mentioned the precipitation monitoring to the  
8 ACNW last time we got a lot of laughs. But, you know,  
9 the intent of it is not for climate or anything like  
10 that. It's to set the context for the seepage  
11 monitoring.

12 So in that sense, in and of itself, it's  
13 not what I would consider one of the high-risk  
14 activities. However, it is providing a certain amount  
15 of information to put some other activity in context.

16 CHAIRMAN RYAN: And I realize you're  
17 struggling with the fact that some things are out in  
18 time as opposed to some things that are at hand. But,  
19 you know, and I see some of the interesting ones that  
20 talk about material degradation, or, you know, waste  
21 package activities, those kinds of things, those --  
22 you know, I think it would be interesting for you to  
23 think about your plans and the -- you know, in the  
24 sense of, where is the risk significant activity? And  
25 don't leave an important risk activity until later if

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1 it really ought to be thought about sooner.

2 MS. BARR: Well, I understand your point,  
3 but I think that, you know, as Doug laid out the  
4 schedule for the proposed implementation of these  
5 activities, as I'm sure you understand, I mean,  
6 there's no point in actually developing a test plan  
7 for something that won't start until waste is  
8 emplaced, or, you know, something far out like that.

9 It's an exercise in paperwork, which  
10 doesn't give us the opportunity to actually learn from  
11 trying to implement it and modifying it along the way  
12 as appropriate.

13 CHAIRMAN RYAN: Sure. That's a detail --

14 MS. BARR: So, really, a lot of it is  
15 driven by schedule in terms of when these activities  
16 would start.

17 CHAIRMAN RYAN: At the detail level that  
18 may be true. But at a more global level, it'll be  
19 interesting to know if a particular parameter is even  
20 within the range of available instruments or not.  
21 There are some key parameters, and so forth.

22 So I'm with you on a detailed -- let's  
23 start building at sort of that level of plan, but at  
24 a more global scale. It might be interesting to think  
25 about it just from the risk perspective, which is a

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1 little bit independent of time. It's something to  
2 think about, but, again, it's -- it's clear you've  
3 made a tremendous amount of progress since our last  
4 discussion. So thanks for the presentation.

5 Let's start at this side. Jim, any  
6 questions?

7 MEMBER CLARKE: If I could just followup  
8 on that. Is it fair to say, then, that you're taking  
9 these plans as they come? You're open to where you  
10 should go and based on what you see? And I think one  
11 of your slides indicated that some things may, in  
12 fact, be monitored after closure. Is that a  
13 possibility?

14 MS. BARR: No. The current program right  
15 now ends with closure. I would out that 10 CFR 63  
16 doesn't talk about --

17 MEMBER CLARKE: I'm sorry. I can't hear  
18 you.

19 MS. BARR: 10 CFR 63 doesn't talk about  
20 doing monitoring after closure.

21 MEMBER CLARKE: Thank you.

22 CHAIRMAN RYAN: Bill?

23 MEMBER HINZE: Just a few questions. I am  
24 very much impressed by this ambitious program you've  
25 laid out. I believe that our history on this suggests

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1 that budget might have something to do with this,  
2 which means that we have to make selections. And I  
3 don't see the criteria here.

4 I hear risk-informed, but there are other  
5 factors as well as the risk significance, whether you  
6 can really improve on the measurements, and you've  
7 talked about sensitivity analysis.

8 MS. BARR: I'm sorry. I couldn't quite  
9 hear you.

10 MEMBER HINZE: Well, let me -- I'm  
11 questioning, what are your criteria for ranking these  
12 various program plans?

13 MS. BARR: For ranking the activities?

14 MEMBER HINZE: Yes. Do they all have the  
15 same rank? Does precipitation monitoring -- is that  
16 as important as saturated zone alluvium testing?

17 MS. BARR: No, we do not have a ranking of  
18 the 20 activities in and of themselves. When we went  
19 through the multi-attribute utility analysis stage, we  
20 developed a numeric utility value -- you know, utility  
21 that was assigned to each of the potential activities.

22 And, theoretically, you could say that we  
23 would then prioritize them. We'd -- you know, we'd  
24 have the highest on top and the lowest on bottom, and  
25 then we'd do some cutoff based on some criteria, and

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1 we'd say, "Okay. We're going to do all of these up  
2 here." But in reality that doesn't give you a  
3 complete program.

4 There are a lot of reasons why you may do  
5 an activity which may not rank very highly in terms of  
6 risk. And so, for example, we had to weigh things  
7 like there are some things that are explicitly called  
8 out in 10 CFR 63 that caused us to elevate activities  
9 even though they didn't receive a high utility value  
10 as a part of that decision analysis process.

11 For instance, seals testing was something  
12 that, quite frankly, was kind of the bottom of the  
13 heap. And -- but, you know, it's explicitly called  
14 out in 63, and we put the time and effort and work  
15 into doing something that we felt was a well thought  
16 out, risk-informed program, and yet we also realize  
17 that there are other reasons why you want to do  
18 something, why you may want to do something. And so  
19 we would, you know, raise some things that had lower  
20 values, just to make sure that we were meeting all of  
21 our regulatory obligations as well as being a  
22 responsible licensee.

23 MEMBER HINZE: Well, it seems to me you've  
24 answered my question. You do have criteria, but they  
25 are not specified here.

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1 CHAIRMAN RYAN: I was going to ask, are  
2 they all in the revisions of the plan? Is that laid  
3 out in --

4 MS. BARR: If you want to see the blood,  
5 guts, and gore of the multi-attribute utility  
6 analysis, that's all in Revision 2 of the plan. And  
7 it's -- there are some appendices in the back of it  
8 that essentially -- I mean, there's tables that  
9 actually give the responses to the questions on the  
10 questionnaire, that then rolled into the numeric  
11 values that gave it a utility value.

12 And so, I mean, if you really wanted to  
13 work at it, you could actually, you know, figure out  
14 why something is ranked higher and others lower, just  
15 by looking at those tables, although, you know, it can  
16 take a little bit of time. And I understand we'll  
17 have to do that as a part of defending this program,  
18 you know, during the licensing process, and clearly we  
19 will.

20 But all of that detail is documented  
21 explicitly in Revision 2. The methodology that we  
22 used in applying the criteria was a questionnaire. We  
23 would ask things like, okay, for this specific  
24 activity that we're considering -- say, you know,  
25 temperature on the waste package surface -- if you

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1 measured something outside of the -- your anticipated  
2 range, how likely is it that it would cause the dose  
3 to change by more than .1 millirem?

4 And then, that would cause it to roll  
5 into, you know, a certain numeric value, and then  
6 there would be other questions that would also roll  
7 into that utility value that that particular activity  
8 would get. And so ultimately, at the end, by just  
9 applying those and management judgments in terms of  
10 the value in an overall context, those were actual  
11 numeric weightings that were applied as well.

12 All of these activities were given a  
13 numeric utility at the end. And, sure, you could look  
14 at that prioritized list, and you could say, okay,  
15 well, these -- you know, these ranked higher, these  
16 ranked lower. But then, like I said, there are other  
17 factors that need to be evaluated, and those might be  
18 things like completeness of a program or completeness  
19 in addressing all of the parts of the regulation, you  
20 know, that we have to meet, and, you know, things like  
21 that. So --

22 CHAIRMAN RYAN: That's real helpful.  
23 Thanks for that explanation. But the key is, I think  
24 -- the summary point is, as you've summarized all of  
25 the appendices -- it's on your slide 8 -- I mean,

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1 there's a lot that goes in behind it, which it's good  
2 to hear. Appreciate it. Thank you.

3 Allen? Oh, Bill, are you done? I'm  
4 sorry.

5 MEMBER HINZE: Yes, I do have another  
6 question, if I might, please.

7 CHAIRMAN RYAN: Sorry.

8 MEMBER HINZE: I hear about the management  
9 review, and so forth. Many of us would think that the  
10 best people to look at the review of what is needed in  
11 the future, taking into account as you have listed  
12 here the technological advancements that have been  
13 made since certain data were acquired, how much are  
14 you -- and that leads me to the question, how much are  
15 you involving the grant -- I mean, the actual  
16 scientist that is involved in the program, or was  
17 involved in the acquisition and setting up of a  
18 program a decade ago in terms of looking at what is  
19 needed now for the performance confirmation?

20 MR. WEAVER: Okay. The question is along  
21 the line of the development of the test plans.  
22 Absolutely. The principal investigators and the  
23 technicians have been involved, and will be involved,  
24 in -- because ultimately they are the ones that are  
25 working to those -- those products.

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1 But I think I heard the question, perhaps,  
2 how much were the investigators involved in the multi-  
3 attribute process that led us to say whether or not  
4 something was measurable or not? And if that was --

5 MEMBER HINZE: Yes, or needs to be  
6 measured.

7 MR. WEAVER: Yes.

8 MEMBER HINZE: Right.

9 MS. BARR: Okay. I lived through the  
10 painful process. Poor Doug, you know, didn't, so --  
11 he was fortunate enough not to have -- not to have  
12 been working with us on the program then.

13 The questionnaire that we developed also  
14 addressed things like how measurable is this activity,  
15 and, you know, it actually got at things like the  
16 logistics of how accurate could a measurement be, and  
17 how direct is a measurement, things like that. And  
18 that, of course, is based upon a scientist's current  
19 understanding of the technology available, the work  
20 that they may have done in the past to measure just  
21 such a type of parameter, things like that.

22 And so they were basing it on their  
23 current experience, and these were the people that  
24 actually were performing those kind of measurements on  
25 the program. They were the ones who were answering

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1 these questions in the questionnaire.

2 And that was that third one -- the  
3 accuracy criteria that I talked about earlier --  
4 meaning, can you even measure what it is you want to  
5 measure?

6 MEMBER HINZE: Sure.

7 MS. BARR: And so I would say that they  
8 were very much involved in the multi-attribute utility  
9 analysis portion, which got at, is it something that  
10 we can even realistically get at?

11 And then, when I talk about management  
12 judgment that's applied, for one thing, in most cases  
13 the managers that I'm talking about are people that  
14 rose up through the ranks of the technical staff, and  
15 are all still well in touch with the technical work  
16 themselves.

17 And so we're talking about, you know, TSPA  
18 managers, you know, and process model managers who --  
19 you know, who have been intimately involved in the  
20 work itself and are well versed in the technical area.

21 These are really more technical managers  
22 that we're talking about here, and yet that management  
23 judgment that we talk about is important because if  
24 all we were to -- is to poll the PIs about aspects of  
25 the program, what you'd get is a very narrowly-focused

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1 view of the importance of a particular area, and you  
2 wouldn't be able to apply an understanding across the  
3 board of the relative weight of importance of that  
4 information as opposed to other areas of the program.

5 And so there is a very appropriate role  
6 for management judgment in terms of kind of, you know,  
7 equalizing things and placing them in the right  
8 perspective.

9 MEMBER HINZE: Thank you. That helps  
10 clarify it for me.

11 Let me ask another question in terms of  
12 the maturity of the program plans. Have you decided  
13 how you're going to make decisions about where to put  
14 down drill holes for the saturated zone alluvial  
15 testing? You know, what level of detail are you at at  
16 this stage?

17 MR. WEAVER: Rev. 5 discusses anticipated  
18 methodology and has made -- does make some statements  
19 as to where we would anticipate, how many,  
20 whereabouts, but none of it -- none of it firm until  
21 we get to writing those -- those test plans and really  
22 get those PIs in a room and decide exactly where and  
23 what faults to interrogate, or so forth.

24 So the plan identifies concept and maybe  
25 goes beyond that and actually gives some specifics.

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1 But nothing firm until that test plan is signed off.

2 MEMBER HINZE: And, for example, what kind  
3 of a time schedule do you have set for that? Is that  
4 predicated on when and if the construction license  
5 becomes available, for example, or what's the  
6 situation? What are -- are you proceeding with that  
7 now?

8 MR. WEAVER: For those ongoing --

9 MEMBER HINZE: Yes.

10 MR. WEAVER: -- test activities, yes.  
11 Like I said, we've got two in draft right now with  
12 more planned on the heels of those, so --

13 MEMBER HINZE: That answered my question.

14 MR. WEAVER: Yes.

15 MEMBER HINZE: Thank you.

16 CHAIRMAN RYAN: Allen?

17 VICE CHAIRMAN CROFF: Thank you. Early in  
18 the presentation you mentioned that -- in the  
19 management review that some activities were deleted  
20 and left to other testing development programs. What  
21 other testing development programs are there into the  
22 future, and is there sort of a one-stop-shop to get  
23 the big picture on all of these kinds of activities?

24 MS. BARR: We get that question a lot. We  
25 talk very briefly in Rev. 5 about some of the other

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1 possible testing and monitoring programs. And, for  
2 instance, there are some that are explicitly called  
3 out in 10 CFR 63 that -- usually -- and we did this at  
4 the presentation we gave in 2003 -- I always start off  
5 with this balloon diagram, which basically shows how  
6 performance confirmation is one fish in a big school,  
7 you know, of fish or something.

8 But there are other things out there, and  
9 we do always, you know, get the question of, where can  
10 I find information about these other programs? And so  
11 we are working on developing an overall, you know,  
12 testing and monitoring strategy, I guess you could  
13 say, and that's in the progress right now. That's in  
14 progress right now.

15 Some areas are more mature than others.  
16 But probably this program is one of the more mature of  
17 them, just because we've had to conceptualize it and  
18 develop it as a part of our license application.

19 In 63, it talks about things like design,  
20 construction, and operations testing, like prototype  
21 evaluation testing, operations and maintenance  
22 testing, license specifications testing, security and  
23 safeguards and emergency testing, you know, regulatory  
24 directed -- I mean, NRC-specified tests, things like  
25 that.

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1           There is a number of things that are  
2 explicitly called out in 63. And do we have a plan  
3 that shows the development of those areas yet? Well,  
4 in a conceptual stage at this point. There is a draft  
5 -- I think it's draft. Bob, do you want to talk to  
6 this? No. Okay.

7           (Laughter.)

8           There is a draft plan, which sort of lays  
9 out a vision for a testing and monitoring strategy.  
10 It's not yet a plan, but it's sort of a vision, and  
11 that's something that's currently under development.

12           VICE CHAIRMAN CROFF: Okay. And the  
13 performance confirmation seems to be largely directed  
14 at gathering data from one place or another, whether  
15 it be the lab or the field. At some point it seems  
16 this has to get into models and ultimately be  
17 reflected in its -- in the effects of new information  
18 on a performance assessment, and do we understand  
19 what's going on or not?

20           Who does the modeling part and the  
21 performance assessment part? Is there a continuing  
22 activity like that someplace else, or is it part of  
23 performance confirmation?

24           MS. BARR: Well, I would say that all of  
25 that had to precede the selection of these activities

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1 and the development of expected and reporting ranges.  
2 We had to have had that very information that you're  
3 talking about to decide whether or not these were  
4 risk-informed activities, whether or not they made a  
5 difference in terms of total system or barrier  
6 performance, whether or not they were important.

7           You know, it's not like we just started  
8 off with a whole list of, you know, things we could  
9 measure and just, you know, sort of threw a -- you  
10 know, a dart at them or something. These were all  
11 informed decisions made on the very fact that they are  
12 a part of our modeling in the process model level and  
13 in the TSPA.

14           And so all of that work had to precede the  
15 selection of these activities, and so we started from  
16 the bigger picture, you know, how do the processes,  
17 you know, perform? How do they develop? How do they  
18 go? And narrowed it down to specific test activities  
19 which would then confirm those models and those  
20 assumptions, those -- you know, all of those things.

21           And so now we're at a point where we've  
22 done all of that homework, and now we have this list  
23 of activities, we specify a range where we say, okay,  
24 if it's within this range it's behaving just the way  
25 we thought it would in our models, in our process

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1 models and our TSPAs, and -- but if it starts to go  
2 outside of that, well, what does that say?

3 We have to go back and revisit those  
4 process models and possibly that TSPA to say, did we  
5 really understand this as well as we thought we did?  
6 So I guess the answer there is I think we already did  
7 all of that that you're talking about.

8 VICE CHAIRMAN CROFF: I was thinking more  
9 in just a future context as opposed to the past. You  
10 started to get to it at the end, and that is, if you  
11 start to observe things that don't look right, that  
12 are outside some defined range, does your program get  
13 into trying to understand the whys and --

14 MS. BARR: Yes. Yes.

15 VICE CHAIRMAN CROFF: -- or is there  
16 something else out there that you interact with?

17 MS. BARR: Well, we talked a little bit  
18 about this integration function. And essentially, you  
19 know, for the most part, like I said, we've done all  
20 of this homework that preceded the selection of these  
21 activities, and what we expect those ranges to be. We  
22 define them. And then, it should be fairly textbook  
23 unless we start to exceed those ranges.

24 And so that being the case, the  
25 performance confirmation program is very, very simple,

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1 very -- you know, it's not science for science sake.  
2 We're not doing further research on, you know, seepage  
3 or anything like that. We are simply making those  
4 measurements and confirming that they are, in fact,  
5 supporting what we have in our models.

6 But should we start to head in the  
7 direction of exceeding those ranges? Or should we  
8 actually exceed those ranges and have to notify the  
9 NRC? We then trigger this integration function, which  
10 is we -- we look at that data. We say, you know, what  
11 does it all mean? There is, in fact, you know, why --  
12 why have we, you know, started heading in the  
13 direction or actually exceeded the range that we had  
14 predicted?

15 Yes. Answering the whys is a part of this  
16 program. And so, ultimately, that would result in  
17 notification to the NRC -- well, first notifying them  
18 that we've exceeded a range, you know, a reporting  
19 range. But then, also notifying them of the results,  
20 notifying the NRC of the results of the assessment  
21 that we do.

22 Is it that we need to reconsider our  
23 models? Is it -- does it have an impact on barrier  
24 performance or total system performance? And at the  
25 very end extreme, do we have to start considering

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1 retrievability?

2 So the role of the performance  
3 confirmation program would be to assess that  
4 information to see whether or not we need to revisit  
5 our understanding of things and even potentially have  
6 to make a recommendation on retrieval.

7 VICE CHAIRMAN CROFF: Okay. Thank you.

8 CHAIRMAN RYAN: Just one quick follow-up,  
9 Ruth, before, if I may. It seems to me that when you  
10 set a range for a parameter like you discussed, if you  
11 do the integration thinking first, then you'll really  
12 know what that range means.

13 Now, the range may be picked based on what  
14 you can measure, or what you should measure, or be  
15 able to measure. And if it's risk significant, you  
16 should be able to back calculate. Or if it's in this  
17 range, it should be okay. If it's outside of this  
18 range high, or outside of this range low, that might  
19 have an implication that something is working really  
20 well, or something is not working so well.

21 So rather than do the integration after a  
22 measurement goes out of range, I would think you'd  
23 want to try and figure out what it means if it's out  
24 of range up front, and make sure your range is  
25 adequate for its purpose. Am I out of whack there, or

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1 is that consistent with what you're trying to tell us?

2 MS. BARR: I'm thinking it's consistent  
3 with what we talked about. But I'd also add to that  
4 this -- the sensitivity analyses we talked about  
5 dealing with TSPA, because that's going to also help  
6 us to define what those --

7 CHAIRMAN RYAN: Exactly, yes.

8 MS. BARR: -- ranges are. And so, for  
9 instance, we may say, okay, the -- what we feed off  
10 from the process model to the TSPA is, you know, this  
11 range for this parameter, and that would be our  
12 expected range. It's a distribution, you know, over  
13 this area, or whatever.

14 CHAIRMAN RYAN: That's the exact point  
15 where you get your first risk insight as to what a  
16 measurement means.

17 MS. BARR: Right.

18 CHAIRMAN RYAN: Now, the accuracy  
19 precision, measurability, viability of instruments,  
20 and all of that kind of comes as the second part of  
21 the thinking process.

22 MS. BARR: Yes. Yes. Well, and then,  
23 this gets at what I was saying before about how our  
24 reporting range might be different from our expected  
25 range. For instance, you know, our expected range,

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1 say, on, I don't know, thermal conductivity, you know,  
2 we may -- we may be able to exceed that expected  
3 range, and it really doesn't make a difference in  
4 terms of performance.

5 And so our reporting range would be  
6 something wider. It would probably be something that  
7 were based on, if we were measuring thermal  
8 conductivity as a parameter, which I don't think we  
9 are, but let's just say we were, it would be based on  
10 some information which would say, all right, we can  
11 exceed our range to a certain extent, and in terms of  
12 performance it really doesn't make a difference.

13 But then, you know, once we go beyond a  
14 certain point, then we're starting to look at impacts  
15 to performance. And so that would be something we  
16 would consider as a basis for --

17 CHAIRMAN RYAN: So that raises the next  
18 question. If something has a narrow range relative to  
19 performance, your reporting range should be inside of  
20 that.

21 MS. BARR: Inside of it?

22 CHAIRMAN RYAN: Perhaps.

23 MS. BARR: Well, if it's inside the range,  
24 we're behaving as we expect.

25 CHAIRMAN RYAN: Well, you know, your range

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1 -- I'm sorry. Let me restate that. The width of your  
2 range should be narrower because --

3 MS. BARR: Yes.

4 CHAIRMAN RYAN: -- it's important to --

5 MS. BARR: Yes. I would anticipate that  
6 would be the case, yes.

7 CHAIRMAN RYAN: You know, and I -- believe  
8 me, I recognize it's very hard to lay out all of these  
9 interrelationships in an hour, but we appreciate your  
10 Promethean effort to get that done today.

11 Ruth, thank you for your patience.

12 MEMBER WEINER: Thank you. I have some  
13 questions about your multi-attribute utility analysis.  
14 I confess that that's because that's an interest of  
15 mine.

16 You've correctly said the MUA is itself a  
17 risk-informed process. Did you use risk scales to  
18 rank any of your attributes, any of your activities?

19 MS. BARR: Well, I am actually not the  
20 person who did the logistics of it. And so I wish I  
21 could answer your question, but we had Karen Jenni,  
22 who was with Geometrics. She was the one. And I  
23 believe you were -- you had just joined the ACNW I  
24 think at that time.

25 MEMBER WEINER: Yes, that's correct.

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1 MS. BARR: And so I don't know if you  
2 remember Karen, but she's very good. She's really  
3 good. And she was the one who set up the entire  
4 analysis that we did. And so, unfortunately, she's  
5 the one who would be able to answer the logistical  
6 details of how it was done.

7 MEMBER WEINER: So you're telling me go  
8 read Rev. 2.

9 (Laughter.)

10 MS. BARR: Well, yes.

11 MEMBER WEINER: Okay.

12 MS. BARR: I'm happy to say, though, that  
13 Karen is still working on the project. I heard she  
14 was doing a utility analysis for some other aspect of  
15 the program as well, so I was very happy to hear that  
16 she is -- she is spreading that particular knowledge  
17 in other areas of the project.

18 So if worse comes to worse, you know, we  
19 can still tap into that resource.

20 MEMBER WEINER: Did you use constructed  
21 scales for any of the activities, or did you always  
22 use natural scales in measurements of things? Was  
23 there any -- were there any activities where you said  
24 you had to figure out yourself or construct what would  
25 constitute a rank, a given high rank or low rank or

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1 medium rank? Or is this a question I should ask  
2 Karen?

3 MS. BARR: Yes, I'm thinking Karen is  
4 probably the one for this one, too. Sorry.

5 MEMBER WEINER: Oh, okay. You mentioned  
6 the question that in some cases like waste package  
7 performance you can scale some things. How do you  
8 determine when and what kind of scaling is  
9 appropriate?

10 MS. BARR: Scaling in terms of like --  
11 well, we talked about a couple of different kinds of  
12 scaling. One was you scale it based upon the -- you  
13 know, whether or not perfect information is available.  
14 There is that scaling factor that we applied in terms  
15 of the accuracy of the method. That's one scaling  
16 factor.

17 MEMBER WEINER: The other is -- what I was  
18 thinking of was more physical scaling. I mean, you  
19 can do a corrosion experiment --

20 MS. BARR: Okay.

21 MEMBER WEINER: -- on a piece of metal.  
22 You don't have to do it on the whole container. But  
23 there are some things --

24 MS. BARR: Oh, I see.

25 MEMBER WEINER: -- where you need to do

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1 measurement -- make your measurements on the whole  
2 system.

3 MS. BARR: Oh, absolutely. And as a  
4 matter of fact, you know, in 10 CFR 63, there are some  
5 parts of the text there that specifically say that it  
6 has to be in the environment, you know, or -- I mean,  
7 you know, it gets at things like that it has to be a  
8 full-scale or in the drift, or things like that.

9 There are some where we're looking at lab  
10 testing -- for instance, long-term corrosion test  
11 facility type of thing. That would be looking at  
12 samples, at coupons, at things like that. However,  
13 that's then counterbalanced. You know, that's  
14 balanced by also having waste package monitoring in  
15 the drifts.

16 And, sure, you can say -- you know, one is  
17 you can say, how can you say that the samples that you  
18 have in your tanks are representative? But on the  
19 other hand you can say, how can you say that what  
20 you're seeing in 50 years in a ventilated drift, or  
21 even an unventilated, thermally accelerated drift, is  
22 really going to say anything about the rates and the  
23 -- you know, the environments in question?

24 Well, our intent is that the two of them  
25 together will be able to capture all the aspects of

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1 that. So, yes, there is some scaling in some places.

2 We also talked a little bit about waste  
3 form testing, and that one was one of the ones that  
4 was added based on the part of the regulation that  
5 said that it had to be in the environment,  
6 anticipated, or something like that.

7 We originally didn't really have much in  
8 the way of a big, you know, comprehensive waste form  
9 activity, but then we were worried that we were not  
10 quite meeting the wording of the regulation, and so we  
11 ended up putting that activity in for that. And that  
12 one actually looks at -- has two full-scale waste  
13 packages with, you know, some sort of waste material  
14 inside of it in a lab environment. So that's not even  
15 really scaled, but it's in a lab environment.

16 MEMBER WEINER: It's full scale.

17 MS. BARR: It's a full scale.

18 MEMBER WEINER: And you've really --  
19 Allen's last question was really the same as mine. I  
20 take it you do have a system that kicks in if you get  
21 a confirmatory measurement that somehow exceeds what  
22 you expect, is different from what you expect to  
23 automatically kick in a system that -- that starts to  
24 look at that.

25 MS. BARR: Right.

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1 MEMBER WEINER: Does one of your documents  
2 describe that system in some detail?

3 MS. BARR: Yes. We have a general  
4 overview of it in Revision 5. There is a couple of  
5 figures in here. Well, Figure 4-1 in Revision 5 is a  
6 generalized flowchart that talks about the analysis  
7 and trend detection process. And so it walks through  
8 the, you know, we're making measurements. Are they  
9 within the range expected? You know, if yes, go in  
10 this direction. Are they not? Then go in this  
11 direction, you know.

12 And then, at this point, notify NRC,  
13 initiate, you know, a document that results in the CAP  
14 system -- Corrective Action Program, you know, and  
15 then start the assessment of the meaning. So there's  
16 an overall sort of flowchart here in terms of how we  
17 would -- you know, how we would move through the  
18 assessment and everything.

19 But the details will be -- in terms of  
20 reporting, to some extent will be in the test plan.  
21 So, for instance, in the test plans we'll establish  
22 what those expected ranges are and what the reporting  
23 ranges are. And then, in the test plans that the PI  
24 is working to, it will trigger them. You know,  
25 they'll assess the data against the ranges.

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1 And then, if they are -- you know, if they  
2 meet certain criteria, that will require them to then  
3 make a notification process to the overarching, you  
4 know, performance confirmation organization, at which  
5 time then we would start a process of evaluating that  
6 information and deciding what path to go forward on  
7 it.

8 MEMBER WEINER: I imagine you've had some  
9 technical exchanges with NRC on this whole performance  
10 confirmation question.

11 MS. BARR: We had -- well, as I mentioned  
12 earlier, we met with them shortly before we met with  
13 the ACNW here in 2003. And at that time, what we did  
14 was we walked through the decision analysis process.  
15 We explained, you know, the methodology we were using,  
16 but we were still kind of like in the final stages of  
17 developing the listed activities, and so we weren't  
18 able to share those with them at the time, because it  
19 was still draft.

20 And then, you know, of course less than  
21 six months later we had that information that we were  
22 able to share with you.

23 We have had some telecons. I have had  
24 regular phone calls with my counterpart in the NRC,  
25 who is Jeff Poole. You know, we have made available

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1 to them the revisions of the performance confirmation  
2 plan as they become available, and so there has been  
3 coordination -- well, there has been communication  
4 going on between us.

5 MEMBER WEINER: Thank you. Thank you.  
6 And thank you for an excellent presentation.

7 CHAIRMAN RYAN: Thank you, folks. Any  
8 other questions or comments? We're running a little  
9 bit long, so let's make it quick. Ashok and then  
10 Neil.

11 MR. THADANI: Yes, a quick question.  
12 Obviously, it's important to look at the issue of  
13 metrics in terms of the analysis you did. But did you  
14 utilize some formal procedures to seek opinions of  
15 experts, in terms of expert elicitation? Was there a  
16 formal procedure for that?

17 MS. BARR: Are you talking about, say,  
18 like an independent technical review, or --

19 MR. THADANI: No, no, no. I'm talking  
20 about your multi-attribute --

21 MS. BARR: Oh, I see.

22 MR. THADANI: -- the analysis, you went to  
23 certain experts presumably to get their views. Was  
24 there a formal structure to say, "Who are these  
25 participants in the study whose opinion you are

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1 relying on?"

2 MS. BARR: So, are you asking if there was  
3 a procedure we followed?

4 MR. THADANI: Yes. You know, normally,  
5 for expert elicitation there are formal methods. And  
6 the question is: did you go to people you knew, or  
7 was there a specific procedure that you laid out in  
8 terms of who could participate in providing you their  
9 input?

10 MS. BARR: Well, I can tell you that the  
11 people that were involved were the -- you know, either  
12 the managers of the particular disciplines or the  
13 people who were involved in the model implementation  
14 themselves. So we have the direct people who were  
15 involved in the development of that work.

16 In terms of utilizing a formal procedural  
17 process for this decision analysis, that's something  
18 I think I'd probably have to get back to you on,  
19 because I don't remember. I remember -- it's been  
20 years, I'm sorry. I've slept since then.

21 (Laughter.)

22 MR. THADANI: That's fine.

23 MS. BARR: I would have to get back to you  
24 on that one.

25 MR. THADANI: Okay.

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1 MS. BARR: Because we had a different  
2 manager of the area at the time, and I remember us  
3 talking about it, but I just don't remember exactly  
4 what the response was.

5 I'm sorry. April?

6 MS. GIL: Debbie, could I just help you  
7 out just a bit? April Gil, Department of Energy. The  
8 process that Karen Jenni used for the multi-attribute  
9 utility analysis was very well defined, rigorous, and  
10 documented.

11 MR. THADANI: I understand.

12 MS. GIL: I don't believe we have internal  
13 procedures on it, because this is something that we  
14 just do, you know, very rarely. The last one I  
15 remember was done on the site characterization plan.

16 However, let me mention to you that Karen  
17 Jenni is also working with the probabilistic volcanic  
18 hazards assessment expert elicitation, and we do have  
19 a procedure for expert elicitation internally to the  
20 program that we have used on a number of occasions and  
21 NRC staff has reviewed it.

22 So Debbie is correct. I don't believe we  
23 have a procedure per se for the MUA. However, it is  
24 very well documented, rigorous. The process is gone  
25 through. Everybody knows what the process is. You

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1 make sure that the people that are involved have the  
2 correct credentials.

3 MR. THADANI: Okay. Thank you.

4 MS. GIL: Sure.

5 CHAIRMAN RYAN: Neil?

6 MR. COLEMAN: Russ Dyer mentioned there's  
7 an analysis going on right now of potential changes to  
8 a license application based on a million-year  
9 compliance period. I noticed from your slide 11 that  
10 following completion of the TSPA-LA, performance  
11 assessment for LA, that there would be a systematic  
12 evaluation done to confirm the activity and parameter  
13 selection.

14 Is that when the possible implications of  
15 a million-year compliance period would be considered  
16 for the Performance Confirmation Program?

17 MS. BARR: Formally, that would probably  
18 be an appropriate time. But, informally, we are  
19 staying in contact with the work that's being done to  
20 develop the peak dose calculations. In terms of  
21 looking at -- being aware of the discussions that go  
22 on in terms of, you know, what are the processes that  
23 we would need to consider that might be different for  
24 the longer timeframe than the shorter, you know, we're  
25 trying to keep in touch with all of those kind of

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1 discussions that are going on, such that we would be  
2 aware if there was a need to make any modifications to  
3 the program based on a longer timeframe.

4           However, I would say that to date nothing  
5 has popped out. And when I say that, it's because in  
6 the -- well, as you're aware, the peak dose  
7 calculations are very much a simplified, stylized  
8 assessment that's being done. And in most cases the  
9 guidance that's given is to really not make any  
10 changes substantively in terms of processes, except  
11 for a few areas.

12           And so that being the case, it's hard to  
13 say that the program -- the Performance Confirmation  
14 Program should change in any way specifically.  
15 However, one area, though, would be something like  
16 generalized corrosion. That's something that I  
17 believe is mapped out for the 10,000-year case, and  
18 yet for the million-year scenario that's something  
19 that then does come into play.

20           And so, you know, that would be an area  
21 where we would consider whether or not there was a  
22 change needed. However, if we look at the program  
23 that we have in place right now, we're already I think  
24 well capturing that. We have laboratory testing of  
25 waste package materials. We have observation of the

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1 waste packages in the drifts.

2 We have a fairly comprehensive look at  
3 those things, because they had already been identified  
4 as risk-informed activities. So I think what you're  
5 asking is is over the longer timeframe, are there  
6 other things that would float to the top in terms of  
7 risk-informed activities?

8 And we are -- we are working on making  
9 that assessment and keeping on top of what's being  
10 done to address the longer timeframe scenario, but so  
11 far nothing is coming out that is inconsistent with  
12 what we already have in the program.

13 CHAIRMAN RYAN: Okay. Thank you.

14 I think, with that, we are scheduled for  
15 a short break. And to be mindful for our other  
16 speakers this afternoon, we should probably stick  
17 fairly close to the schedule. So why don't we take  
18 our break and return promptly at 3:30. Thanks.

19 (Whereupon, the proceedings in the  
20 foregoing matter went off the record at  
21 3:19 p.m. and went back on the record at  
22 3:38 p.m.)

23 CHAIRMAN RYAN: All right, folks. If I  
24 could get everybody to take their seats, please.

25 We have one additional presentation this

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1 afternoon, I think. Two, actually. We've got a  
2 discussion of a couple of items for the committee.  
3 The presentation is high-level waste repository safety  
4 licensing review process project planning, and Jeff  
5 Ciocco is here to make the presentation. Jeff?

6 MR. CIOCCO: Okay. Thank you, Dr. Ryan.  
7 Thank you, committee members, for the invitation  
8 today. It's been a few years since I've briefed the  
9 committee. With that, could we go to slide 2, please?

10 The overview of the -- of what I'm going  
11 to cover today, I'll go through the purpose of this  
12 presentation, I'll go through our project management  
13 approach that we would apply if a license application  
14 was tended to the NRC.

15 From there, I'm going to break out a  
16 specific element for the safety evaluation report  
17 process. It's certainly one of the biggest elements  
18 and the biggest product that we would produce as part  
19 of this licensing review process. And then I'll go  
20 through a path forward from there.

21 Slide 3. The purpose of this presentation  
22 today is to explain to you the project management  
23 approach for the licensing review. Whenever I say  
24 "project," I always think of it in terms of -- as a  
25 temporary endeavor to create a unique product or

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1 service. In this case our biggest product is the  
2 safety evaluation report. Certainly, nothing unique  
3 to the NRC.

4 We certainly produce many and varied  
5 safety evaluation reports, but this is unique to us in  
6 that it's the first safety evaluation report produced  
7 using Part 63, using the Yucca Mountain review plan,  
8 using Part 2 of the Appendix D milestones, as well as  
9 Part 2 Subpart J. So it really is a very unique  
10 endeavor.

11 As well as I want to present to you the  
12 licensing review process. And by the process, I'm  
13 talking about the -- who will do the work, what  
14 they'll do, and when they'll do it. And to a lesser  
15 extent, how they're going to do the work. How is work  
16 -- we have defined in policies and procedures at the  
17 NRC. How is defined in the Yucca Mountain review  
18 plan, in the standard review plan.

19 So we're really looking at, who will do  
20 what and when in this licensing review process?  
21 That's the project planning approach.

22 On slide 4, getting into the project  
23 management approach, these are the real drivers  
24 charging the NRC with our mission here. And I start  
25 with the Nuclear Waste Policy Act. From there, I can

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1 derive a lot from this little paragraph out of Section  
2 114(d) that gives me a little bit of scope, and it  
3 gives me a timeline and some reporting requirements.

4 Looking down, starting about the third  
5 line, that the Commission shall issue a final decision  
6 approving or disapproving the issuance of a  
7 construction authorization, not later than the  
8 expiration of three years after the date of the  
9 submission of such application, except that the  
10 Commission may extend such deadline by not more than  
11 12 months if not less than 30 days before -- 30 days  
12 before such deadline the Commission complies with the  
13 reporting requirements established in another  
14 subsection.

15 So here I've got a schedule with a three-  
16 year deadline, possible one-year extension, and I've  
17 got some reporting requirements that I have to factor  
18 in as well.

19 Moving down, Title 10 of the Code of  
20 Federal Regulations, driving -- charging us here is  
21 Part 63. From that, I get the content of the license  
22 application. I get the scope of what has to be  
23 covered in this licensing review.

24 In Part 2, which is the rules of practice  
25 for domestic licensing proceeding, I get a timeline.

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1 Part 2 Appendix D gives me 30 milestones -- gives us  
2 30 milestones over a period of 1,125 days that really  
3 lays the framework for doing this process. And that  
4 is unique in the NRC, this Appendix D, and I guess  
5 they've extrapolated from the NWPA a three- to four-  
6 year time period, as well as the requirements in  
7 Subpart J.

8 So this is really the foundation for us.  
9 We get scope and schedule from the regulatory and  
10 statutory processes.

11 On slide 5, what are the project  
12 objectives? Well, they're certainly tied directly to  
13 the statutory requirements. We want a licensing  
14 process and decisions that are technically and legally  
15 defensible, which is a complex project, first of its  
16 kind, one that could go through an adjudicatory  
17 process.

18 Second objective, compliance with the  
19 applicable statutory and regulatory requirements and  
20 the NRC standards and policies. NRC's most important  
21 mission is applying our statutory and licensing  
22 authority to protect human health and the environment,  
23 and we take that very seriously, and we want to use  
24 this project plan to help us make those decisions.

25 When I talk about NRC standards and

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1 policies, I'm talking about NRC as an independent  
2 regulatory agency, which means we will conduct a  
3 thorough safety evaluation of DOE's license  
4 application and report our -- all of our findings in  
5 a public safety evaluation report.

6 And the final objective is certainly a  
7 good business practice -- complete your project on  
8 time and within budget, meeting all of your major  
9 milestones.

10 One slide 6, moving along to project  
11 management approach, we want to apply the best project  
12 management practices, and leveraging other licensing  
13 programs within the NRC to build the elements of our  
14 licensing review process. And when I talk about  
15 leveraging other licensing programs, I'm talking about  
16 those from the reactor side, looking at license  
17 renewal programs, licensing amendments.

18 From the materials side, we have  
19 independent spent fuel storage installations, fuel  
20 cycle facilities, all of those we're trying to  
21 leverage as much information as we can to build the  
22 best process. Even though our process is unique, we  
23 know that we can leverage other licensing programs.

24 So our approach for meeting our project  
25 objectives I list in bullet form all of the elements

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1 of the licensing review process. And I have slides  
2 for each of these that I'm going to provide you a  
3 little bit more detail.

4 The first is the work breakdown structure.  
5 It's the road map of the activities. I've got about  
6 eight slides to cover that. I'll talk about the  
7 integrated schedule. I'll talk about the resource  
8 planning and management, how we're going to utilize  
9 resources, and I'll talk about -- a little bit about  
10 project risk management.

11 And this -- I want to differentiate this  
12 project risk from the human health and safety risks.  
13 These are problems that haven't happened yet. But if  
14 they do happen, they'll certainly impact negatively on  
15 the scope and schedule and costs of this project.

16 Change assessment and management, it's  
17 inevitable the plan is going to change. We need to  
18 have a process to manage those changes.

19 Communications, giving the right  
20 information to the right people in a timely fashion.

21 Records management, as well as  
22 establishing performance measures. How well are we  
23 doing in our licensing review program?

24 So with that, I want to go -- first, I'm  
25 going to cover a lot of these project scopes. For

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1 this project, the scope is organized into what's  
2 called a work breakdown structure. It provides the  
3 foundation for the project by defining the project  
4 task, milestones, and activities.

5 What you see here is a hierarchical  
6 representation of this planning effort. It goes into  
7 progressively greater and greater level of detail as  
8 you go down, and we go through a -- kind of a work  
9 scope decomposition identifying tasks.

10 Let's start with the top block. We'll  
11 call that Level I. That's the entire scope of this  
12 licensing review program. Level II, these are the  
13 three high-level phases where the NRC has to make  
14 decisions throughout the licensing process. For those  
15 of you who know Part 63 Subpart B titled "Licenses,"  
16 there's three phases -- construction authorization,  
17 that's the first block on the left of Level II. And  
18 that's really what we're going to be -- what we're  
19 focusing on now.

20 To the right of that is the next phase,  
21 the license issuance and amendment, and, finally,  
22 permanent closure. Those two aren't included right  
23 now. We're going through a planning and implementing  
24 phase, where as we get further down the road we'll get  
25 into planning and implementing the license issuance

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1 and amendment and permanent closure, if we get that  
2 far in the project.

3 So let's move down to Level III of the  
4 activities of the project scope. Going from left to  
5 right -- and I'm going to explain a little bit about  
6 the scope of each of these -- we start with the  
7 acceptance review process. That leads to our  
8 docketing decision. There's a Federal Register  
9 Notice.

10 Next is the EIS adoption, the  
11 environmental impact statement adoption, safety  
12 evaluation. I'm going to pull this out, and at the  
13 end of my presentation I've got a few slides that get  
14 into a little bit more detail the safety evaluation  
15 report process.

16 Hearings support -- that's the  
17 adjudicatory process, field reviews that are going to  
18 support our licensing program review, construction  
19 authorization decision at the very end, and then kind  
20 of a catch-all -- program management.

21 Now, what this does whenever we set out  
22 for this licensing review process, it tells us what is  
23 in the scope of this. What it also tells us is what  
24 isn't in the scope of the licensing review process  
25 that I'm talking about here.

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1 And a couple of those areas, which you  
2 won't see here, is the transportation cask  
3 certification program. You won't see the cask  
4 inspection program. Those are separate programs that  
5 are done by other parts of the NRC.

6 Permanent closure -- I mentioned that's  
7 not part of this right now. License issuance and  
8 amendment isn't. The inspections program, the  
9 allegations program, those are all programs outside of  
10 the licensing review program leading to a construction  
11 authorization decision.

12 So this helps us lay out what's in scope  
13 and what's out of scope. So now I'm going to walk you  
14 through the next couple of slides telling you what the  
15 scope of some of these activities are. First is the  
16 acceptance review. Determine whether the license  
17 application is complete and acceptable for docketing.  
18 For this, we look to Part 2, 2.101(f).

19 The foundation for that for our  
20 completeness review, before we would begin any  
21 technical review, is found in the Yucca Mountain  
22 review plan in the Appendix B. This will lead to a --  
23 to a docketing decision and a Federal Register Notice.  
24 So that's just, in short, what the scope of the  
25 acceptance review is.

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1           On page 9, project scope for the final  
2 environmental impact statement adoption decision, this  
3 would entail reviewing DOE's final environmental  
4 impact statement and license application to reach an  
5 adoption decision.

6           NRC is required under the Part 51  
7 regulations to adopt the FEIS to the extent  
8 practicable, and then to make it -- and then to make  
9 a decision at the time of docketing. Well, what this  
10 tells the project manager, that there are certain  
11 interdependencies when you have to make a decision at  
12 the time of docketing.

13           We have certain staff doing an acceptance  
14 review over a nominal 90-day period after the license  
15 application is tendered. In parallel with that, we  
16 have staff who estimate an EIS adoption determination,  
17 so now we're starting to get into some of the  
18 interdependencies of our project planning process  
19 here. We're looking at scope, schedule, and  
20 resources. Staff may be doing two activities in  
21 parallel.

22           And also, we know that certain areas of  
23 the environmental impact statement can be contended in  
24 the hearings, so I have to think as a project manager  
25 what staff, what resources, what scope, how can I

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1 estimate the amount of staff needed to support any  
2 kind of hearings on the environmental impact  
3 statement. And when would those hearings be?

4 On page 10 -- actually, my next step would  
5 be the safety evaluation report, but I'm going to  
6 cover that a little bit later. So now let's focus in  
7 on the project scope for the hearings support.

8 And the Appendix D of Part 2 gives us a  
9 lot of milestones to meet, gives the agency a lot of  
10 milestones to meet, and a lot of deadlines for the  
11 hearings support, because the safety case is what  
12 would be decided before any construction  
13 authorization.

14 And I've listed in bullet form a couple of  
15 these activities for the hearings support. Reviewing  
16 and preparing responses to petitions, contentions,  
17 appeals, testimony, other filings from third parties.  
18 Participating in conferences and hearings with the  
19 Atomic Safety and Licensing Board and participating in  
20 discovery.

21 So we see a lot of activities that are  
22 going to happen, that the NRC staff has to support in  
23 the hearings, beginning with notice of a hearing,  
24 first -- everybody looking at contentions that are  
25 proffered, what contentions are admitted after the

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1 first preconference order. We have a period of time  
2 where the staff is going to be writing the safety  
3 evaluation report, and there could also be discovery  
4 -- what we call pre-SER discovery, which the staff may  
5 have to be involved with.

6 We have a period of time after the staff  
7 issues the safety evaluation report the staff would  
8 have to support post-SER discovery. From that, we  
9 have the evidentiary hearings, and then after that we  
10 have the entire appellate process and the Commission  
11 decision.

12 So we're starting to understand the scope  
13 of the hearings by drilling into the Appendix D  
14 milestones to see where the NRC staff has to support  
15 what -- you know, what's the scope of the activities,  
16 what's the timeframe, what's the workflow, what are  
17 the resources needed.

18 On slide 11, this is called our field  
19 reviews. This is something that would support the  
20 license application review. It's intended to confirm  
21 the basis for the information and analysis in the  
22 license application. It may include detailed reviews  
23 of data, models, software, assumptions, or it may help  
24 us clarify an area of the license application.

25 And by doing these kind of field reviews

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1 it may also eliminate a need for a request for  
2 additional information, an RAI. With this, we plan on  
3 leveraging regional resources in such areas as data  
4 validation, models, looking at assumptions, etcetera.

5 We'll have review teams looking at the  
6 application. They will identify areas where they want  
7 to do field reviews. They will come out to the site,  
8 do the reviews, provide that information back to their  
9 teams. That's the field reviews.

10 Next is on slide 12. There really isn't  
11 a lot of information that we can get from Part 2  
12 Subpart J on the construction authorization decision.  
13 But we need to identify scope, because we know that  
14 there are certain activities that the staff is going  
15 to have to do, and this is certainly towards the end  
16 of the adjudicatory process.

17 We may have to revise the safety  
18 evaluation report, identify and discuss license  
19 conditions with the Department of Energy, if needed,  
20 if we get to that point. Certainly, under 63.32 --  
21 it's called Conditions of Construction Authorization,  
22 we know that there are certain requirements that we  
23 would have to deal with to get to a construction  
24 authorization phase. And then, ultimately, we may  
25 have to prepare a notice of issuance or denial of a

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1 construction authorization.

2 On slide 13 is the program management  
3 element of our scope, project planning. That's  
4 everything we've done to date. It's in progress, it's  
5 still underway.

6 The second bullet is the project  
7 implementation, which is upon receipt of the license  
8 application. And I'm going to go into a little bit  
9 more detail on some of these areas on the  
10 communications, the change control, the project  
11 controls, the project risk management, as well as the  
12 performance measurements.

13 On slide 14 -- now, we're done with the  
14 scope and we're looking back at the elements of our  
15 licensing review process, the integrated schedule.  
16 It's certainly based on 10 CFR Part 2, Appendix D.  
17 This is these 30 milestones that lay out over a period  
18 of 1,125 days specifically. So that gives us a lot of  
19 constraints on what we can do.

20 There are certain major event triggers in  
21 our scheduling, such as DOE's Licensing Support  
22 Network certification, the receipt of the license  
23 application, and a Federal Register Notice of Hearing.  
24 Most importantly, what the integrated schedule does is  
25 that it converts that work breakdown structure, that

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1 scope, into an operating time table with plan dates  
2 and milestones for us to track.

3 It provides us a tool to identify and  
4 control the interdependencies amongst all of the  
5 different scope that we have in a task. It gives us  
6 a baseline for controlling all of the activities, and  
7 it -- it's a baseline that we would establish at a  
8 point where we think we're very close to receiving a  
9 license application.

10 With that baseline, there's a lot of  
11 assumptions that we use in building our schedule  
12 assumptions in many aspects of the project, such as  
13 how was the work organized, what resources are going  
14 to be available, how are they going to be organized,  
15 what decisions need to be made, and which deadlines we  
16 are designated to meet.

17 So events are going to unfold, assumptions  
18 are going to change. We need to be flexible and  
19 really -- and to have a changed management process as  
20 we baseline this integrated schedule.

21 On slide 15, the resource planning and  
22 management, to ensure that the resources needed to  
23 complete the project are available when they are  
24 needed -- how do you do that? Through solid resource  
25 planning. And for us, that's linking the resources to

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1 the work breakdown structure, to the scope, and to the  
2 integrated schedule.

3 What's going to be done, by when, and by  
4 whom -- very important for us. So we can assure that  
5 we have all of the technical and legal expertise that  
6 we need to meet our project objectives.

7 We are also putting together what are  
8 called responsibility assignment matrices. That's  
9 where we lay out the entire scope of the project in a  
10 large table on one side, and on top we have all of the  
11 staff involved, and we can put levels of effort,  
12 hours. It's a tool that we're using in Microsoft  
13 Excel and Microsoft Access to really lay out the  
14 resource utilization throughout the entire project,  
15 from beginning to end.

16 On slide 16 is the project risk  
17 management. If you look at that second bullet,  
18 unidentified bullet in italics, we're talking about  
19 the project risk, and this is just a little  
20 definition. The project risks are any events or  
21 occurrences that might negatively affect the project  
22 scope, quality, schedule, or cost objectives.

23 When I say any events or occurrences, I  
24 talk -- whenever we talk to the staff, and we  
25 certainly get their input, it's what keeps you -- what

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1 would keep one up at night worrying about the project  
2 being completed?

3 Well, if you ask me that, I think about  
4 things like, well, we don't know the quality of the  
5 license application, we don't know how many  
6 contentions are going to be proffered, we don't know  
7 how many contentions are going to be admitted, we  
8 don't know how many RAIs we're going to have to write  
9 after reviewing the application.

10 So these are the kind of project risks --  
11 those are examples of the kind of things that we  
12 identify. When you have the complete information on  
13 a project, it creates a certain environment of  
14 uncertainty, and that uncertainty leads us to identify  
15 what the project risks are.

16 So we have a process here where we  
17 anticipate what the uncertainties are and try to plan  
18 for them and address for them. The model that we're  
19 following is on the first bullet, very typical in  
20 project risk management where you identify the risks,  
21 you analyze them, you plan for them, you track them,  
22 you control them, but most importantly you communicate  
23 those risks between the staff and the management of  
24 the project.

25 Risks will change, and they do change,

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1 since we started this process a year and a half ago.  
2 When new risks arrive, old risks become obsolete. So  
3 that's why when I say "throughout the life of the  
4 project," project risk management won't stop because  
5 the risk will change as we go through the project.

6 And, certainly, I think failure to  
7 identify these risks early and continually could have  
8 some negative consequences -- schedule delays, us  
9 being able to meet the project objectives. So we  
10 think we have a pretty good process to identify the  
11 project risks.

12 17 is the inevitable -- change assessment  
13 and management. We know it's going to happen. We  
14 want to implement a process to control those changes,  
15 to be able to communicate the potential changes to  
16 management and within the project team to assess their  
17 impact on the project. If you change a Level IV or  
18 Level V milestone, what does that mean across the  
19 project? And then, to implement procedures to accept  
20 the changes, and then disseminate those changes  
21 throughout the project team.

22 So we're going to plan, we're going to  
23 implement, we're going to control, and we're going to  
24 track.

25 And when I talk about implementing on

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1 slide 18, I'm talking about the implementation  
2 procedures.

3 We have a project controls function. With  
4 this, we'll be maintaining somebody who is going to  
5 maintain all of the tools that we have in place, such  
6 as the work breakdown structure, the integrated  
7 schedule, the risk management, the resource  
8 utilization, all of those electronic tools which aids  
9 the project manager.

10 We know we have status reporting and  
11 performance measurement reporting. It's been made  
12 clear to me that there's a lot of people who want a  
13 lot of information throughout the licensing review  
14 process. We'll look at bi-weekly and monthly  
15 reporting, etcetera.

16 You know, there's a saying that you plan  
17 to get in control, and you track to stay in control.  
18 Well, we'll hold regular progress tracking meetings to  
19 identify issues that come up and to look and to track  
20 the milestones as we move through the project.

21 On slide 19, communications. Close and  
22 coordinated communication is going to be necessary and  
23 very important on this project. It's a very complex  
24 project, and we have a need to get the right  
25 information to the right people in a timely manner.

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1           So whenever we think about communications,  
2       here I talk about internal communications amongst the  
3       management at the NRC, as well as the project team,  
4       and there's a lot of teams, and external  
5       communications. At the NRC, it's important that we do  
6       our business in the public eyes. It's one of NRC's  
7       openness initiatives.

8           We will have public meetings with the  
9       applicant, as necessary. Certainly through the RAI  
10      process, the request for additional information, we  
11      could have public meetings with the applicant to  
12      explain a draft RAI. All of the letters that we send  
13      between us and the applicant would be made publicly  
14      available. So those are the external communications.

15           On slide 20 is records management. We  
16      need to identify what the official records are for the  
17      agency. We had management directives and other  
18      requirements as far as documenting our work, and as  
19      well as the documentary material that would go on the  
20      Licensing Support Network that's required by Part 2  
21      Subpart J. So records management is certainly a very  
22      important element of the licensing review process.

23           On Slide 21 is the performance measures.  
24      Indicates how well the project is functioning, and  
25      it's something that we would monitor over the life of

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1 the project. This is an area that we're currently  
2 developing. It's not fully developed. We certainly  
3 have a lot more work to do in this, and we have been  
4 challenged by our senior managers to come up with  
5 useful and meaningful performance measures.

6 Typically we'll look at performance  
7 measures in the area of the quality of the technical  
8 work, the timeliness of the work, resource  
9 utilization, as well as risk management. So it's an  
10 area that we're certainly developing, we've been  
11 challenged to identify performance measures in this  
12 area, and we're going to keep working it with our  
13 management at the NRC.

14 Okay. Now we'll get out of the elements  
15 of the licensing review process and get into a little  
16 bit of the specific element of our scope, the safety  
17 evaluation report, the biggest product we're going to  
18 -- that we're going to have to produce.

19 Certainly, it has been a major focus of  
20 our project planning, certainly the most tasks we've  
21 identified in our integrated schedule, the most  
22 resource-intensive area is for the safety evaluation  
23 report.

24 So with that little introduction, on  
25 page 23 of the safety evaluation report process, it

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1 has to be consistent with the regulatory requirements,  
2 it has to be produced in an 18-month duration. I  
3 think Part 2 Appendix D gives us 548 days to produce  
4 a safety evaluation report, and to issue it. That is  
5 our planning basis, and it's the law.

6 It will be consistent with the Yucca  
7 Mountain review plan, and the little picture on the  
8 bottom shows the safety evaluation report process and  
9 lays out -- these are actually chapters in the Yucca  
10 Mountain review plan that are tied back to Part 63.21  
11 for the content of the application.

12 That's how we're going to produce our  
13 safety evaluation report, beginning with the general  
14 information section, the preclosure, post-closure, the  
15 administrative and programmatic sections, the license  
16 specifications, and the research and development and  
17 performance confirmation program. So these are all  
18 tied directly to the -- to Part 63.21, as well as the  
19 Yucca Mountain review plan.

20 What are some of the key elements of the  
21 safety evaluation report process? I talked about  
22 joint teams. These are joint. This is identifying  
23 the joint NRC and Center for Nuclear Waste Regulatory  
24 Analysis joint teams, and those teams we've laid out  
25 in our project planning exercises.

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1 Another key element of the SER process is  
2 the request for additional information. We have an  
3 assumption that we have one single round of requests  
4 for additional information. That's what's in our  
5 integrated schedule. That's what will be in our  
6 baseline work breakdown structure.

7 We go through a review cycle, typical  
8 really for producing any work product. It's a  
9 sequential review cycle, not just for the safety  
10 evaluation report but for the request for additional  
11 information.

12 The technical staff producing the document  
13 -- we have an integration -- a safety integration  
14 review. It's a peer review. It's an expert panel to  
15 look at the integration of many, many different  
16 sections, and I think my next slide talks about the  
17 sections. We call it a safety integration review, an  
18 editorial review, legal review, followed by a  
19 management review.

20 So these kind of sequential review cycles  
21 are going to happen as we move along our work flow for  
22 the safety evaluation report.

23 On slide 25, on the left side in small  
24 print is the 50 sections of the Yucca Mountain review  
25 plan. These would be the major chapters of the safety

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1 evaluation report. So we align all of the chapters of  
2 the Yucca Mountain review plan with the chapters of  
3 the safety evaluation report from the general  
4 information down to the research and development and  
5 performance confirmation program.

6 And the output would be a NUREG, which  
7 would be the safety evaluation report -- all of the  
8 major chapters and sections of that safety evaluation  
9 report.

10 On slide 26, this is our general approach  
11 using a five-phase process, and for us this is a major  
12 accomplishment. This really lays out for us the  
13 workflow for producing the safety evaluation report.

14 And you can see on the very bottom it says  
15 the duration of 18 months. And of the five phases,  
16 Phase I is where the staff, these teams, the lead  
17 authors, lead technical reviewers, etcetera, where  
18 they draft the SER section. At the same time it's  
19 doing that, if there is a request for additional  
20 information, it would be drafted in Phase I.

21 Phase II is the safety integration review.  
22 It's this expert panel. It's our senior-level  
23 scientists, our senior-level engineers. It would be  
24 an attorney, it would be managers. We would do a  
25 safety integration review, it says of the RAIs, but

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1 it's more than a -- it's of the RAIs and the safety  
2 evaluation report. They go hand in hand. You have to  
3 draft a section of the SER before you can identify  
4 what the request for additional information is.

5 And they'll look at the integration as  
6 what is -- is it risk significant, the request for  
7 additional information? Is it tied to a statutory  
8 requirement? Is it tied to a specific finding in the  
9 Yucca Mountain review plan?

10 And we are going to use the safety  
11 integration review, the SIR, not just in Phase II, but  
12 I -- I should have mentioned that it's also in Phase  
13 IV. In Phase III is where we actually issue the RAIs  
14 to the applicant, to the Department of Energy, and we  
15 go through a process here where we'd have a public  
16 meeting with the applicant, explain what the draft  
17 RAIs are. They have a certain amount of time to  
18 provide their response.

19 In Phase IV, after we get the response  
20 from the applicant, we go through where we actually  
21 complete a final draft of the SER sections. And in  
22 there we also -- we would have the safety integration  
23 review, looking at the information once again, and  
24 then, in Phase V, where we would finalize the safety  
25 evaluation report and produce the NUREG document.

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1           On slide 27 is the path forward. We're  
2 going to continue all of our pre-licensing activities  
3 in preparation for license application receipt, if one  
4 were to hit -- come our way, monitor the project  
5 environment for conditions that could affect the  
6 project.

7           Certainly, the rulemaking underway affects  
8 the project. That was a project risk identified a  
9 long time ago. It's not obsolete, but we are in the  
10 proposed rulemaking phase. Continue our project  
11 planning process, working on our workflows, working on  
12 the task durations, so we can get to a point of base  
13 -- of down the road baselining our project.

14           And then, finally, there would be  
15 implementation of our licensing review process  
16 following receipt of the license application.  
17 Actually, it would probably begin a little before  
18 that. It could be whenever DOE certifies its LSN  
19 collection where we couldn't docket the application.  
20 I think six months have to elapse from the time that  
21 they certify until the time that we can actually  
22 docket the license application.

23           So with that, I conclude my presentation  
24 on our licensing review process.

25           MR. COLLINS: Before we turn it over for

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1 questions, I would just like to add --

2 CHAIRMAN RYAN: Could you just tell us who  
3 you are and who you're with for the record? We have  
4 --

5 MR. COLLINS: Excuse me. Elmo Collins,  
6 Deputy Director.

7 CHAIRMAN RYAN: That was my mistake. I  
8 didn't mention you by name.

9 MR. COLLINS: Thank you. Thank you. I  
10 just wanted to add that we have put a considerable  
11 amount of effort into this plan. It's very extensive,  
12 I think fairly exhaustive, and we -- we believe it  
13 represents a good basic plan. As you have indicated,  
14 it will change. All plans change, but the value is in  
15 the planning.

16 We also were able to derive from it what  
17 we believe is a fairly solid resource estimate for  
18 what it's going to take for us to conduct this review  
19 and prepare this safety evaluation report. And, of  
20 course, the key element -- one of the key elements is  
21 that it recognizes important areas where there are  
22 unknowns and uncertainties, such as the number of  
23 contentions, the number of requests for additional  
24 information.

25 We'll need the quality of the application,

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1 what are we going to see when we get it, and  
2 environmental issues and environmental conditions as  
3 well. So we believe we're well positioned at this  
4 point in time to take the license application.

5 CHAIRMAN RYAN: Thanks very much.  
6 Appreciate your comments.

7 Jeff, thanks for your presentation.

8 MR. CIOCCO: You're welcome.

9 CHAIRMAN RYAN: Let me start with a  
10 question. You mentioned one place -- and it's toward  
11 the last couple of slides -- where Phase III of the  
12 RAI issuance was the place where there'd be a public  
13 meeting with the applicant.

14 Are there any other opportunities earlier  
15 in the process where information will be available  
16 publicly, or is that predecisional phases? Or just --  
17 I know that question will come up, so I thought I'd  
18 ask it first.

19 MR. CIOCCO: Do you mean as far as in  
20 Phase I as staff is preparing the --

21 CHAIRMAN RYAN: Well, no, I --

22 MR. CIOCCO: -- the draft?

23 CHAIRMAN RYAN: -- just thinking about it,  
24 you know, the LA is received I guess right here in  
25 Phase I. And then, what happens in terms of public

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1 involvement during those first two phases? The first  
2 place where you said, you know, the decisionmaking  
3 comes out is in Phase III.

4 MR. CIOCCO: Yes. I think probably in  
5 Phase III would really be the first opportunity for  
6 public involvement, unless we decide -- if we have  
7 questions that we need asked, ask the Department of  
8 Energy, there's an opportunity for us always to -- to  
9 meet with the applicant and request clarification on  
10 certain areas.

11 CHAIRMAN RYAN: Okay. Have you thought  
12 about, you know, are those meetings all going to be  
13 open or all going to be closed? Or a mix of both? Or  
14 has that been decided? I don't know. That's why I'm  
15 asking.

16 MR. CIOCCO: Yes. Well, it probably  
17 depends on the nature of the information that we need  
18 to ask.

19 CHAIRMAN RYAN: Knowing itself obviously  
20 will be in the public area, but it would be  
21 interesting to think about how it's going to work.

22 MR. CIOCCO: Yes, we'll have to think  
23 about it. Like I said, it really depends on -- I  
24 think on the kind of information that we need, when we  
25 need it, how we need it, whether it would be, you

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1 know, public interaction with the Department of  
2 Energy.

3 MR. COLLINS: Let me just add, Mike, there  
4 will -- that mention of public meetings at RAI, that  
5 was a very discreet mentioning of a public  
6 involvement.

7 CHAIRMAN RYAN: Oh, no, I understand that.

8 MR. COLLINS: There will be others in  
9 terms of the review process itself. That's NRC  
10 internal, although Part 63 does make a provision for  
11 us to entertain requests for participation in the  
12 application review. So we would entertain a  
13 request --

14 CHAIRMAN RYAN: Okay.

15 MR. COLLINS: -- if we received them.

16 CHAIRMAN RYAN: All right. Thanks.  
17 Again, I think it's a very thorough job that you've  
18 put together to look at this. It's a very formal and  
19 detailed project. A couple of us had the benefit of  
20 seeing a few demonstrations of your work breakdown  
21 structure capability and how you've prepared to manage  
22 it. It seems very thorough, and it's a well developed  
23 and well thought out tool and process you've put in  
24 place. So congratulations.

25 MR. CIOCCO: Thank you.

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1 CHAIRMAN RYAN: Ruth, any questions?

2 MEMBER WEINER: I'll try it this way.

3 That's a very thorough presentation, and we  
4 congratulate you on it. Do you have a contingency  
5 plan? In other words, what if there are unanticipated  
6 budget cuts? The regs require and the law has --  
7 gives you a certain time scale in which you have to do  
8 things. So what if all of a sudden you don't have the  
9 budget to do what you want to do?

10 MR. CIOCCO: Yes. That's certainly a  
11 project risk, if you don't have the budget or the  
12 resources to do the work. And from a project manager  
13 standpoint, I certainly -- I would use the escalation  
14 process, and I would pass it over to Elmo Collins.

15 (Laughter.)

16 MR. COLLINS: Well, our current planning  
17 basis is established, and it's as we know it, and in  
18 anticipation of a license application in the  
19 relatively near future. I think if the application is  
20 received and we begin our review, it would -- I  
21 wouldn't anticipate budget cuts at that point. But if  
22 they did come, it would -- it would have a substantial  
23 effect and lengthen our delay considerably.

24 CHAIRMAN RYAN: Well, isn't your job at  
25 that point to assess the impact of it, not to find the

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1 new money? I mean, so, you know, you really have two  
2 different questions there. I think, you know, you are  
3 obviously focused on assessing the impact of any cut  
4 rather than, you know, worrying about how big it is or  
5 how little it is, or, you know, the impact is the  
6 important issue from a project management standpoint.

7 MEMBER WEINER: Well, my question -- the  
8 original question was: do you have a contingency  
9 plan? Or have you thought about a contingency plan?  
10 And not just for budget, but for any kind of  
11 unanticipated thing.

12 MR. CIOCCO: For certain project risks we  
13 do. I mean, we look at how do you handle the risk.  
14 Well, you can accept them, you can avoid them, you can  
15 transfer them, or you can mitigate them. So, I mean,  
16 it really -- it really varies across the board. Some  
17 risk we have to accept, that -- you know, that we have  
18 an 18-month timeframe, so we try to put the resources  
19 on the most significant areas of the license  
20 application.

21 So we really look at it across the board  
22 as --

23 CHAIRMAN RYAN: A more realistic question,  
24 Ruth, might be, what if a particular technical review  
25 extends in time, for six months instead of three

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1 months? I mean, that's probably a more realistic kind  
2 of question or that's, you know --

3 MR. CIOCCO: It is. I mean, I think it's  
4 a good question. It's an issue that we would have to  
5 track. We would have to figure out why and how, is it  
6 a resource that could be applied to it, do we have  
7 enough information to get to our safety evaluation  
8 report process. But it's certainly one that we want  
9 to be able to address and catch early in our progress  
10 tracking meetings throughout the implementation.

11 MEMBER WEINER: What's the basis that  
12 you're going to use for the FEIS acceptance? And I  
13 ask because we had a presentation earlier on what is,  
14 in effect, a supplemental EIS. There is another  
15 environmental impact statement on Nevada Rail. Now,  
16 would you look at the original FEIS? Would you look  
17 at that along with the new one on Nevada Rail? What  
18 would you -- would you consider supplemental  
19 environmental assessments? How do you plan to accept  
20 -- since part of this is acceptance of the  
21 environmental impact statement, how do you plan to  
22 accept that?

23 MR. COLLINS: For the final environmental  
24 statement, the law requires Department of Energy to  
25 submit that -- the final environmental impact

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1 statement, which has already been prepared to us, as  
2 part of the license application. We're anticipating,  
3 along with that, we'll have an environmental  
4 assessment. In our -- it does specify in the law that  
5 we will adopt, to the extent practicable.

6 So the elements of our -- they basically  
7 are going to be, are there new significant changes,  
8 new significant information that we either become  
9 aware of or was brought to our attention as part of  
10 the environmental assessment, which would then dictate  
11 the need to supplement that environmental impact  
12 statement, and which we would do that at that point in  
13 time.

14 MEMBER WEINER: Would the new EIS on the  
15 Nevada Rail be part of what you accept?

16 MR. COLLINS: It's not going to -- not  
17 part of the Nuclear Waste Policy Act per se, but we do  
18 participate in that environmental impact statement  
19 process through NEPA, with our ability to take that  
20 and comment on it, which we plan to do as well.

21 MEMBER WEINER: But you would be accepting  
22 -- the document --

23 MR. COLLINS: No. It would be --

24 MEMBER WEINER: -- that you would be  
25 accepting would be the FEIS.

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1 MR. COLLINS: That's correct. That's  
2 correct.

3 MEMBER WEINER: Finally, and you may not  
4 be able to answer, this is really not a fair question  
5 to you. What if the construction authorization is  
6 denied? What happens -- who decides what happens to  
7 the site? Is that a DOE decision? As I said, you --

8 CHAIRMAN RYAN: I'm going to ask that you  
9 guys don't slide that microphone. It puts a hurricane  
10 in his ear. Just pick it up and move it.

11 MR. CIOCCO: Okay. Yes, I think it's  
12 specified in the Nuclear Waste Policy Act what happens  
13 at that point, and I don't have the Act in front of me  
14 here to know what it is.

15 CHAIRMAN RYAN: I agree with Ruth's  
16 comment it's not a fair question.

17 (Laughter.)

18 MR. COLLINS: Okay. Thank you.

19 CHAIRMAN RYAN: Allen?

20 VICE CHAIRMAN CROFF: Good job. I don't  
21 have any questions.

22 CHAIRMAN RYAN: Great. Bill Hinze?

23 MEMBER HINZE: A quick one or two. The  
24 RAIs, what are -- do you have protocols in place with  
25 DOE regarding these? And what is the manner in which

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1 you're going to conduct a request for additional  
2 information?

3 I note here on 26 that -- page 26 that it  
4 looks as if you're going to collect all of the RAIs  
5 together, and then ask for them and then get an  
6 answer. But many of these concerns are really  
7 staying, so you need the information in order to  
8 conduct further investigations.

9 MR. CIOCCO: Yes, that's correct. I mean  
10 --

11 MEMBER HINZE: Let's hear about how you're  
12 going to do RAIs.

13 MR. CIOCCO: Yes. Well, we haven't  
14 interacted yet with the Department of Energy on this  
15 entire process. This is really the first time that  
16 we're kind of laying out what our five-phase process  
17 is for the safety evaluation report, and we will down  
18 the road. We're certainly committed to interacting  
19 with the Department of Energy on this process and  
20 getting into some of the more details.

21 But we do plan on, whenever I talked about  
22 the chapters of the safety evaluation report, making  
23 sure that we have the RAIs for that particular area,  
24 because a lot of them are cross-cutting, and we want  
25 to make sure through the integration review that we

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1 have -- we're not just kind of piecemeal sending out  
2 requests for additional information, and that the  
3 safety integration review looks at those in total, and  
4 whether it's post-closure, whether it's preclosure,  
5 general information, whatever.

6 So we do want to make sure that they are  
7 bundled to the extent that they can be, so that we're  
8 not redundant, we're not asking for information that  
9 isn't really important. And then, those would be sent  
10 to the Department of Energy.

11 We would have an interaction with them, I  
12 guess whenever the RAIs are in draft format, to  
13 explain -- make sure they understand the basis of what  
14 we're asking for, because we do have a very -- a very  
15 limited timeframe in producing the SER, so we want to  
16 make sure we're -- that we're as clear as possible in  
17 the RAIs.

18 MEMBER HINZE: I assume that you'll have  
19 a time goal that you'll want to have the DOE answer  
20 these and to take care of them.

21 MR. CIOCCO: Correct, yes.

22 MEMBER HINZE: What is the technical staff  
23 doing after the 18 months of -- and the completion of  
24 the final SER?

25 MR. CIOCCO: Well, we'll be doing a lot of

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1 activities. A lot of them will be supporting the --  
2 you said the post-SER discovery, leading up to the  
3 evidentiary hearings. A lot of the other programs  
4 that aren't -- maybe they're kind of out-of-scope  
5 programs, performance confirmation program,  
6 inspections program, allegations program. They will  
7 be supporting a lot of these different areas.

8 And, certainly, when you just look at the  
9 resource utilization, there is peaks and valleys of  
10 staff utilization over the five-phase process. We're  
11 trying to shave off some of the peaks and fill in some  
12 of the valleys, but there are a lot of other  
13 activities underway throughout the entire process.

14 MEMBER HINZE: Thank you.

15 MR. CIOCCO: You're welcome.

16 CHAIRMAN RYAN: Jim?

17 MEMBER CLARKE: Just a quick followup. As  
18 you noted, many of these issues it looks like could be  
19 addressed in parallel. Teams could be working on them  
20 at the same time. Others are cross-cutting. Is there  
21 a -- does the review plan specify a sequence that  
22 you'll follow?

23 MR. CIOCCO: For the safety evaluation  
24 report?

25 MEMBER CLARKE: Yes.

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1 MR. CIOCCO: To the extent that we could  
2 do it. I mean, right now, the approach we're looking  
3 at is over the 18 months is we really need to begin  
4 the review -- writing and reviewing the application  
5 and writing these individual sections in parallel.  
6 It's hard to do a lot of sequential work when you have  
7 a very short timeframe to get these five phases done.

8 To the extent that we could do certain  
9 areas first, we'll certainly entertain that and do  
10 other areas later. But a lot of work gets done in  
11 parallel. There is a lot of interdependencies amongst  
12 the group, and that's where we're trying to identify  
13 the staff utilization over the entire period of this  
14 18 months.

15 MEMBER CLARKE: Okay. Thank you.

16 MR. CIOCCO: You're welcome.

17 CHAIRMAN RYAN: I think, you know, you've  
18 touched on a number of different ways the layering.  
19 You know, you can think of a project as being a linear  
20 thing. It starts here, and ends there, but this is  
21 probably a layer of -- I don't know, pick a number --  
22 500 or 1,000 individual projects that are all not  
23 only, you know, left to right but they are in and out,  
24 too.

25 And they're all connected in time and

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1 scope, so it's clear that you guys have worked hard to  
2 produce a system that will help you make sense out of  
3 all that, which is really your goal.

4 Thanks for your presentation and your  
5 discussion today.

6 Other questions from staff? Mike?

7 MR. SCOTT: Yes, please. Jeff, in the  
8 reactor world, typically there is a document issued  
9 partway through. They used to call it a draft SER,  
10 and then they changed it to an SER with open items.

11 MR. CIOCCO: Correct.

12 MR. SCOTT: I'm curious. I don't see that  
13 here, particularly for a first of a kind project. Why  
14 not go that route?

15 MR. CIOCCO: You're absolutely right,  
16 Mike, and I know I meet a lot with and try to leverage  
17 as much as I can through the license renewal folks and  
18 the NRR people. And certainly they do issue an SER  
19 with open items that goes through the ACRS.

20 This project doesn't have that same  
21 process, mainly because, you know, we have to follow  
22 what's laid out in the Appendix D milestones of  
23 Part 2, and it talks about issuing -- issuance of a  
24 safety evaluation report.

25 So there isn't -- so we're trying to look

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1 at it in chapters, in logical areas of the safety  
2 evaluation report, but there isn't a provision, as  
3 they have in either the 22 months or 30 months where  
4 license renewal, for example, produces their safety  
5 evaluation report. Actually, it's 22 months,  
6 excluding the hearings. You're right, there isn't a  
7 provision.

8 I guess in some cases in the Part 50 or  
9 Part 52 framework it mentions specifically that  
10 document. In other cases it doesn't, but I think the  
11 staff has frequently found it useful to get a document  
12 out there that has the areas that are not yet fully  
13 resolved for everybody to look at. And they also have  
14 the draft text out there to sort of --

15 CHAIRMAN RYAN: Lean in a little, Mike.

16 MR. SCOTT: -- on finalizing the document.

17 CHAIRMAN RYAN: Lean in to the microphone.

18 MR. SCOTT: Sorry.

19 CHAIRMAN RYAN: You have to get it closer  
20 to your face.

21 MR. SCOTT: I was just suggesting that in  
22 some cases it's specified in the regulatory framework.  
23 In some cases it's not. It just -- it seems like  
24 particularly where we had a first of a kind activity,  
25 it was a good context for helping the staff getting it

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1 -- helping the staff gets its act together.

2 MR. CIOCCO: Yes, yes. Thank you, Mike.

3 I certainly appreciate and understand what you're  
4 saying. To the extent that we had to look at the  
5 constraints of the Part 2 or the Appendix D schedule  
6 and lay out a framework to get this done in 18 months,  
7 we certainly considered that. It just wasn't there.

8 MR. SCOTT: Okay. One other question if  
9 I might, unrelated. On slide 11, I think it's 11, it  
10 refers to the regional support.

11 MR. CIOCCO: Yes.

12 MR. SCOTT: Is there one particular region  
13 that has cognizance, or are you going to tap all of  
14 them?

15 MR. CIOCCO: Region IV.

16 MR. SCOTT: And that's where you're going  
17 to go to get your resources for this?

18 MR. CIOCCO: Yes, sir.

19 MR. SCOTT: Thank you.

20 MR. CIOCCO: You're welcome.

21 CHAIRMAN RYAN: Okay. John Larkins?

22 DR. LARKINS: Yes. Just a quick question.  
23 When you do your labor rates and you look at the  
24 resource utilization for these various activities,  
25 have you identified some where if you add additional

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1 resources or people that you can speed the process up,  
2 or have you also looked to see if there is a loss of  
3 certain knowledge, skills, and abilities in the staff,  
4 in the adverse impact of that? There's sort of two  
5 parts there.

6 MR. CIOCCO: Yes. I mean, the first part  
7 of your question, are you talking about the  
8 productivity rate of the staff?

9 DR. LARKINS: Yes. You assign a certain  
10 amount of -- a team a certain amount of time to get a  
11 task done.

12 MR. CIOCCO: Correct. And then we look  
13 historically at the productivity rate of a particular  
14 staff, team, division, whatever, and apply those type  
15 of FTE hours, if you will, whenever we try to fill in  
16 the resource utilization for a particular task.

17 DR. LARKINS: Have you assessed if you had  
18 additional resources the impact, whether things would  
19 get done quicker or -- or it's a matter of resource  
20 leveling is what it --

21 MR. CIOCCO: Yes, I think we have to  
22 certain areas. And I talked a little bit about trying  
23 to shave off some of the peaks or fill in some of the  
24 valleys in times where we know we're going to have a  
25 lot of work, particularly early on in producing these

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1 draft SERs and draft RAIs. So I think we are looking  
2 at putting -- you know, putting the -- not just the  
3 amount of resources but the right resources in the  
4 right areas.

5 DR. LARKINS: Yes. And there are certain  
6 areas, I guess, where there are critical what I call  
7 KSAs -- knowledge, skills, and abilities -- if  
8 something happens in those areas. This goes back to  
9 Ruth's question about contingency planning to  
10 supplement the staff.

11 MR. COLLINS: On that, John, I would  
12 offer, you know, to the review teams that where we  
13 have those critical areas, where we do have the people  
14 with the depth and experience, and then we put some  
15 people them with less depth and less experience, that  
16 are going to be working with them along the way in the  
17 even that they become unavailable.

18 Right now, we have them planned, but, of  
19 course, we can't predict the future. So we  
20 understand.

21 DR. LARKINS: Thank you.

22 CHAIRMAN RYAN: I'm sorry. Ashok? Pardon  
23 me.

24 MR. THADANI: Thanks, Mike. Let me  
25 commend you. I think what you presented is truly

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1 outstanding, very well-planned program execution that  
2 you're considering.

3 One issue that you may have considered,  
4 and would be interested, that could have an impact on  
5 how you go forward -- and that's you will need access  
6 to some very specialized expertise. Do you have all  
7 of that expertise in-house? Are you counting on  
8 getting some consultants?

9 And in the case you go out and seek some  
10 consultant support, have you looked carefully at  
11 potential conflict of interest issues? See if that  
12 might have an impact on the license.

13 MR. CIOCCO: Yes. Well, the answer is, as  
14 we're putting together our teams and we're looking at  
15 -- they have to identify the individual and the  
16 particular area of expertise. And these teams --  
17 these are joint NRC and the Center for Nuclear Waste  
18 Regulatory Analysis teams.

19 So if it's either an in-house expertise  
20 that we have, or it's an expertise at the Center in  
21 San Antonio, or it's a consultant, which may be  
22 employed by the Center in San Antonio -- so we're --  
23 we're definitely -- by doing kind of a bottoms-up  
24 approach to this project planning, and having the team  
25 leaders and individual project managers look at the

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1 tasks that they have, they need to know what those  
2 activities are, what work they have to do, and who is  
3 going to do the work.

4 So it isn't just a project manager like  
5 myself sitting up here saying, "You need this, this,  
6 and this." It's really at a lower level -- Level 5,  
7 Level 6 of the work breakdown structure identifying  
8 who those resources are, and what specific level of  
9 expertise.

10 And it's not just within our Division of  
11 High-Level Waste Repository Safety. There could be  
12 other staff within the NRC that aren't part of the  
13 adjudicatory employee program who could also support  
14 us in our licensing review.

15 MR. COLLINS: Ashok, I would just add the  
16 point you're making is right on the money. There is  
17 a number of areas of specialized expertise that we  
18 don't retain in-house on NRC staff, yet this is where  
19 -- this shows the value of the Center for Nuclear  
20 Waste and Regulatory Analysis we have in San Antonio.

21 They came into existence a number of years  
22 ago, and we've taken overt efforts to preserve them  
23 from conflict of interest, and also maintain that  
24 technical capability. So we will have them when we  
25 need them to do our work with the application review.

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1 MR. THADANI: Thank you.

2 CHAIRMAN RYAN: Any other questions?  
3 Again, I think it's important to note as we finish  
4 that you've been developing this plan and its tools  
5 and capabilities for 18 months or so now.

6 MR. CIOCCO: Correct.

7 CHAIRMAN RYAN: And I think as Ashok  
8 pointed out, the quality of the work is showing  
9 through, and we appreciate your being here with us  
10 today.

11 MR. CIOCCO: Thank you, Dr. Ryan.

12 CHAIRMAN RYAN: You're welcome.

13 With that, we are -- the next item on our  
14 agenda is actually two. There's two elements. One  
15 which will be very short is the ACNW's low-level  
16 radioactive waste White Paper, a brief status report.  
17 We're actually going to take up a bit of that  
18 discussion on Thursday, in our session Thursday.

19 But I'll briefly mention that what the  
20 ACNW is trying to do is put together a White Paper  
21 that examines the regulation of low-level waste, its  
22 history, its connections in this for the Rosetta  
23 stone, and its linkages to other regulations past and  
24 present, and how the definitions evolved as they have  
25 evolved, and so forth. And then, are there any

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1 opportunities to better risk-inform that or to address  
2 issues that are out there in decommissioning or other  
3 topics?

4 And we're pretty much finalizing over the  
5 next weeks the factual part of it, which is, how is it  
6 all connected? And, you know, what is the history,  
7 and what are the dates, and when did something change?  
8 And what does pre-'78 versus after '78 mean? And  
9 things of that sort, just from a structure of the  
10 regulations and laws standpoint.

11 And then, the second part of that, which  
12 we'll be preliminarily discussing, is what does it  
13 tell us where the opportunities are to do a better job  
14 or to risk-inform the process or to recognize where  
15 something isn't risk-informed, for example, and go  
16 from there. So that's kind of where we are, and we'll  
17 be taking that up Thursday.

18 The next and final item for the day is the  
19 subcommittee report, the ACNW subcommittee report on  
20 the DOE probabilistic volcanic hazards analysis, the  
21 PVHA workshop. And, Professor Hinze, would you lead  
22 us in that report, please?

23 MEMBER HINZE: Well, I'll make a few  
24 comments, and my colleagues that were at the meeting -  
25 Bruce Marsh, our consultant, and Neil Coleman -- can

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1 add their points. This --

2 CHAIRMAN RYAN: Once again, Bill, just  
3 drag that just a bit closer, so everybody can hear  
4 you, if you don't mind.

5 MEMBER HINZE: Okay.

6 CHAIRMAN RYAN: I'm sorry I keep bugging  
7 everybody.

8 MEMBER HINZE: I'll chew on it.

9 CHAIRMAN RYAN: It's in the interest of  
10 good communication.

11 MEMBER HINZE: Okay. The objectives of  
12 the workshop were to present to the panelists of the  
13 expert elicitation on PVHA update the new data and the  
14 compilations that had been prepared by the DOE. In  
15 addition to that, there was the identification of the  
16 panelists' approach to the volcanic hazard modeling,  
17 and particularly the definition of the igneous event,  
18 as well as the individual panelists' approach to the  
19 temporal and spatial modeling of the volcanic activity  
20 that is anticipated over 10,000, and now we hear over  
21 a million years.

22 The status of that program -- one of the  
23 things I was going to mention in this report was the  
24 10,000 and one million year, because I think that's an  
25 important change in the program that the committee

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1 should be aware of, but we've discussed that and so we  
2 can move on.

3 In terms of the status of the program, the  
4 expert elicitation team has met with all of the  
5 experts, and so they're on their way. There has been  
6 drilling of the geophysical anomalies that has begun,  
7 and that Russ mentioned to us.

8 There is a -- somewhat of a delay in the  
9 program. The next workshop is now planned for April  
10 of 2006, as well as a fourth workshop in September of  
11 2006. The report preparation, as I understood it, at  
12 the -- and Eric can correct me on this -- but as I  
13 understood it, at the PVHA was that the report  
14 preparation was during '07, and the drop dead date on  
15 that is September of '07. That is a slight delay of  
16 about three or four months according to my  
17 recollections.

18 One of the quotes that I have is that they  
19 hope to have the results of the PVHA-U shortly after  
20 the submittal of the license application. There was  
21 even some discussion of the program going into a  
22 slumber mode, which indicates that there has been some  
23 delay in the program.

24 The drilling of the geophysical anomalies  
25 began with drilling of a magnetic minimum in the

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1 northwest corner of Crater Flat. This is a drill hole  
2 that the DOE anticipated would be -- not be associated  
3 with basalts. And the basalts, of course, are the  
4 important thing in terms of being -- using the  
5 historical record of basaltic activity to predict into  
6 the future, and the detection of the hidden volcanic  
7 -- basaltic volcanic rocks.

8 The DOE did not anticipate in this hole  
9 that they would run into basalt, but that the --  
10 rather, that the anomaly would be associated with some  
11 faulting of the tufts.

12 They did, however, discover the basalts in  
13 that hole, as I have it, at about 140 meters. The  
14 petrology and the location of these basalts indicate  
15 that they probably are old basalts -- that is, that  
16 they date from the early opening of Crater Flat,  
17 roughly 11 million years ago.

18 And as Russ mentioned, they have not been  
19 dated yet. There is going to be a reconnaissance  
20 dating, and I think that was one of the advancements  
21 that came out of the PVHA-U. There is going to be  
22 reconnaissance dating by potassium argon, and that  
23 should be available in a couple of weeks.

24 Other new data aspects -- one of the more  
25 interesting reports was on analog studies of the dikes

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1 and dike swarms, as well as the events associated with  
2 studies being made by the DOE and its contractors.

3 The limitations in the knowledge of the  
4 processes, the geological and physical processes,  
5 makes these analog studies terribly important, and  
6 will be very useful to the panelists.

7 There are a number of conclusions that  
8 came out of that. I won't bore you with those at this  
9 point.

10 Another very significant thing is that we  
11 learned about this magma dynamics AMR, and we're  
12 looking forward to seeing that.

13 Another point that I should make is that  
14 the 30 August 2005 article in EOS by Gene Smith of  
15 UNLV, a contractor to the State of Nevada, published  
16 a paper entitled "Yucca Mountain Could Face Greater  
17 Volcanic Threat," and this was the lead article in  
18 EOS, which has a distribution, as I recall, of about  
19 35,000, something like that, in the geoscience  
20 community.

21 Gene has a -- has published similar types  
22 of material before. It's largely based upon the  
23 linear arrangement of observed volcanoes from Crater  
24 Flat up to the Reveille Range some 120 kilometers or  
25 so.

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1           The conclusion from the panelists I'll try  
2 to summarize briefly. But, really, these are at a  
3 temporary stage. They are still in the -- in a  
4 process of developing the techniques that they are  
5 going to use for their own determination of the  
6 probability of volcanic hazard.

7           One of the things we learned was that  
8 there is a reliance on these analog studies for event  
9 definition, and they -- they do provide some very  
10 concrete evidence regarding the processes that are  
11 going on.

12           There was concern raised by the panelists,  
13 though, that it was difficult to obtain sufficient  
14 analogs. The DOE is going to take the panelists on a  
15 field trip of some of those, and I think that will be  
16 extremely helpful to them.

17           In terms of temporal models, one of the  
18 more interesting presentations was one made by Bruce  
19 Crowe. Bruce took time slices of past time and the  
20 volcanic events in the greater Yucca Mountain region  
21 that occurred, and then tried to predict what was  
22 going to happen during the next million years.

23           I don't want to quote or put words in  
24 Bruce's mouth, but basically he found that it was very  
25 difficult to predict into the future on the basis of

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1 past events. For example, at seven million years, the  
2 events that occurred between 11 and seven million  
3 years, and then try to predict from seven to six  
4 million years. And this is a very difficult thing to  
5 accomplish.

6 In terms of spatial models, there were a  
7 number of things that came out that are of a more  
8 technical basis. I won't go into them. I will  
9 mention one, however, that I thought was particularly  
10 interesting, and that was one by Rick Carlson of the  
11 Carnegie Labs.

12 And Rick suggested that there -- the  
13 distribution of post-Miocene, that's post 11 million  
14 year-old basalts, were centered on the Caldera, that  
15 gave rise to the volcanic rocks that the repository is  
16 to go into -- were centered on this Timber Mountain  
17 Caldera to the northwest of Yucca Mountain.

18 And that with time, he had two different  
19 scenarios, one in which there was a shrinkage of the  
20 basaltic volcanic activity towards -- from the outside  
21 in towards Timber Mountain Caldera. The second  
22 scenario was the possibility that the volcanic  
23 activity, the post-Miocene volcanic activity, was  
24 concentrated along a more linear segment, a north-  
25 northwest linear segment, that is associated with a

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1 structural feature or stress patterns.

2 And, you know, that's just one of the  
3 panelist's ideas, but it does -- it is an interesting  
4 conjecture. And it's, frankly, one of the newer ones.

5 One of the things I didn't hear at that  
6 meeting was the possibility of a floater model, like  
7 in the Midwest we have a -- we have a 5.5 or a 6  
8 magnitude earthquake that we can float anyplace in the  
9 mid-continent region, because, frankly, we're ignorant  
10 of the detailed processes involved and the controls.

11 And one possibility is that, indeed, there  
12 is a model that you could develop that would suggest  
13 that you have a floater of volcanic activity that  
14 would occur any place within the greater Yucca  
15 Mountain region.

16 Was that fast enough?

17 CHAIRMAN RYAN: I'm riveted, Bill. That's  
18 great.

19 (Laughter.)

20 Are you done?

21 MEMBER HINZE: I'm done. I'll pass it to  
22 my colleagues.

23 CHAIRMAN RYAN: Okay. Great job.

24 MEMBER HINZE: If you wanted another half  
25 hour, I'll be very happy.

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1 CHAIRMAN RYAN: Yes.

2 (Laughter.)

3 DR. MARSH: I might just enlarge a little  
4 bit on some of these comments. The analog studies are  
5 very valuable for DOE, because if you go to an area  
6 like Crater Flats or Lathrop Wells you can see what's  
7 happening on the surface, but you don't know what's  
8 going on below the surface.

9 So in terms of when you're counting events  
10 over various periods of time, you have no idea whether  
11 these are all on the same sort of fisher or dike, and  
12 they actually could be all the same -- one large event  
13 or you break these up. And it kind of comes down to  
14 the fact, you know, in researching whether people are  
15 bunchers or -- you know, or splitters, or whatever.

16 But when you go to an analog area where  
17 you can actually see the system has been eroded  
18 through, of course you don't see everything on the  
19 surface, but you do see a subsurface where things have  
20 been venting. And so you can see if one vent is  
21 related to one dike, and there's another dike that's  
22 not related, or another swarm that's related perhaps.  
23 And so it really helps a lot to look at these analogs  
24 back and forth.

25 In the world, there are sections like this

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1 throughout the world, and more emphasis on this -- a  
2 lot of this information is readily available. It  
3 really helps get a better picture for the probability  
4 estimates.

5 And in that same context, in tying in with  
6 what Bill was saying about Rick Carlson's stuff, the  
7 estimates that have been used so far when you use  
8 these probabilistic methods and these Bayesian  
9 approaches, and things where you actually just take  
10 the volcanism as it stands today and use a certain  
11 area of influence, and then come up with a number,  
12 there are attempts, then, to add in other things, like  
13 gravity minimums, topographies, stuff like this.

14 Well, we made the point, actually, that  
15 this material is already -- all of these other  
16 influences are already in the -- what you see on your  
17 service -- in other words, when the volcanism comes  
18 up. That was influenced by a number of things, and  
19 that is the final outcome.

20 However, it would be very good and work is  
21 going -- is starting on this I think from Chuck Connor  
22 -- is starting with a clean slate for the whole United  
23 States, for example, and saying, "Let's build up an  
24 assessment -- a probability model based on, let's say,  
25 first where there's been tectonic activity, where the

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1 upper mantle has slowed in terms of seismic  
2 velocities, where we have certain valleys, ridges,  
3 faulting," etcetera.

4 Let's build up and build up and build up  
5 and see what you get in the end, see if you can  
6 approach what the actual volcanism looks like. So  
7 that's something that is probably in the wings of what  
8 may happen.

9 So there are some things that I think are  
10 quite positive coming out in -- that will take some  
11 time to nurture perhaps but will be valuable.

12 MR. COLEMAN: I'll just add a couple of  
13 things, what Dr. Hinze mentioned about the  
14 reconnaissance dating. This is very important,  
15 because using a method that may have less precision  
16 but can still quickly categorize any new discovered  
17 basalts, as Miocene, Pliocene, or Pleistocene, this  
18 information is very important for the panelists to  
19 have as soon as they can get it.

20 There was a new data set introduced at the  
21 meeting -- the free air anomaly map, which is derived  
22 from gravity data. And they obtained an estimate of  
23 pressure differentials at depth, and I believe the  
24 depth they were using was three kilometers below sea  
25 level.

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1                   And this -- the patterns in this map were  
2                   very interesting in that they seem to coincide fairly  
3                   closely with the post-Miocene basaltic activity in the  
4                   region, something for the panel to be considering in  
5                   their future deliberations.

6                   There was one question that came up from  
7                   a panelist about the Lathrop Wells volcano, the  
8                   youngest one in the region, approximately 80,000 years  
9                   old. And the question was: how can the panel assess,  
10                  was this the start of a new pulse of volcanism,  
11                  something that would be of concern in the region?

12                  And I had an opportunity to speak to that,  
13                  and said that our paper published last year in  
14                  Geophysical Research Letters, in December of last  
15                  year, directly addressed that question and found that  
16                  to be unlikely, based on the evidence that we see  
17                  today.

18                  That's all I would add.

19                  CHAIRMAN RYAN: Thanks. I think we're  
20                  looking forward to Dr. Marsh's presentation tomorrow  
21                  on an approach to the modeling of magma/repository  
22                  interactions. I think that will further illuminate  
23                  the topic and give us the benefit of Bruce's insight,  
24                  so we look forward to that.

25                  MEMBER HINZE: We will be preparing a trip

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1 report, Mike --

2 CHAIRMAN RYAN: Yes.

3 MEMBER HINZE: -- for the committee. So  
4 we can -- that will flesh out the details of the  
5 rather rough --

6 CHAIRMAN RYAN: That's fine, Bill. Thank  
7 you for the update here.

8 We have some time this afternoon -- I  
9 spoke earlier with a couple of our participants today  
10 who would like to speak tomorrow. I'll speak to that  
11 schedule in a minute, but there's an opportunity now  
12 if anybody wants to make any comments or address the  
13 committee.

14 Yes. Judy, would you like to do that?

15 MS. TREICHEL: Is this working? Hello?  
16 Hello?

17 CHAIRMAN RYAN: Just get right on top of  
18 it.

19 MS. TREICHEL: Okay.

20 CHAIRMAN RYAN: Thank you.

21 MS. TREICHEL: I'll probably die of a  
22 shock here.

23 The question was asked earlier about  
24 information going into the LSN, and I think it was a  
25 good one, and I wish that Ruth had been as hopelessly

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1 involved in this as we have for so long, because  
2 that's a question that comes up all of the time.

3 And the DOE has very great turnover, and  
4 they have for a long time. And as Russ answered the  
5 question, everybody is told, you take all of your  
6 documents and your correspondence and anything that's  
7 relevant, and you turn it in.

8 Well, a lot of people are gone now, and  
9 you may- -- at this time, the problem may be getting  
10 less, because you have computers left with people's  
11 files and correspondence, and so forth, so you've got  
12 that. But with people who were there before, you may  
13 not. And even like the e-mail scandal that came up,  
14 it was through somebody else. Those weren't turned in  
15 -- I don't suppose -- by the same people. I don't  
16 know.

17 But there is so much to go through that  
18 it's unclear how they will know whether or not they've  
19 got everything.

20 The other thing I wanted to say was that  
21 if DOE had started out with Yucca Mountain with their  
22 site characterization plan, with something akin to  
23 what Jeff had presented here, and stuck with it, you  
24 wouldn't be facing the sort of dilemma that you've got  
25 now, and you wouldn't have the kind of project risks

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1 that he talked about in such great numbers.

2 I suppose there's always uncertainties,  
3 but these terrific concerns or things that keep you  
4 awake at night are huge. And I would guess that they  
5 are, and the question was a great one -- what happens  
6 if you turn down the license application and you don't  
7 feel comfortable giving a construction authorization?

8 Well, fine. I would assume that when a  
9 kid comes in and threatens people with a car, that the  
10 guy that's looking at him for the driver's license  
11 would say, "No. You can come back when you know more,  
12 or with something else." So I don't think -- I feel  
13 uncomfortable if you're uncomfortable with their  
14 failure to get a license.

15 As a member of the public, and  
16 particularly a Nevadan, where we would hope that that  
17 would happen, it's lousy to hear that it might be  
18 unacceptable for there not to be a license given. But  
19 the risks belong with the applicant, not with you. I  
20 don't think you should be that worried.

21 Yes, there is a time table given in the  
22 Nuclear Waste Policy Act, but there was a time table  
23 for the first EPA rule, too, and that ran years and  
24 years and years and years. EPA didn't start making a  
25 time schedule until they threw out the most horrible

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1 thing that we've seen in a long time, which is this  
2 latest up to the million year thing with 350 millirem.

3 But I don't think the time table rules.  
4 When you're talking about something for a million  
5 years, it's up to the applicant to have a  
6 scrupulously-prepared license application and to know  
7 all of these things. And I don't -- I don't think  
8 that you should feel that worried. I think NRC should  
9 worry about the way in which they review what they  
10 get, and it seems to me that with this plan you're in  
11 pretty good shape.

12 CHAIRMAN RYAN: Well, I think that's our  
13 focus is to make sure that the staff has a tool, and  
14 is prepared to do a -- as I think they both indicated,  
15 a thorough and detailed review of what is submitted.  
16 So our focus is on that aspect, not on the outcome so  
17 much.

18 MS. TREICHEL: But if they give you a  
19 lousy application, don't lose sleep. They need to  
20 lose sleep.

21 CHAIRMAN RYAN: They won't give it to us.

22 (Laughter.)

23 We'll give it to them. And, again, our  
24 focus is to make sure that the process of review is as  
25 competent and as thorough and well established as it

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1 can be and needs to be.

2 MS. TREICHEL: Yes.

3 MEMBER WEINER: I'd like to get back to  
4 Judy's first comment, which was -- which she said to  
5 me a little offline. A lot of people have left the  
6 Department of Energy and have left documents behind,  
7 and there is a need to get all of that captured in the  
8 LSN. And I -- that is -- I think that is a concern  
9 with the License Support Network, that we -- that  
10 everything that has gone before when the person may no  
11 longer be here is a very long project to be captured.

12 And, April, I see you getting up. Can you  
13 enlighten everybody about that?

14 MS. GIL: Yes, Dr. Weiner. April Gil,  
15 Department of Energy. Let me expand on what Russ Dyer  
16 said earlier, and he just went over it in passing. He  
17 didn't emphasize this point.

18 The Department of Energy, in addition to  
19 being under the Licensing Support Network requirements  
20 in 10 CFR Part 2 Subpart J, also has federal records  
21 requirements that we have always had to operate under.

22 Even if we weren't working on an NRC  
23 license facility, because we're a federal agency, we  
24 have to maintain federal records. So for years, since  
25 I started on the program in 1989, we have always had

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1 a records system, and we have had specific procedural  
2 requirements that flow down from the quality assurance  
3 requirements document to put records in the records  
4 system on a specific schedule.

5 We have complied with those requirements  
6 religiously. We've been audited, because it's a QA  
7 requirement to make sure that we were in compliance  
8 with those procedural controls.

9 Now, Russ Dyer mentioned, in addition to  
10 each individual being asked on a regular basis, "What  
11 records do you have in your -- or what material do you  
12 have in your possession that could potentially be LSN-  
13 relevant under the requirements of 10 CFR Part 2  
14 Subpart J, in addition to the guidance that we've  
15 gotten from our OGC on what is relevant material, what  
16 you have in your possession?"

17 We also have the records system that was  
18 screened for LSN relevancy. So the records system has  
19 been in existence, as I said, for years and should  
20 have captured the bulk of that type of material.

21 In addition to the records system, which  
22 would capture hard copy material, we also have our  
23 Legacy e-mail, all the electronic e-mail that everyone  
24 has sent going back in perpetuity as far as I know,  
25 from the beginning of the program, has been screened

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1 by contractors working under the auspices of our  
2 Office of General Counsel. And that's where some of  
3 the material came out that you're aware of with the  
4 USGS.

5 I think that was relatively recent, 1998  
6 or 1999, but the e-mails have been screened going way  
7 back. And we have traditionally used the e-mail  
8 system for comments on the program. So between the  
9 records system and the e-mails, and the updates that  
10 we're being asked to do on a regular basis, I have  
11 very high confidence that the documentary material  
12 will be captured for the Licensing Support Network.

13 I hope that's helpful.

14 CHAIRMAN RYAN: Yes. Thank you very much.

15 MEMBER WEINER: Thank you very much.

16 CHAIRMAN RYAN: Any comments? I may look  
17 ahead to schedule, just to plan ahead for tomorrow.  
18 We have a break scheduled 3:15 to 3:30. The ACNW  
19 subcommittee will make a report on its visit to  
20 Savannah River and the Barnwell low-level waste  
21 disposal facility. That will be shortened up from  
22 3:30 to 3:45.

23 We have a continuation of the discussion  
24 of possible letter reports. I crossed off the ones we  
25 finished today, and that we can shorten up to mainly

1 Allen's discussion from, say, 3:45 to 4:30.

2 And then, my suggestion is at 4:30 we  
3 offer the opportunity for additional public comments  
4 at 4:30 to 5:30. There won't be any other  
5 miscellaneous items for the committee to take up, and  
6 that gives everybody a chance who is here during the  
7 day. And then at -- we have an outreach session  
8 scheduled at 6:00 to 8:00 p.m., which we can take  
9 additional comments, but I just offered that for the  
10 folks that might want to make any statements tomorrow  
11 afternoon. We'll make that time slot available. Does  
12 that suit everybody that's interested in making  
13 comments?

14 Sir? Steve, maybe you could use the  
15 microphone, if you don't mind, just so everybody can  
16 hear you. Thank you.

17 MR. FRISHMAN: Steve Frishman, State of  
18 Nevada. My comments were largely going to be in  
19 relation to the presentation on the '95 NAS report.  
20 And I'd -- if possible, I'd like to be able to comment  
21 at that time, hoping that Bob Fri would be able to  
22 stay around.

23 CHAIRMAN RYAN: At what spot on the  
24 agenda?

25 MR. FRISHMAN: After the 8:40 to 10:40

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1 presentation.

2 CHAIRMAN RYAN: Oh, the morning session.  
3 Let's see if we can make a slot there.

4 MR. FRISHMAN: I won't take more than just  
5 a very few minutes. I'd like to have Bob here.

6 MEMBER HINZE: Excuse me, Steve. Dr. Fri  
7 will be here by telephone only.

8 CHAIRMAN RYAN: Why don't we work it in  
9 right after his presentation.

10 MR. FRISHMAN: Okay. I'd appreciate that.

11 CHAIRMAN RYAN: And we'll deal with it at  
12 lunch and the break if -- to fit it in there. How's  
13 that?

14 MR. FRISHMAN: That'll be fine. Thank  
15 you.

16 CHAIRMAN RYAN: Okay. Great. So that'll  
17 work for everybody's needs, and on we go from there.

18 Any other comments or questions or items  
19 for today? Mike?

20 MR. SCOTT: Mike, just after you let the  
21 meeting go, I'd like to ask that the staff have a  
22 short meeting up here. We have a little bit of  
23 logistics to settle for tonight. So if the ACNW staff  
24 could meet with me here right after you let us go, I'd  
25 appreciate it.

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1 CHAIRMAN RYAN: Okay. Great. Anything  
2 else? Any other comments?

3 Thanks everybody for your participation  
4 today. We'll look forward to seeing you tomorrow.  
5 Today's meeting is adjourned.

6 (Whereupon, at 5:01 p.m., the proceedings  
7 in the foregoing matter were adjourned.)  
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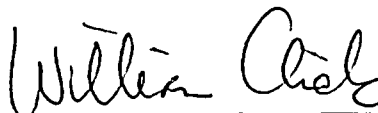
Nuclear Waste

163rd Meeting

Docket Number: n/a

Location: Las Vegas, NV

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# Yucca Mountain Project Update

Presented to:  
**Advisory Committee on Nuclear Waste**

Presented by:  
**Dr. J. Russell Dyer**  
**Assistant Deputy Director for Technical and Regulatory Programs**  
**Office of Repository Development**  
**U.S. Department of Energy**

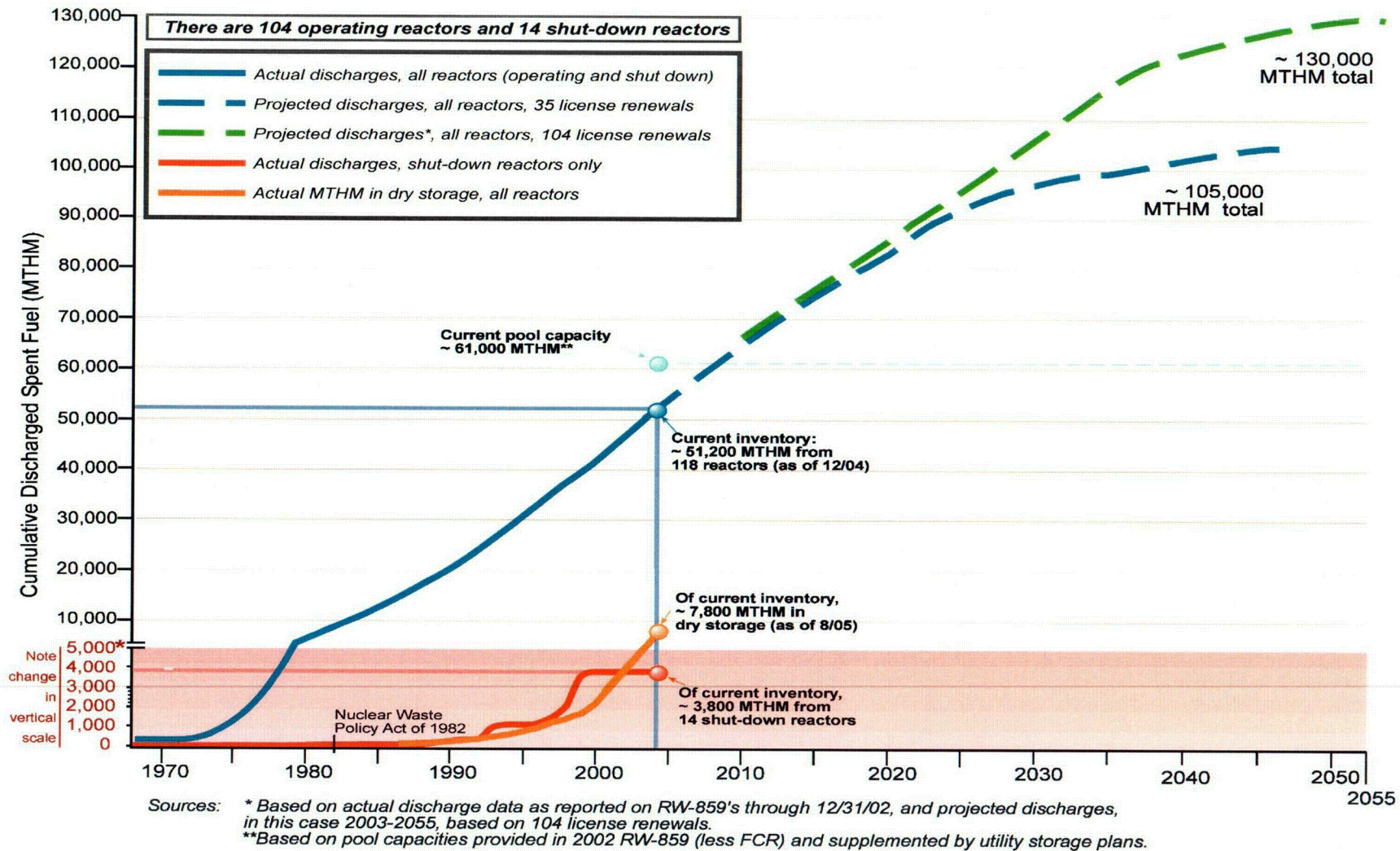
**September 20, 2005**  
**Las Vegas, Nevada**

# Agenda

- **Project update**
- **License Application (LA) and supporting systems and documentation update**
- **Safety Conscious Work Environment (SCWE) review**
- **Probabilistic Volcanic Hazard Analysis (PVHA) update**
- **Nevada transportation**



# Historical and Projected Commercial Spent Nuclear Fuel Discharges

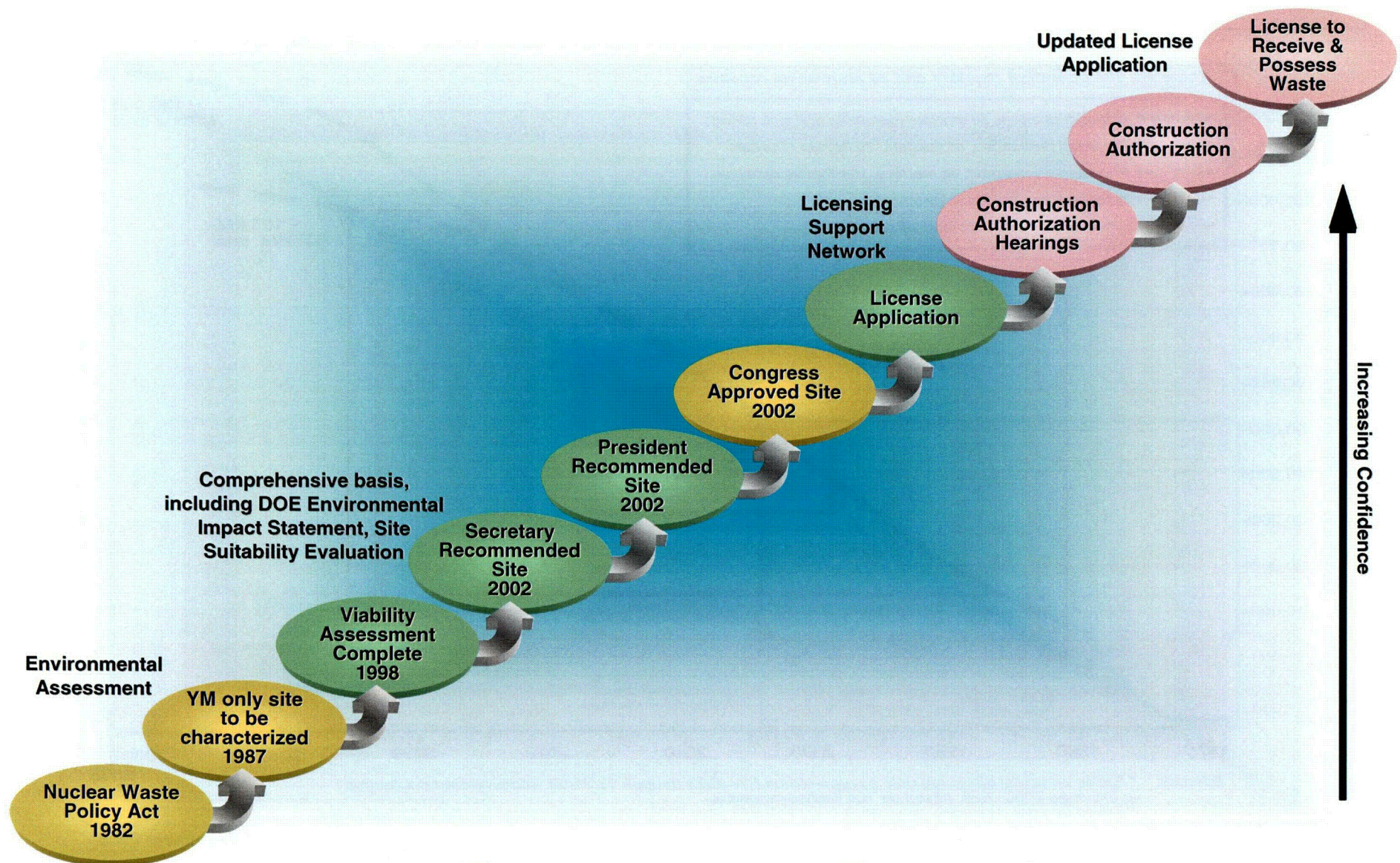


As of September 2005





# Repository Program Steps





# Licensing Support Network

- **Good progress toward Licensing Support Network certification**
- **Approximately 3.3 million documents in collection**
- **During this past year, the Office of Repository Development (ORD) has put in place numerous processes to improve the quality of its document collection. These steps include:**
  - **Conducted reviews for all archived and uncategorized emails to identify potentially relevant documents**
  - **Confirmed all claims of privilege through manual review**
  - **Non-relevant documents that have been identified have been removed from the collection**



# License Application Content and Supporting Documents

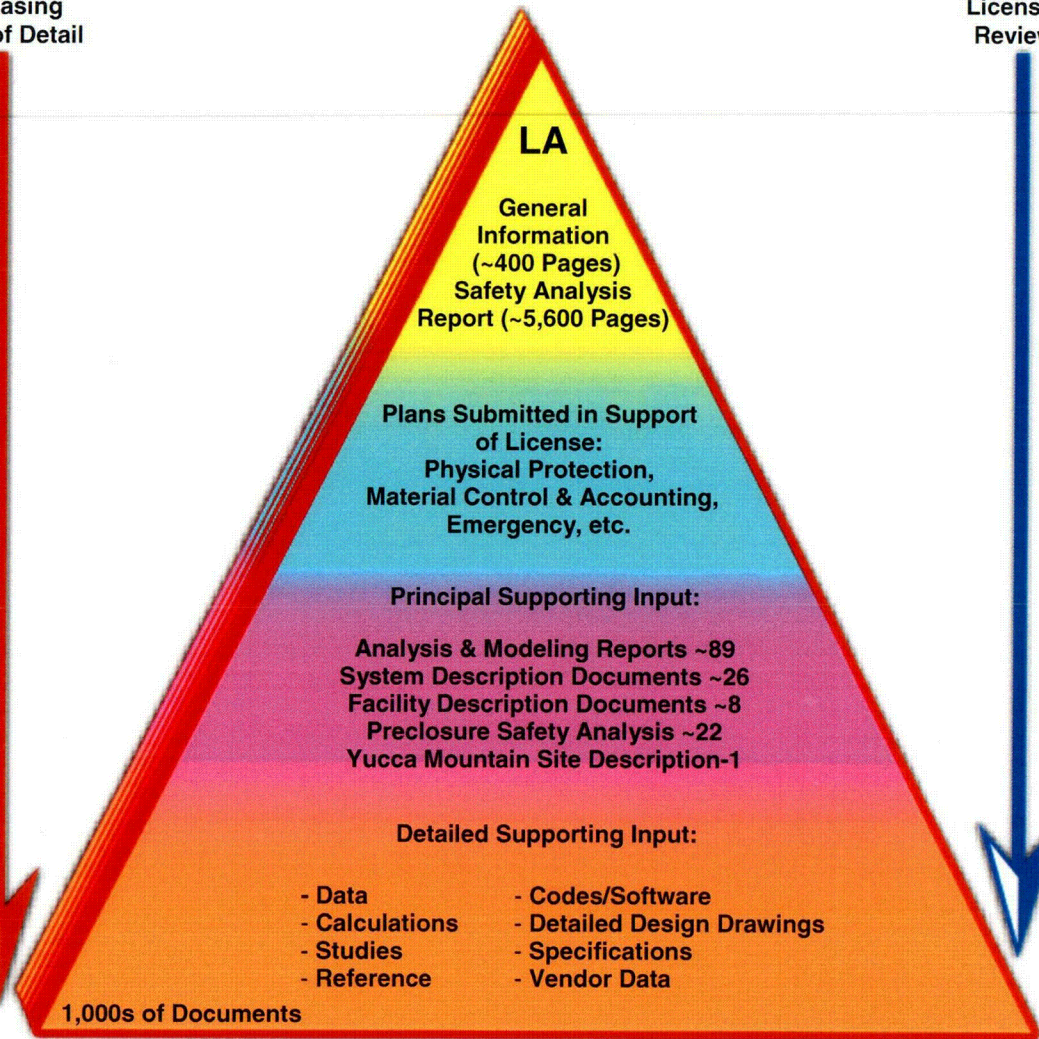
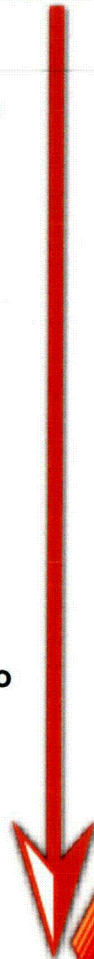
- **General Information (GI)**

- General Description
- Proposed Schedules for Construction, Receipt and Emplacement of Waste
- Physical Protection Plan
- Material Control and Accounting Program
- Site Characterization

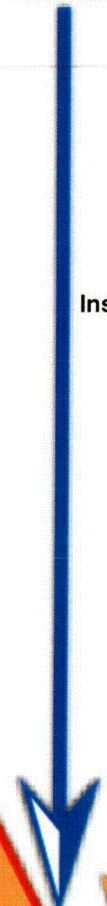
- **Safety Analysis Report (SAR)**

- Repository Safety Before Permanent Closure
- Repository Safety After Permanent Closure
- Research and Development Program to Resolve Safety Questions
- Performance Confirmation Program
- Administrative and Programmatic Requirements

Increasing  
Level of Detail



Licensing  
Reviews



Inspection



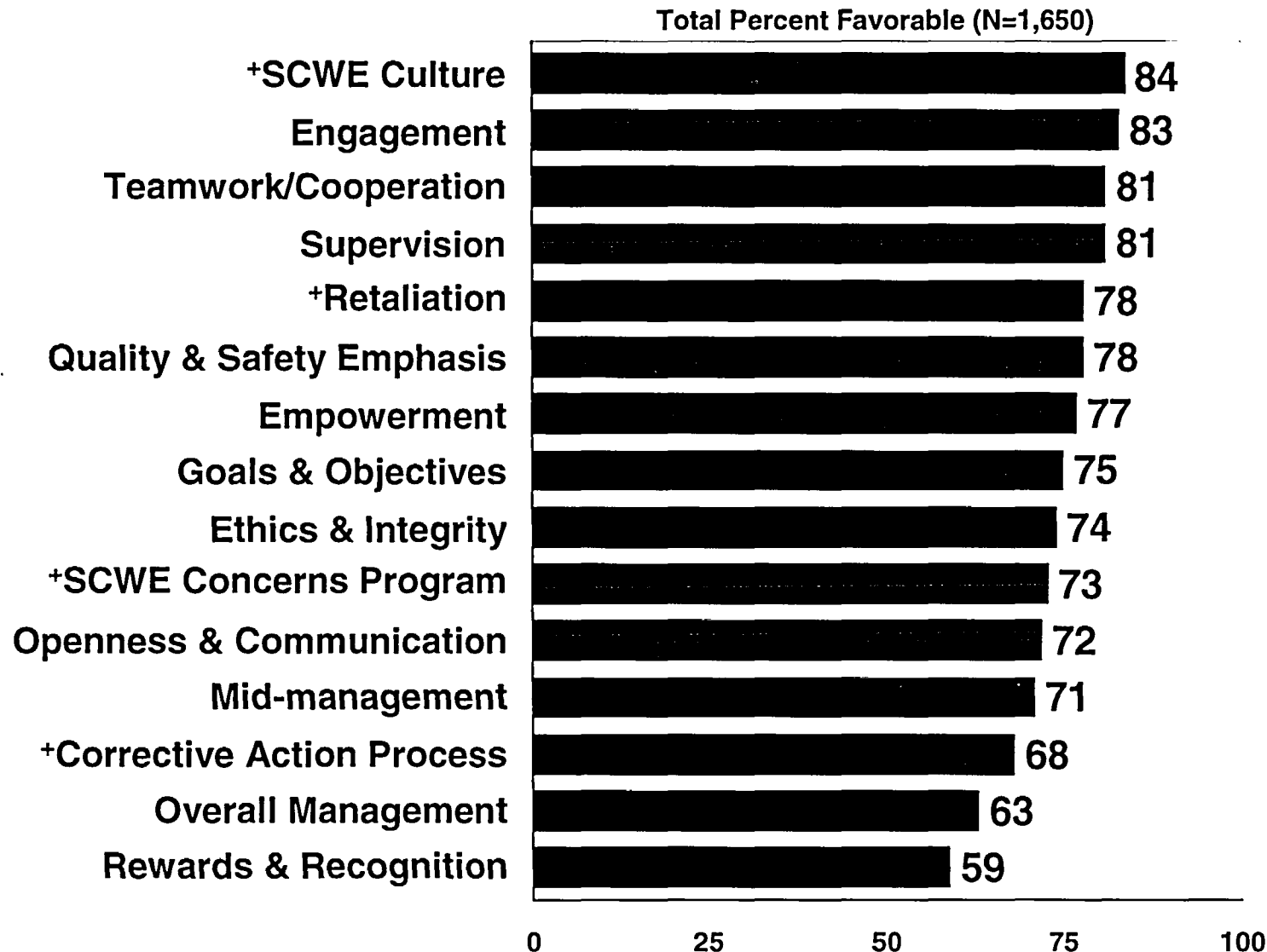
# Status of the License Application

- **DOE is evaluating the draft License Application:**
  - Science and design work for the LA is technically sound and supports robust safety analyses for the preclosure (operational) period through 10,000 years after permanent closure
  - We have thoroughly cross-referenced this work against the requirements in 10 CFR Part 63 and the guidance in the Yucca Mountain Review Plan
  - We are using available time to refine the treatment of uncertainty
- We are preparing to address potential changes due to the ruling on the EPA standard compliance period by the U.S. Court of Appeals



# 2004 Safety Conscious Work Environment (SCWE) Survey

## YMP 2004 Overall Category Scores



+Indicates a new category for 2004



# **Focus of SCWE Improvement Efforts**

- **Improve SCWE behaviors through Human Performance training, observation, and coaching**
- **Improve the ease-of-use and employee confidence in the Corrective Action Program (CAP)**
- **Improve employee willingness to use the Concerns Programs, with confidence that concerns will be thoroughly investigated and confidentiality maintained**
- **Improve confidence in commitment to quality**
- **Develop and implement organization-specific action plans as warranted**
- **Improve the survey instrument**



# USGS E-mail Issue

- Root cause analysis estimated completion by mid-October 2005
- Corrective action underway to replace and remediate the moisture infiltration work
- Planning underway for self-assessment on Project QA, management processes, and nuclear culture



# **Initiating Event Probability Uncertainty:**

## **Probabilistic Volcanic Hazard Analysis Update (PVHA-U) Example**

- **The PVHA-U study undertaken to develop an updated assessment of the volcanic hazard at Yucca Mountain, with quantification of uncertainties**
- **Rationale for updated Expert Elicitation:**
  - **New information since the 1996 PVHA**
  - **Input from NRC on technical basis for current PVHA in light of new information**
- **Primary Product: Probability distribution of the annual frequency of intersection of a basaltic dike with the repository footprint as input to assessments of consequences of volcanic events**





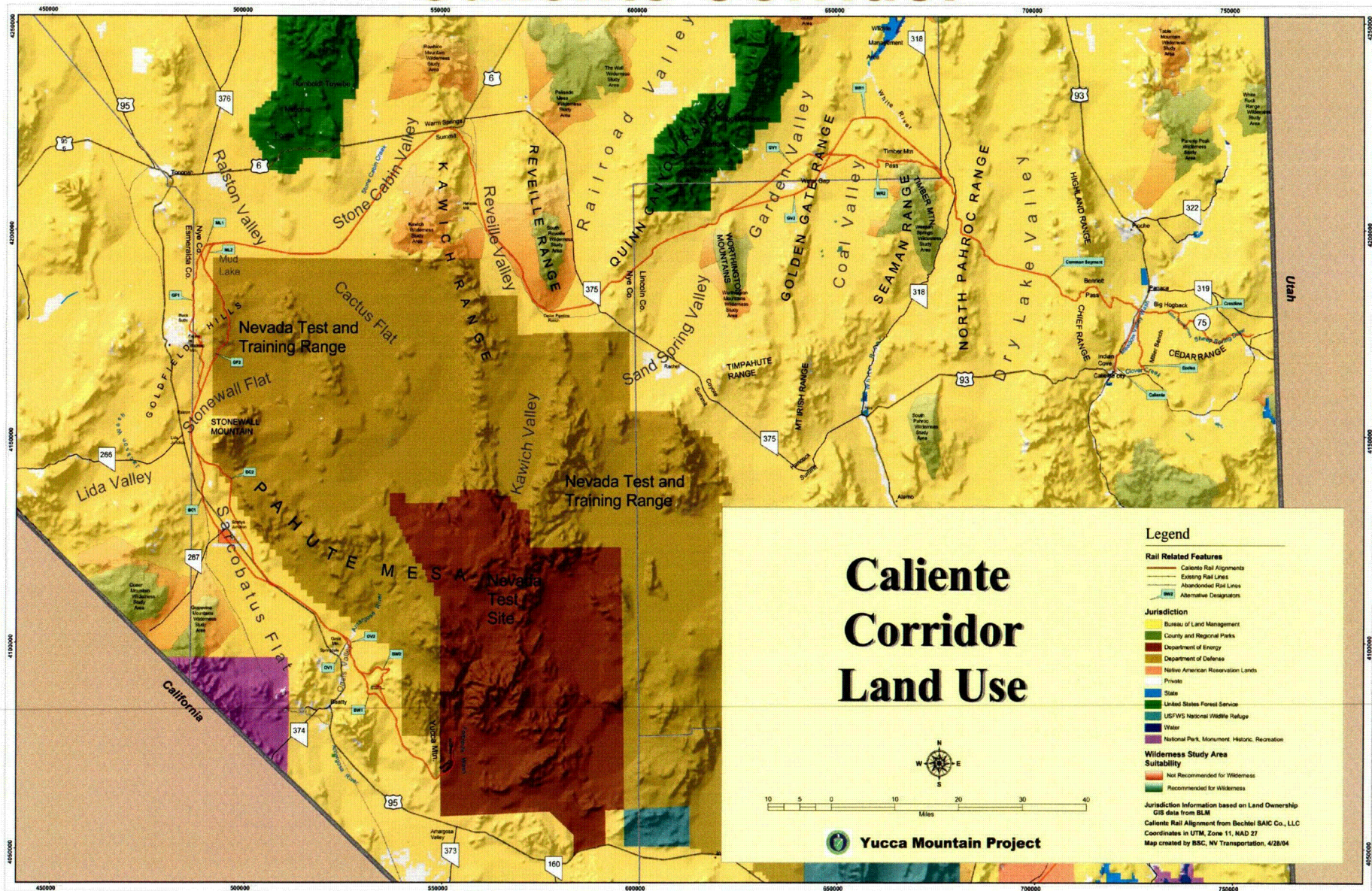
# Transportation – Nevada Rail

- Nevada Transportation's mission is to plan, design, and implement a safe and effective Nevada Transportation Infrastructure to transport cask carrying railcars to the Yucca Mountain repository in a safe and efficient manner that protects the health and safety of the public and maintains the quality of the environment
  - On August 29, 2005 DOE issued a draft environmental assessment supporting its application to the Department of the Interior for a public land order - protecting the proposed rail line corridor to Yucca Mountain from surface entry and new mining claims for a period of up to 20 years
  - A Draft Environmental Impact Statement (DEIS) is currently being prepared on the Caliente Corridor to determine final siting for the Nevada line
  - No final decisions have been made by DOE
  - Field activities supporting DEIS preparation include:
    - ♦ Geotechnical Survey
    - ♦ Hydrology
    - ♦ Aerial Photography
    - ♦ Biological Survey
    - ♦ Conceptual Design
    - ♦ Alignment Engineering
    - ♦ Permitting Planning
    - ♦ Cultural Resources



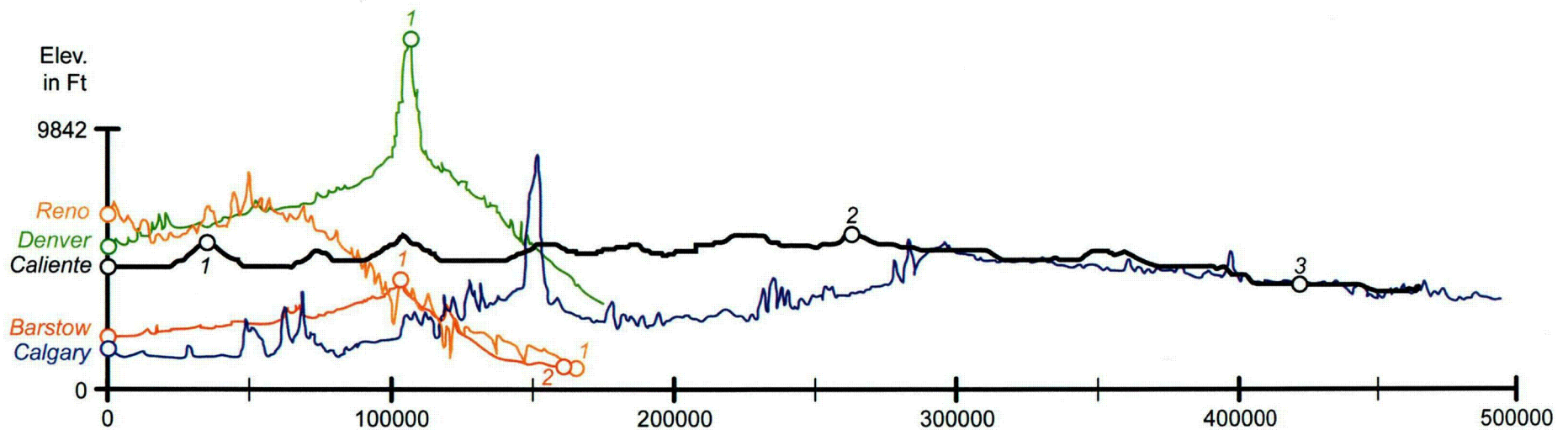


# Caliente Corridor





# Caliente Corridor Comparison



NOTE:  
All Profiles start at the Eastern most point.

## LEGEND

- Caliente Rail Topographic Profile (Max Grade 2%)
  - 1 Bennett Pass
  - 2 Warm Springs Pass
  - 3 Beatty Wash
- CP - Rogers Pass Topographic Profile (Max Grade 2.2%)
  - 2 Warm Springs Pass
- UP - Denver West Topographic Profile
  - 1 Granby
- Cajon Pass Topographic Profile (Max Grade 2.2%)
  - 1 Cajon Pass
  - 2 San Bernadino
- Donner Pass Topographic Profile
  - 1 Sacramento Area



# Summary

- **DOE is addressing work required for Licensing Support Network certification**
- **We have made continued progress on License Application work**
- **EPA's proposed radiation protection standard including a revised compliance period is in public review**
- **We are committed to the safe disposal of U.S. spent nuclear fuel and high-level radioactive waste**





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



# Performance Confirmation Program

Presented to:

**Advisory Committee on Nuclear Waste**

Presented by:

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**Office of Repository Development**

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**Bechtel SAIC Company, LLC**

**September 20, 2005**

**Las Vegas, Nevada**

# Outline of Presentation

- **Evolution of the Performance Confirmation Plan**
- **Risk-Informed Approach to Performance Confirmation**
- **Use of Results in Future Performance Assessments**
- **Summary of Currently Planned Activities**
- **Program Response to Change**
- **Path Forward**



# Evolution of the Performance Confirmation Plan

- **Meeting with the NRC in February 2003**
- **Information Presented to the ACNW in July 2003**
  - **Vision of the Program**
  - **Focus of the Performance Confirmation Plan**
  - **Process used to select activities for inclusion into the program**
    - ♦ **The technical basis for the approach using a formal multi-attribute utility analysis**
  - **Brief description of the selected program and its key components**



# Evolution of the Performance Confirmation Plan

(Continued)

- **Refinement of the program using a Management Review Team**
  - Part of an iterative process of re-evaluating the complete program, incorporating programmatic considerations and applying management judgment
- **Management Review of the Program - Objectives**
  - Senior managers and technical advisory staff evaluated the program with the following criteria:
    - ♦ Is activity necessary and/or sufficient for regulatory compliance?
    - ♦ How does activity contribute to the primary barriers?
    - ♦ Can closely related activities be combined?
    - ♦ Are activities really confirmatory, or are they “model refinement,” “supplemental data,” or “developmental” in nature?





# Evolution of the Performance Confirmation Plan

(Continued)

- **Management Review of the Program - Outcomes**
  - Closely related/overlapping activities were combined
  - Some activities categorized as “model refinement,” “supplemental,” or “developmental” in nature were deleted and/or considered as potential activities for other testing/development programs (e.g. volcanism testing: drilling for magnetic anomalies)
  - 3 activities were added to enhance the program in addressing requirements (Construction Effects Monitoring, SZ Alluvium Testing, and Waste Form Testing)



# Evolution of the Performance Confirmation Plan

(Continued)

- **Latest Enhancements (Revision 5, November 2004)**
  - Clearer crosswalk of requirements and guidance
  - Expanded detail for activities and control processes
  - Description of general test planning and implementation
  - Discussion of high level proposed schedule
  - Guidance for definition of ranges and condition limits for Performance Confirmation parameters
  - Discussion of evaluation processes and notification criteria
  - Performance Confirmation integration function
  - Results of a qualitative Performance Confirmation Program assessment against draft Total System Performance Assessment-License Application (TSPA-LA) model and report
  - Performance Confirmation Test Plans



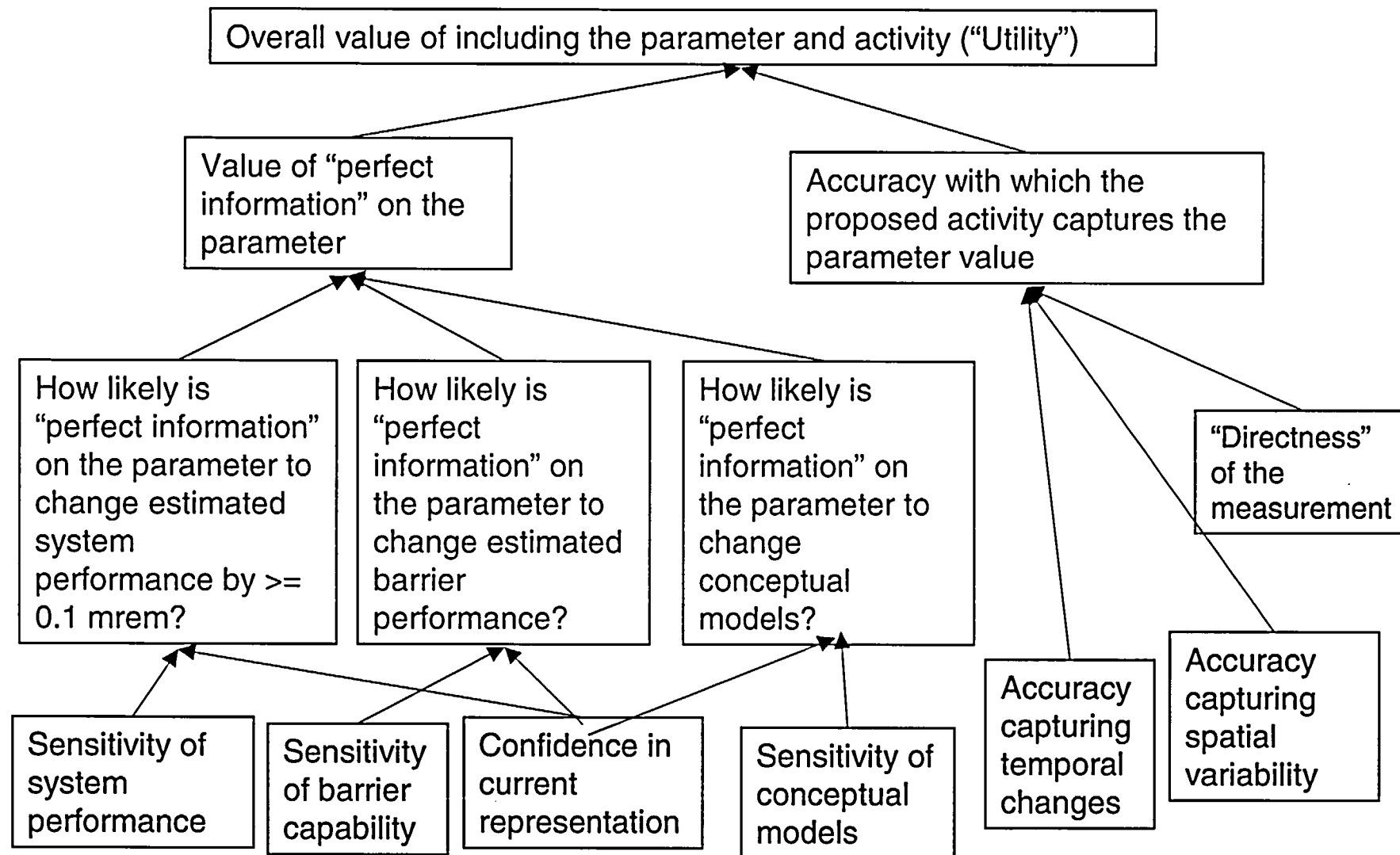
# **Risk-Informed Approach to Performance Confirmation**

- **The decision analysis process focused the Performance Confirmation Program on the highest risk areas by using a formal, rigorous process to determine complexity, extent, and number of activities needed to test the functionality of the total system and barriers important to waste isolation**
- **Initial Activity Evaluation**
  - **Criteria included sensitivity, confidence, and accuracy**
  - **Risk-based in that it relied on performance assessment calculations**
  - **Performance-based in that it considered performance of the individual barriers and the total system**



# Risk-Informed Approach to Performance Confirmation

## Estimating the Utility of a Specific Activity



# **Risk-Informed Approach to Performance Confirmation**

(Continued)

- **Program Development, Selection, and Refinement**
  - Included consideration of factors such as synergy among activities, feasibility, operability, and cost, in addition to risk-based results from the first phase, and is risk-informed
- **Subsequent (and continuing) management assessment and TSPA evaluations ensure the program continually reflects the processes most important to performance, thereby keeping the program risk-informed**
- **Resulting basis for Performance Confirmation Program is risk-informed, performance-based**



# **Risk-Informed Approach to Performance Confirmation**

(Continued)

- **Performance Confirmation Program reflects understanding of TSPA and underlying Process Models**
- **A qualitative evaluation was conducted involving cognizant PA technical staff with an up-to-date understanding of the TSPA model and results. This evaluation was described in Revision 5.**
  - **Affirmed that 17 of 20 Performance Confirmation activities are directly relevant to the technical basis for assessment of postclosure performance of natural and engineered barriers (i.e., medium to high significance to TSPA-LA in terms of importance or uncertainty)**
  - **Remaining 3 activities (Construction Effects Monitoring, Drift Inspection, and Thermally Accelerated Drift Thermal-Mechanical Monitoring) are related to assessment of conditions that support the basis for retrievability, but may also provide information to assess the general framework for model development**
  - **No new Performance Confirmation activities were identified, although clarifications were made to the purpose and anticipated methodology for the waste form testing activity to better confirm igneous scenario assumptions**



# **Risk-Informed Approach to Performance Confirmation**

(Continued)

- **Future sensitivity analyses will be performed using TSPA and the corresponding supporting process models**
  - **Following the completion of the TSPA-LA and associated supporting information, a systematic evaluation (sensitivity analyses) will be conducted to confirm activity and parameter selection**
  - **Both the nominal and disruptive performance assessment scenarios will be evaluated during this assessment to ascertain whether any modifications should be made to the Performance Confirmation Program**



# Use of Results in Future Performance Assessments

- **10 CFR 63.51(a)(1) states that an application to amend the license to permit permanent closure must include “an update of the assessment of the performance of the geologic repository for the period after permanent closure. The updated assessment must include any performance confirmation data collected under the program required by Subpart F, and pertinent to compliance with § 63.113.”**
- **Results of Performance Confirmation activities may trigger performance evaluations prior to the application to amend, if warranted**





# Summary of Currently Planned Activities

- **Current list of 20 Activities sorted by Yucca Mountain Review Plan (YMRP) Acceptance Criteria:**
  - **General Requirements Testing and Monitoring (Natural and Engineered Barriers)**
    - ♦ Precipitation Monitoring
    - ♦ Seepage Monitoring
    - ♦ Subsurface Water and Rock Testing
    - ♦ Unsaturated Zone Testing
    - ♦ Saturated Zone Monitoring
    - ♦ Saturated Zone Fault Hydrology Testing
    - ♦ Saturated Zone Alluvium Testing
    - ♦ Drift Inspection
    - ♦ Thermally Accelerated Drift Near-Field Monitoring
    - ♦ Dust Buildup Monitoring
    - ♦ Thermally Accelerated Drift In-Drift Environment Monitoring



# Summary of Currently Planned Activities

(Continued)

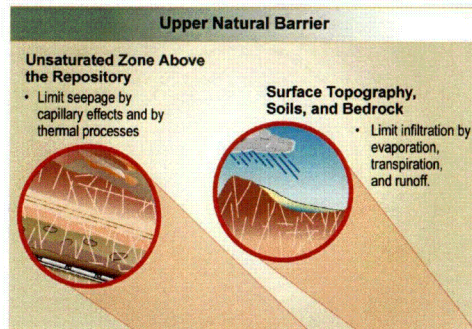
- **Current list of 20 Activities sorted by YMRP Acceptance Criteria (Continued):**
  - **Geotechnical and Design Monitoring and Testing**
    - ♦ Subsurface Mapping
    - ♦ Seismicity Monitoring
    - ♦ Construction Effects Monitoring
    - ♦ Thermally Accelerated Drift Thermal-Mechanical Monitoring
  - **Design Testing (Other than Waste Packages)**
    - ♦ Seal Testing
  - **Monitoring and Testing of the Waste Packages**
    - ♦ Waste Package Monitoring
    - ♦ Corrosion Testing
    - ♦ Corrosion Testing of Thermally Accelerated Drift Samples
    - ♦ Waste Form Testing



# Summary of Currently Planned Activities - Confirmation of Barrier Performance and Capability

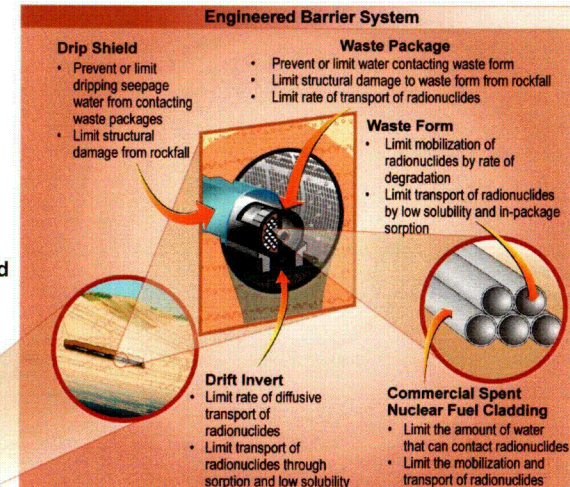
## PC activities evaluating the Upper Natural Barrier:

- Precipitation Monitoring
- Subsurface Water and Rock Testing
- UZ Testing
- Seepage Monitoring
- Thermally Accelerated Drift In-Drift Environment Monitoring
- Subsurface Mapping
- Seismicity Monitoring
- Seals Testing
- Thermally Accelerated Drift Near-Field Environment Monitoring



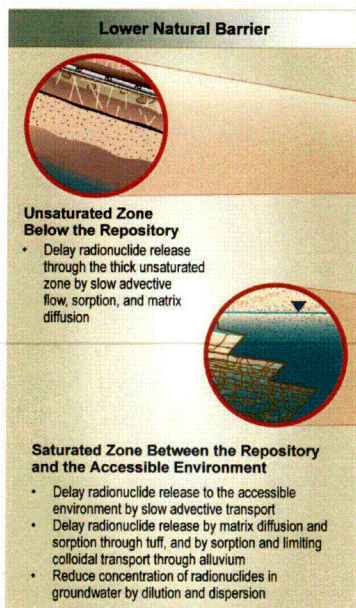
## PC activities evaluating the Engineered Barrier:

- Drift Inspection
- Construction Effects Monitoring
- Thermally Accelerated Drift Thermal-Mechanical Monitoring
- Thermally Accelerated Drift Near-Field Environment Monitoring
- Corrosion Testing
- Corrosion Testing of Thermally Accelerated Drift Samples
- Dust Buildup Monitoring
- Waste Package Monitoring
- Waste Form Testing
- Seals Testing
- UZ Testing
- Thermally Accelerated Drift In-Drift Environment Monitoring
- Seismicity Monitoring



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Note: program not only addresses barrier capability, but also total system performance



## PC activities evaluating the Lower Natural Barrier:

- Subsurface Water and Rock Testing
- UZ Testing
- Subsurface Mapping
- SZ Monitoring
- SZ Fault Hydrology Testing
- SZ Alluvium Testing

Note: Activities in italics confirm information related to performance of more than one barrier





# Summary of Currently Planned Activities

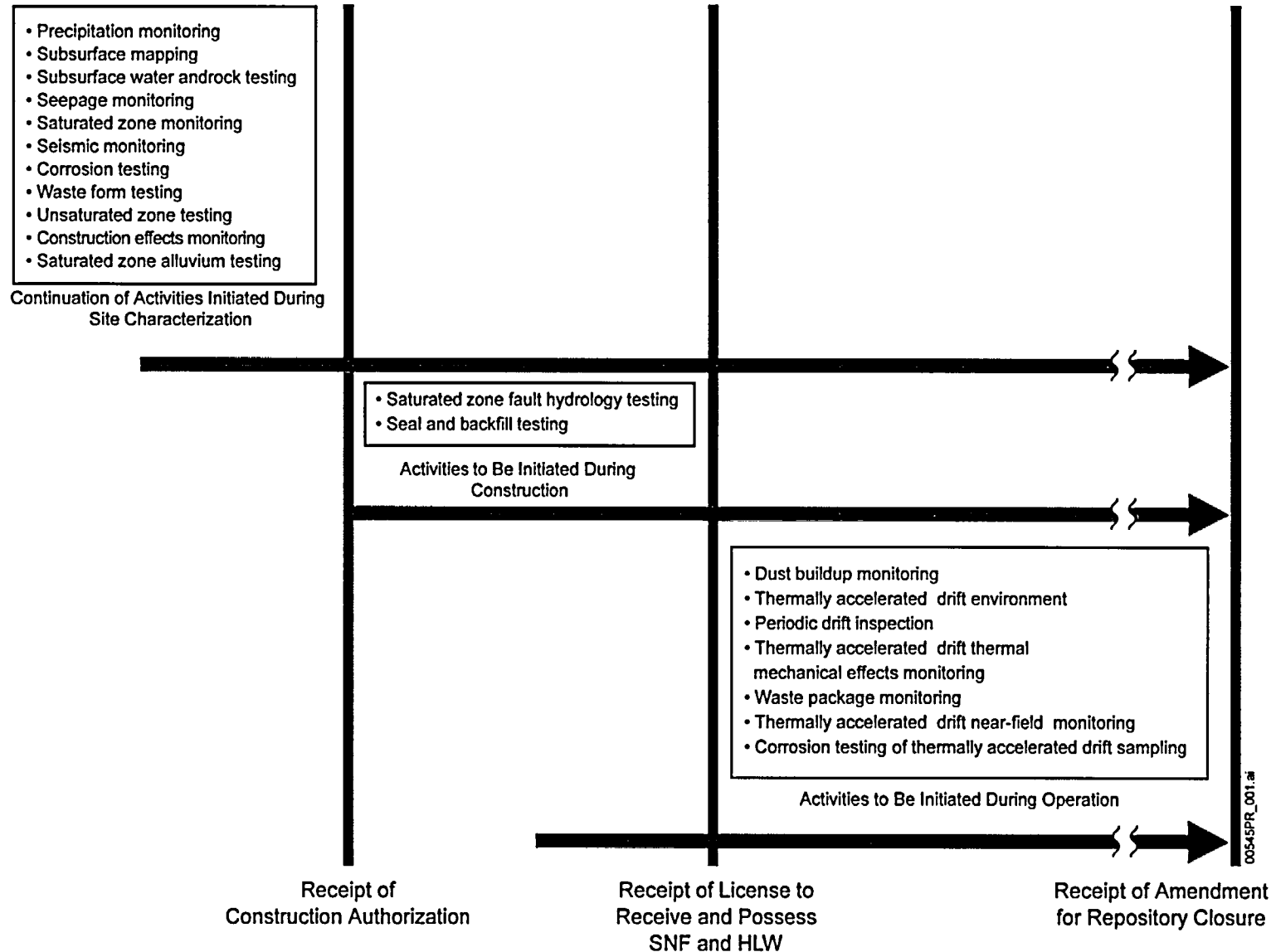
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- **Activities are conducted in three phases:**
  - **Ongoing Activities**
    - ♦ Continuation of activities (or similar activities) initiated during Site Characterization
    - ♦ Some of these activities may have a hiatus, and resume with construction (ie. Mapping)
  - **Construction**
    - ♦ Initiate as early as practicable, but likely during the construction phase
  - **Operations**
    - ♦ Initiate during and after waste emplacement begins
- **Activities initiated in early phases continue through later phases until repository closure, or for as long as is deemed appropriate based on evaluation of results obtained**



# Summary of Currently Planned Activities

(Continued)

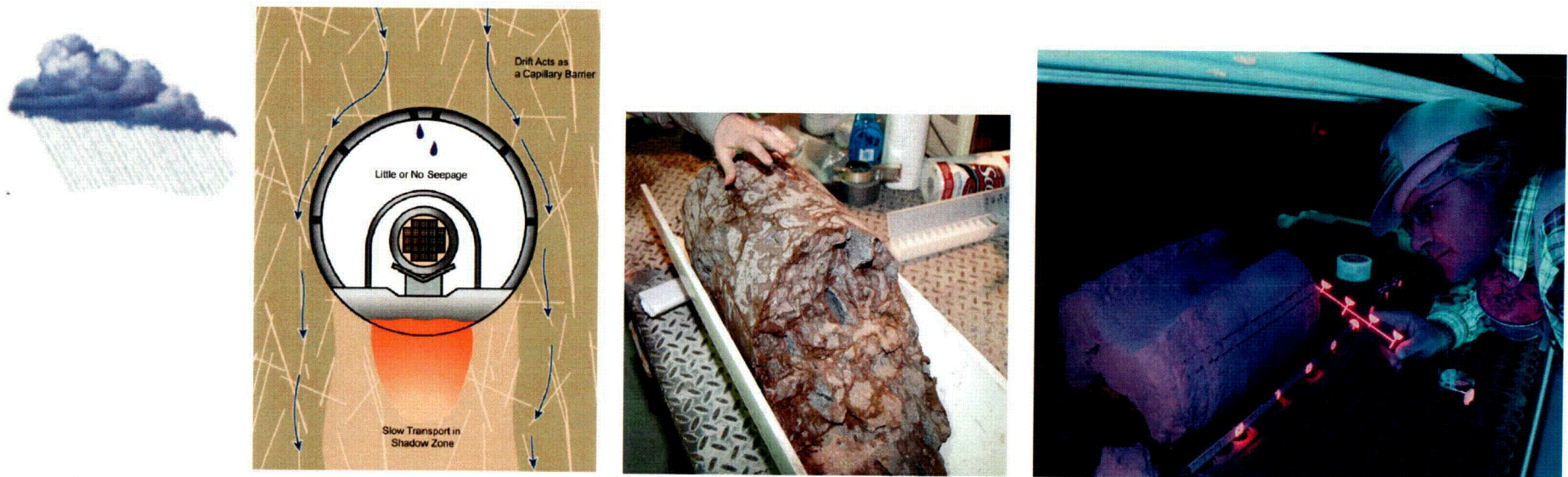


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# Summary of Currently Planned Activities - Ongoing Performance Confirmation Activities

- **Precipitation Monitoring** - precipitation quantities and composition measured at the Yucca Mountain site to place seepage data in context
- **Seepage Monitoring** - seepage monitoring and analysis in bulkheaded alcoves on repository intake side and in repository thermally accelerated drifts
- **Subsurface Water and Rock Testing** - chloride mass balance and isotope chemistry analysis of water samples collected at selected underground locations to evaluate and confirm assumptions for fast paths used in the UZ models

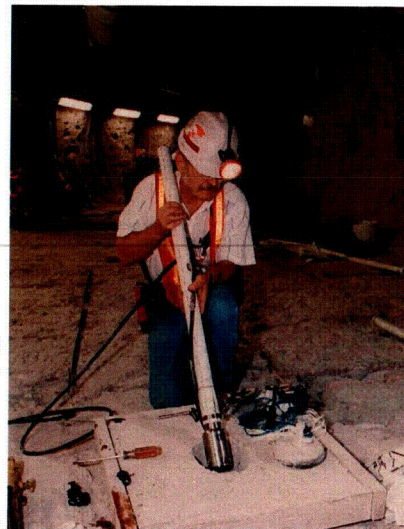
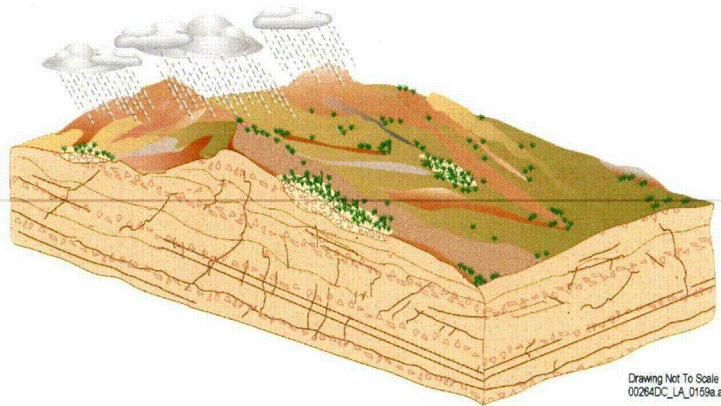




# Summary of Currently Planned Activities -

## Ongoing Performance Confirmation Activities (Continued)

- **Unsaturated Zone Testing** - field-testing of transport and sorptive properties of unsaturated zone rock in an ambient seepage alcove or a drift with no waste packages emplaced to evaluate and confirm sorption coefficients used in UZ models
- **Saturated Zone Monitoring** - measurements of water level, electrochemical potential, hydrogen potential, and background radionuclide concentrations in saturated zone wells at the repository site and in Nye County, down gradient of Yucca Mountain
- **Saturated Zone Alluvium Testing** - tracer testing of alluvium transport properties at the Alluvial Test Complex using multiple boreholes

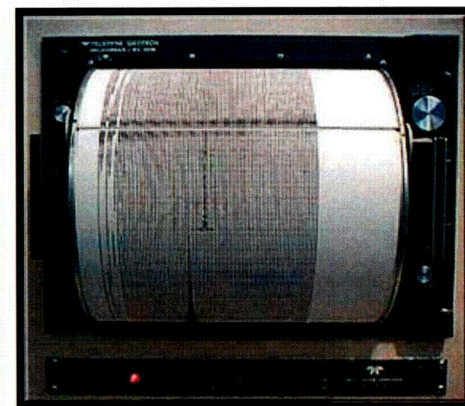
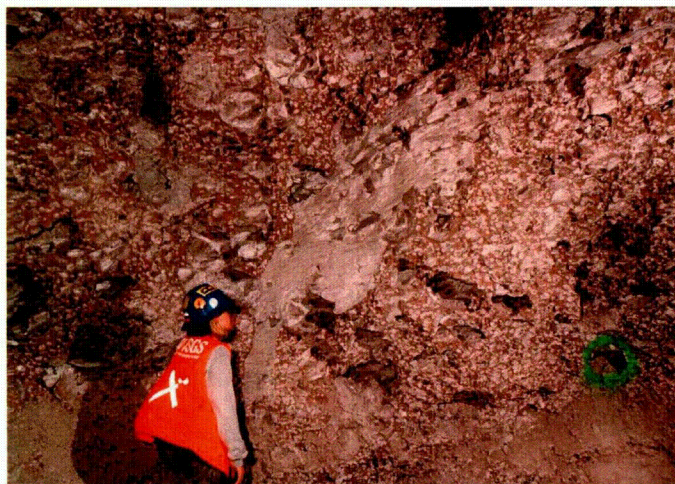
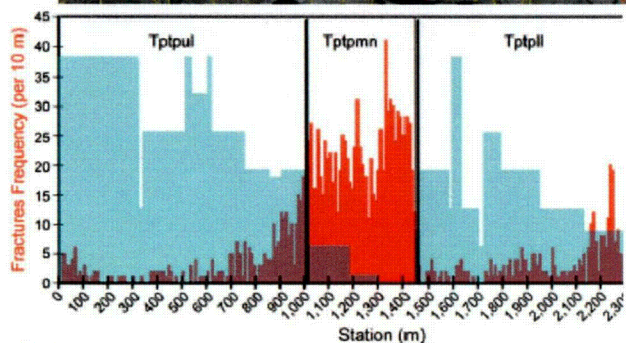




# Summary of Currently Planned Activities -

## Ongoing Performance Confirmation Activities (Continued)

- **Subsurface Mapping** - mapping of fractures, faults, stratigraphic contacts and lithophysal characteristics of rock in underground openings
- **Seismicity Monitoring** - monitoring of regional seismic activity and observation of fault displacements following significant seismic events
- **Construction Effects Monitoring** - measurement of construction deformation in underground openings/confirmation of related rock mechanical properties and drift stability; related to ability to retrieve

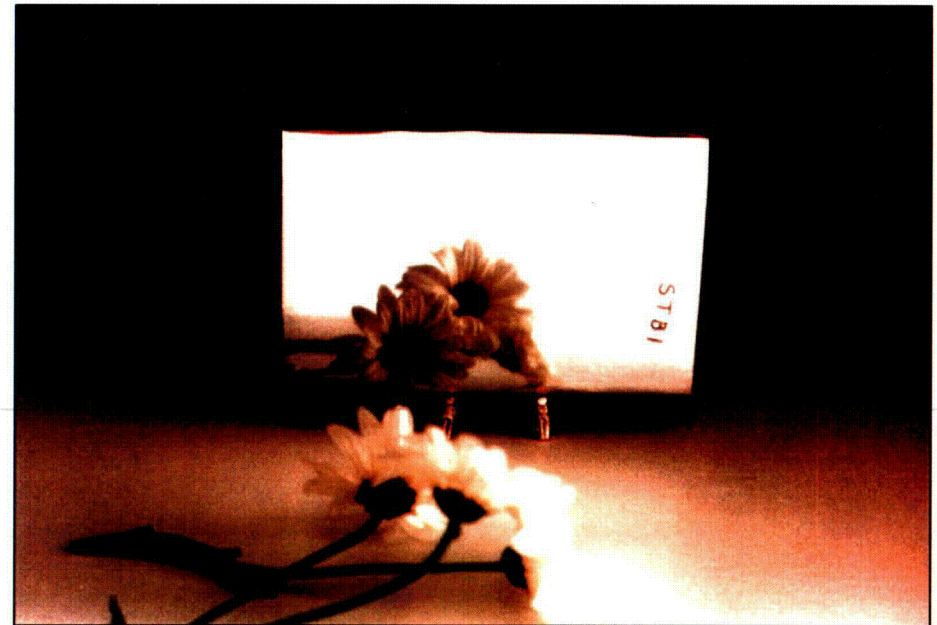
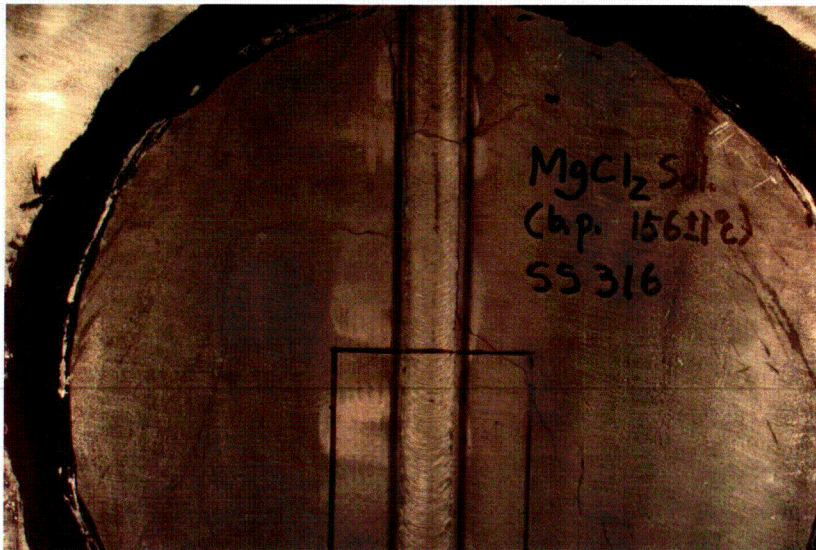




# Summary of Currently Planned Activities -

## Ongoing Performance Confirmation Activities (Continued)

- **Corrosion Testing** - laboratory testing of waste package, waste package pallet, and drip shield materials corrosion behavior in the range of expected repository environments; includes testing of general corrosion, phase transformation of Alloy 22, and localized corrosion
- **Waste Form Testing** - laboratory testing of waste form dissolution and waste package coupled effects including use of scale mockups of waste package to confirm in-package expected conditions

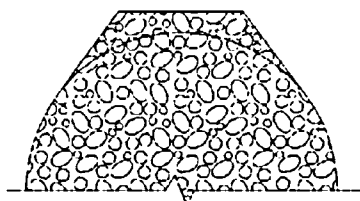
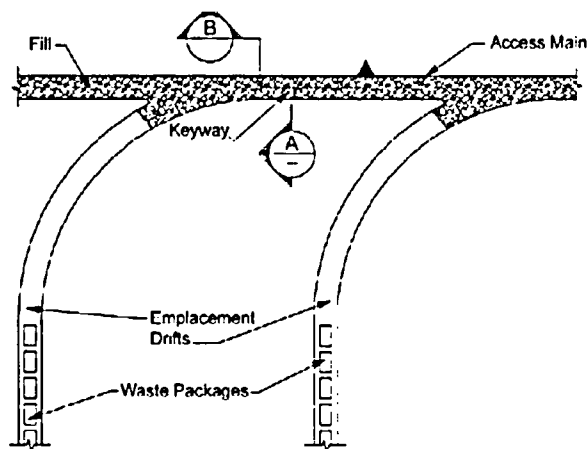


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# Summary of Currently Planned Activities - Construction Phase Performance Confirmation Activities

- **Saturated Zone Fault-Zone Hydrology Testing** - hydraulic and tracer testing in fault zones to evaluate and confirm fault parameter assumptions in SZ flow and transport models
- **Seal Testing** - testing of effectiveness of borehole seals in the laboratory, shaft and ramp seals in the field, and backfill emplacement techniques (as appropriate)



Section  
Scale: None  
A



Section  
Scale: None  
B  
09-MNC-14, 07/03





# Summary of Currently Planned Activities - Operations Phase Performance Confirmation Activities

- ***Drift Inspection*** - periodic inspection of emplacement drifts and thermally accelerated drifts using remote inspection and measurement techniques; related to ability to retrieve
- ***Dust Buildup Monitoring*** - monitoring and laboratory evaluations of quantity and composition of dust on engineered barrier surfaces and samples (also occurs in the Thermally Accelerated Drift)
- ***Waste Package Monitoring*** - monitoring of integrity of waste packages using visual inspection and/or internal pressure measurement employing remote monitoring techniques to evaluate integrity and confirm the absence of leakage

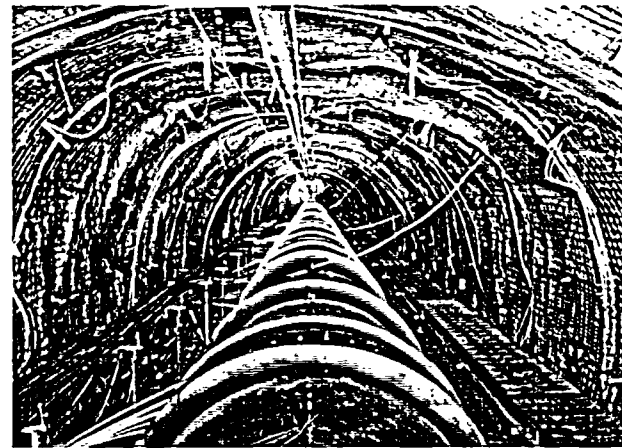


# Summary of Currently Planned Activities - Operations Phase Performance Confirmation Activities

(Continued)

- ***Near-Field Monitoring*** - monitoring of rock mass and water properties in the near-field of a thermally accelerated emplacement drift
- ***Environment Monitoring*** - monitoring and laboratory evaluations of environmental conditions including gas and water compositions, temperatures, film depositions, microbes, radiation and radiolysis effects using remote techniques
- ***Thermal-Mechanical Effects Monitoring*** - measurement of construction deformation of underground openings/confirmation of related rock mechanical properties (also related to ability to retrieve)
- ***Corrosion Testing*** - laboratory testing of waste package, emplacement pallet, and drip shield samples obtained from the thermally accelerated drift

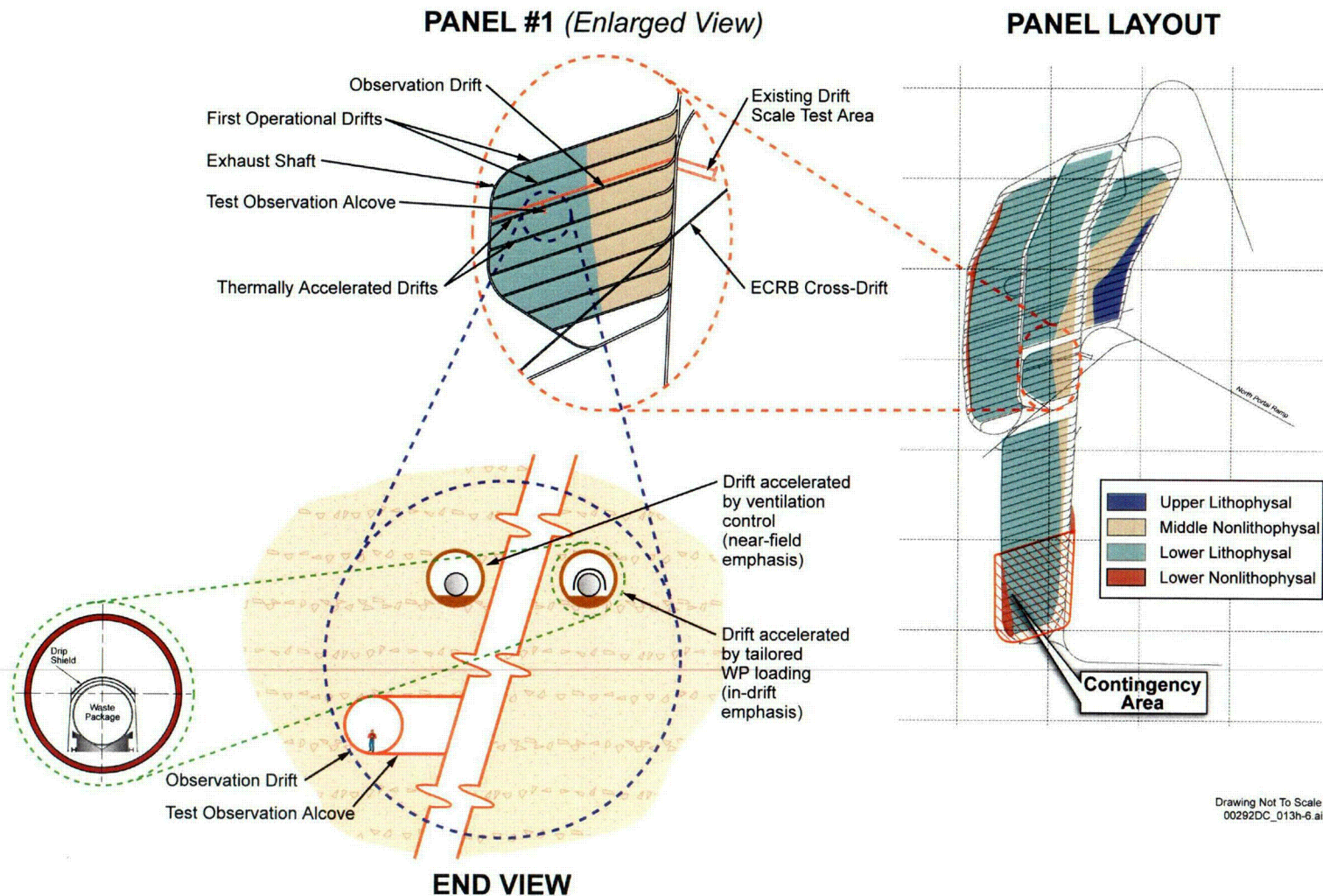
These four activities are conducted exclusively in the Thermally Accelerated Drift Test Bed





# Summary of Currently Planned Activities -

## Operations Phase Performance Confirmation Activities (Continued) Dedicated Drifts with Accelerated Thermal Cycle



# Program Response to Change

- Advances in technology are likely to occur over the life of the program (required to continue until permanent closure)
- The program permits re-evaluation and modification of activities as the state of understanding and technology changes
- An integration function and workshop approach will be implemented to facilitate evaluation of new data and program effectiveness, including technological advancement, and ensure the flexibility needed to accommodate necessary changes
  - Performance Confirmation data will be reviewed and evaluated against the overall status of the program and its activities
  - The integration function will ensure continuity and integration with other testing and monitoring programs, through participation by staff cognizant of other testing activities and interfaces with investigators in other program areas
  - Expertise in other Project areas, including off-Project interfaces, would be used to ensure flexibility as state of knowledge and technology change



# Path Forward

- **Analyze and evaluate existing data for each activity from available sources to establish data ranges and condition limits for Performance Confirmation parameters**
- **Develop dedicated procedures to implement and control the Performance Confirmation Program**
- **Prepare Performance Confirmation Test Plans (two currently in draft) for ongoing test activities and future construction phase activities**
- **Continue to engage NRC on the program and control processes**
- **Continue monitoring, testing, and data collection where appropriate for ongoing tests**
- **Further integrate Performance Confirmation test needs and requirements with construction and operations planning**
- **Continue iteration with TSPA and underlying process models to refine Performance Confirmation program**
- **Update and maintain the Performance Confirmation Plan as needed**





# **High-Level Waste Repository Safety Licensing Review Process Project Planning**

**Presented to:**

Advisory Committee on Nuclear Waste

**By:**

Jeff Ciocco

Senior Project Manager

Division of High-Level Waste Repository Safety

Office of Nuclear Materials Safety and Security

September 20, 2005





## Overview

- Purpose
- Project Management Approach
- Safety Evaluation Report Process
- Path Forward



## Purpose

- Explain the project management approach for the licensing review
- Present the licensing review process



## Project Management Approach

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- Regulations and Statutory Requirements

- Nuclear Waste Policy Act, Section 114(d):

" . . . The Commission shall consider an application for a construction authorization for all or part of a repository in accordance with the laws applicable to such applications, except that the Commission shall issue a final decision approving or disapproving the issuance of a construction authorization not later than the expiration of 3 years after the date of the submission of such application, except that the Commission may extend such deadline by not more than 12 months if, not less than 30 days before such deadline, the Commission complies with the reporting requirements established in subsection (e)(2). . . "

- Title 10, Code of Federal Regulations

- Part 63 – Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada
- Part 2 – Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders



## Project Management Approach *(cont.)*

- Project Objectives
  - Licensing process and decision that are technically and legally defensible
  - Compliance with applicable statutory and regulatory requirements and NRC standards and policies
  - On-time and on-budget completion of project and major milestones



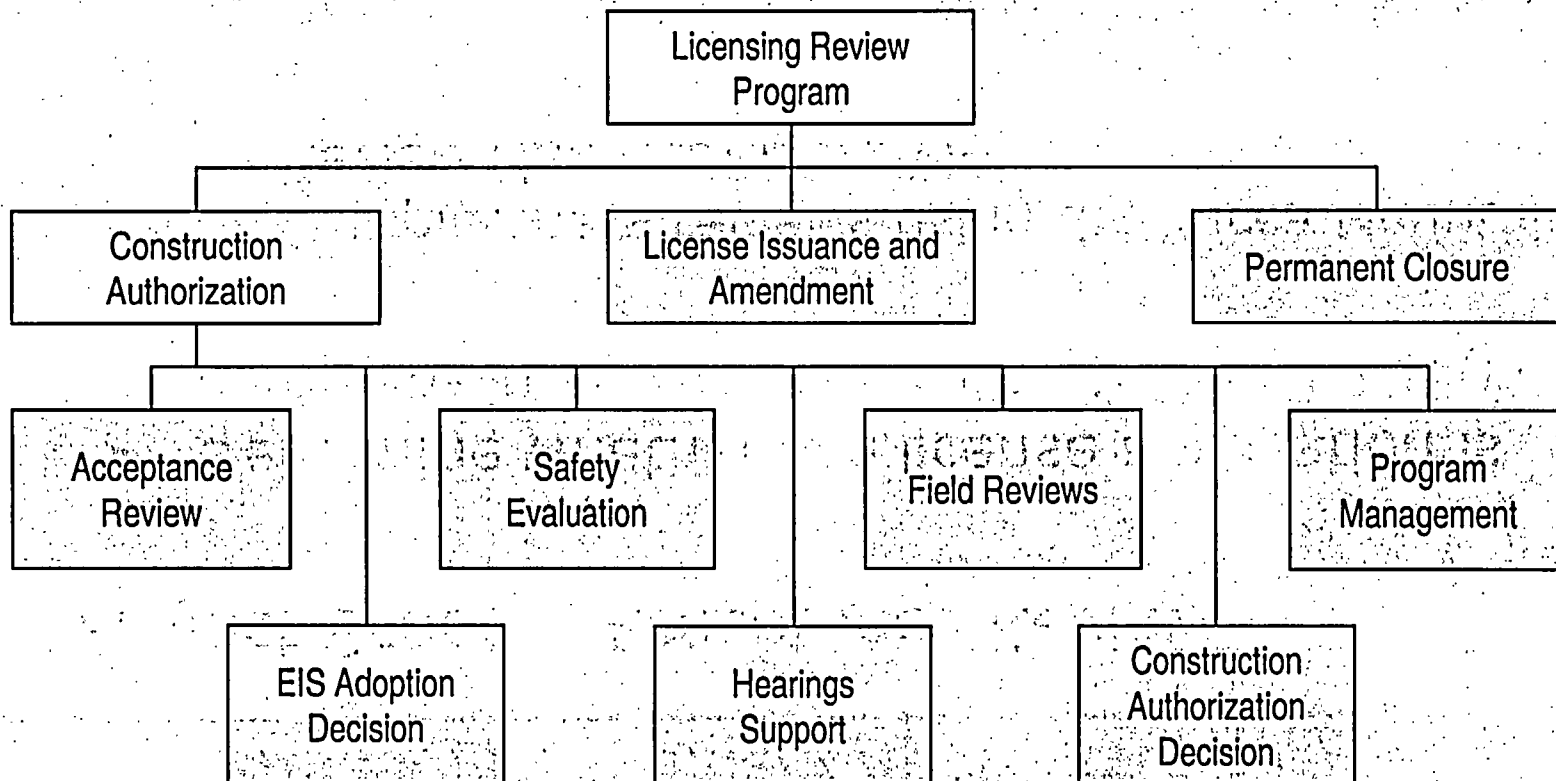
## Project Management Approach *(cont.)*

- Apply project management practices using the following elements:
  - Work breakdown structure (scope)
  - Integrated schedule
  - Resource planning and management
  - Project risk management
  - Change assessment and management
  - Communications
  - Records management
  - Performance measures



## Project Management Approach (cont.)

- Project Scope
  - Scope organized into work breakdown structure





## Project Management Approach (*cont.*)

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- Project Scope – Acceptance Review
  - Determine whether the license application is complete in accordance with 10 CFR 2.101(f)
    - Completeness reviews using the Yucca Mountain Review Plan (NUREG-1804)
    - Docketing decision and Federal Register Notices



## Project Management Approach (*cont.*)

- Project Scope – Final Environmental Impact Statement Adoption Decision
  - Review DOE's Final Environmental Impact Statement and license application to reach adoption decision





## Project Management Approach *(cont.)*

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- Project Scope – Hearings Support
  - Reviewing and preparing responses to petitions, contentions, appeals, testimony, and other filings from third parties
  - Participating in conferences and hearings before the Atomic Safety Licensing Board
  - Participating in discovery



## Project Management Approach *(cont.)*

- Project Scope – Field Reviews
  - Supports the license application review
  - Leverage Regional resources in areas such as data validation



## Project Management Approach *(cont.)*

- Project Scope – Construction Authorization Decision
  - Revise the Safety Evaluation Report (SER)
  - Identify and discuss license conditions with DOE
  - Prepare notice of issuance or denial



## Project Management Approach *(cont.)*

- Project Scope – Program Management
  - Project planning
  - Project implementation, upon receipt of license application
    - Communications
    - Change control
    - Project controls (scope, schedule, resources)
    - Project risk management
    - Performance measurement



## Project Management Approach (*cont.*)

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- Integrated Schedule
  - Based on 10 CFR Part 2, Appendix D Schedule
  - Major event triggers
    - DOE's Licensing Support Network certification
    - Receipt of license application
    - Federal Register Notice of Hearing



## Project Management Approach (*cont.*)

- Resource Planning and Management
  - Ensure that the resources needed to complete the project are available when they are needed
  - Ensure technical and legal expertise



## Project Management Approach (cont.)

---

- Project Risk Management
  - Identify, monitor, communicate, and control project risks over the life of the project

*Project risks are any events or occurrences that might negatively affect the project scope, quality, schedule, or cost objectives*



## Project Management Approach *(cont.)*

- Change Assessment and Management
  - Implement processes to control changes
    - Communicate potential changes to management and within the project team
    - Assess their impact to the project
    - Implement procedures to accept changes and disseminate information on their impacts to the project team





## Project Management Approach (*cont.*)

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- Implementation Procedures
  - Project control function
  - Status reporting and performance measurement



## Project Management Approach (*cont.*)

- Communications
  - Internal communications
    - Management
    - Project Team
  - External communications
    - Public meetings with applicant as necessary



## Project Management Approach (cont.)

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- Records Management
  - Identify official records and documentary material



## Project Management Approach (*cont.*)

- Performance Measures
  - Indicates how well the project is functioning
  - Monitor over the life of the project



## Safety Evaluation Report (SER) Process

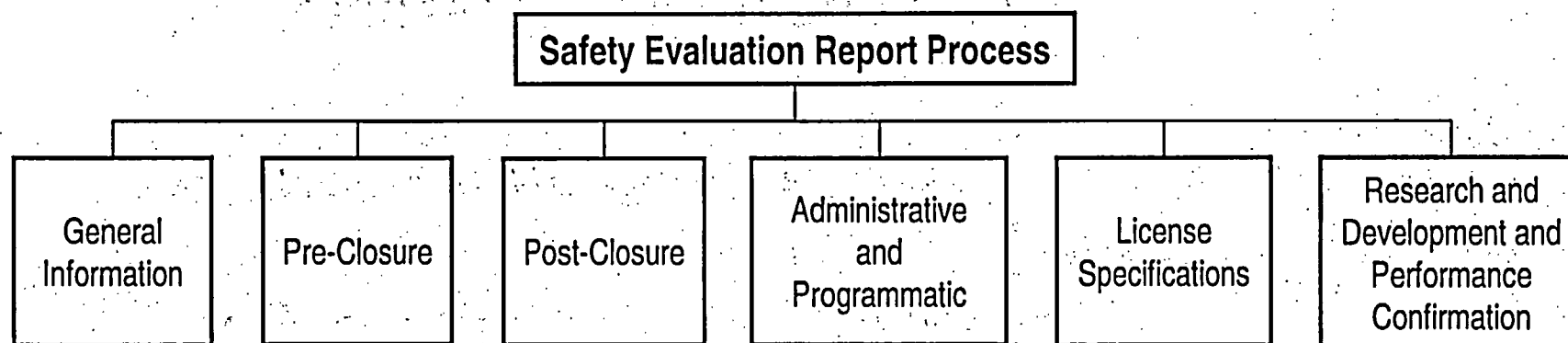
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- SER has been a major focus of project planning



## Safety Evaluation Report (SER) Process (*cont.*)

- Consistent with regulatory requirements
  - 18-month duration
- Consistent with Yucca Mountain Review Plan





## Safety Evaluation Report (SER) Process *(cont.)*

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- Key elements of SER process
  - NRC-CNWRA joint teams
  - Request for Information (RAI)
    - Assumption is single round of RAIs
  - Sequential review cycles for RAIs and SER
    - Technical
    - Integration
    - Editorial
    - Legal
    - Management



# 50 YMRP Sections Organized into 6 SER Volumes

YMRP 1.1: General Description  
YMRP 1.2: Proposed Schedules for Construction, Receipt, and Emplacement of Waste  
YMRP 1.3: Physical Protection Plan  
YMRP 1.4: Material Control and Accounting Program  
YMRP 1.5: Site Characterization Work

YMRP 2.1.1.1: Site Description As It Pertains to Preclosure  
YMRP 2.1.1.2: Structures, Systems, Components, Equipment, and Operational Process Activities  
YMRP 2.1.1.3: Identification of Hazards and Initiating Events  
YMRP 2.1.1.4: Identification of Event Sequences  
YMRP 2.1.1.5.1: Consequence Analysis Methodology and Demonstration That The Design Meets 10 CFR Parts 20 and 63 Numerical Radiation Protection Requirements for Normal Operations and Category 1  
YMRP 2.1.1.5.2: Demonstration That The Design Meets 10 CFR Part 63 Numerical Radiation Protection Requirements For Category 2 Event Sequences  
YMRP 2.1.1.6: Identification of Structures, Systems, and Components Important to Safety; Safety Controls; and Measures to Ensure Availability of the Safety Systems  
YMRP 2.1.1.7: Design of Structures, Systems, and Components Important to Safety and Safety Controls  
YMRP 2.1.1.8: Meeting the 10 CFR Part 20 As Low As Is Reasonably Achievable Requirements for Normal Operations and Category 1 Event Sequences  
YMRP 2.1.2: Plans for Retrieval and Alternate Storage of Radioactive Wastes  
YMRP 2.1.3: Plans for Permanent Closure and Decontamination, or Decontamination and Dismantlement

YMRP 2.2.1.1, TSPA1: System Description and Performance of Multiple Barriers  
YMRP 2.2.1.2.1, TSPA12: Scenario Analysis  
YMRP 2.2.1.2.2, TSPA12: Identification of Events with Probabilities Greater than  $10^{-8}$  Per Year  
YMRP 2.2.1.3.1, ENG1: Degradation of Engineered Barriers, Model Abstraction  
YMRP 2.2.1.3.2, ENG2: Mechanical Disruption of Engineered Barriers, Model Abstraction  
YMRP 2.2.1.3.3, ENG3: Quantity and Chemistry of Water Contacting Engineered Barriers and Waste  
YMRP 2.2.1.3.4, ENG4: Radionuclide Release Rates and Solubility Limits, Model Abstraction  
YMRP 2.2.1.3.5, UZ1: Climate and Infiltration, Model Abstraction  
YMRP 2.2.1.3.6, UZ2: Flow Paths in the Unsaturated Zone, Model Abstraction  
YMRP 2.2.1.3.7, UZ3: Radionuclide Transport in the Unsaturated Zone, Model Abstraction  
YMRP 2.2.1.3.8, SZ1: Flow Paths in the Saturated Zone, Model Abstraction  
YMRP 2.2.1.3.9, SZ2: Radionuclide Transport in the Saturated Zone, Model Abstraction  
YMRP 2.2.1.3.10, DIRECT1: Volcanic Disruption of Waste Packages, Model Abstraction  
YMRP 2.2.1.3.11, DIRECT2: Airborne Transport of Radionuclides, Model Abstraction  
YMRP 2.2.1.3.12, DOSE1: Concentration of Radionuclides in Ground Water, Model Abstraction  
YMRP 2.2.1.3.13, DOSE2: Redistribution of Radionuclides in Soil, Model Abstraction  
YMRP 2.2.1.3.14, DOSE3: Biosphere Characteristics, Model Abstraction  
YMRP 2.2.1.4.1, TSPA14: Demonstration of Compliance with the Postclosure Individual Protection  
YMRP 2.2.1.4.2, TSPA14: Demonstration of Compliance with the Human Intrusion Standard  
YMRP 2.2.1.4.3, TSPA14: Analysis of Repository Performance that Demonstrates Compliance with the Separate Ground-Water Protection Standards

YMRP 2.5.1: Quality Assurance  
YMRP 2.5.2: Records, Reports, Tests, and Inspections  
YMRP 2.5.3.1: U.S. Department of Energy Organizational Structure as It Pertains to Construction and Operation of Geologic Repository Operations Area  
YMRP 2.5.3.2: Key Positions Assigned Responsibility for Safety and Operations of Geologic Repository  
YMRP 2.5.3.3: Personnel Qualifications and Training Requirements  
YMRP 2.5.4: Expert Elicitation  
YMRP 2.5.5: Plans for Startup Activities and Testing  
YMRP 2.5.6: Plans for Conduct of Normal Activities, Including Maintenance, Surveillance, and Periodic  
YMRP 2.5.7: Emergency Planning  
YMRP 2.5.8: Controls to Restrict Access and Regulate Land Uses  
YMRP 2.5.9: Uses of Geologic Repository Operations Area for Purposes Other Than Disposal of

YMRP 2.5.10: License Specifications

YMRP 2.3: Research and Development Program to Resolve Safety Questions  
YMRP 2.4: Performance Confirmation Program

General Information

Pre-Closure

Post-Closure

Administrative and Programmatic

License Specifications

Research and Development and  
Performance Confirmation

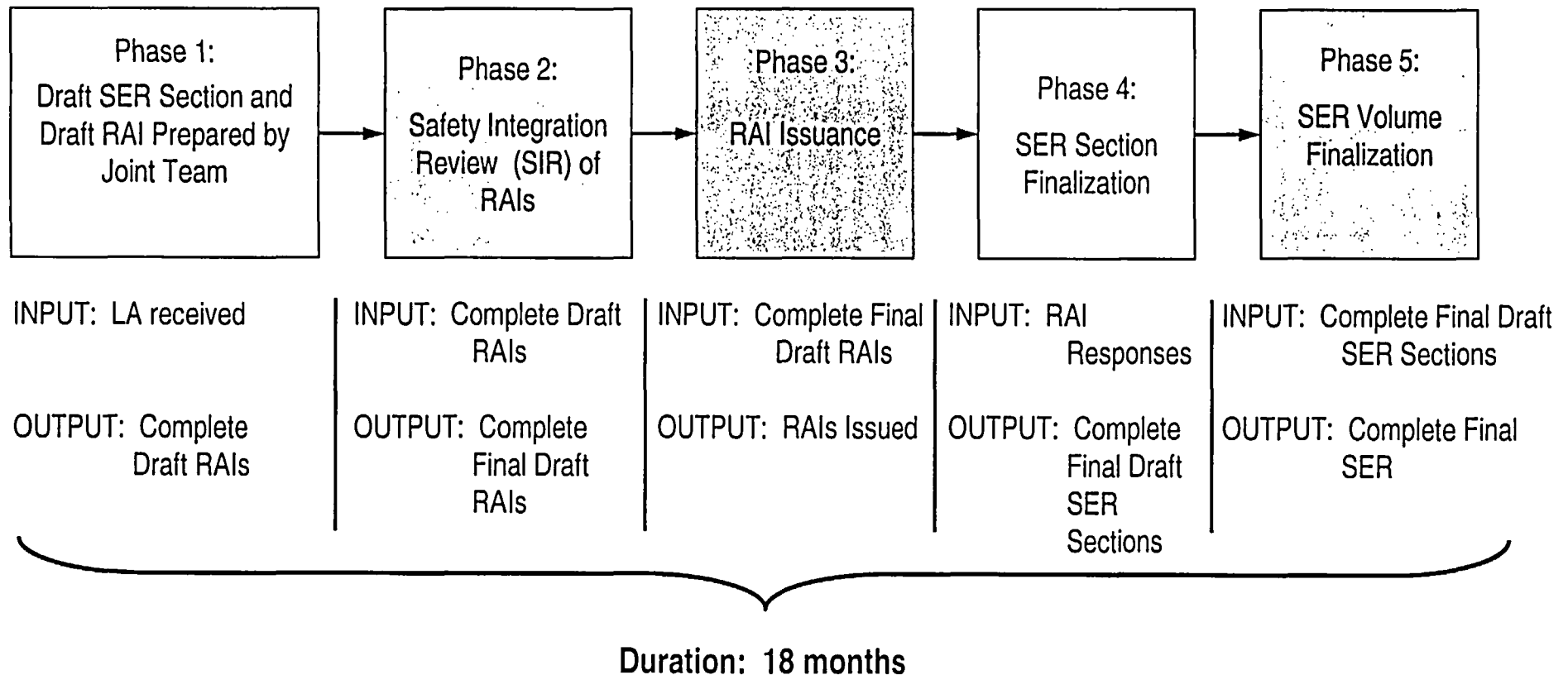
SER  
NUREG





## Safety Evaluation Report (SER) Process (cont.)

- General approach using a 5-phase process





## Path Forward

- Continue prelicensing activities in preparation for license application receipt
- Monitor project environment for conditions that could affect the project
- Continue project planning process
- Implementation upon receipt of license application