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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)

160TH MEETING

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WEDNESDAY,

JUNE 15, 2005

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ROCKVILLE, MARYLAND

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The Advisory Committee met at 8:30 a.m. in Room T-2B3 of the Nuclear Regulatory Commission, Two White Flint North, 11545 Rockville Pike, Rockville, Maryland, Dr. Michael T. Ryan, Chairman, presiding.

MEMBERS PRESENT:

MICHAEL T. RYAN, Chairman

ALLEN G. CROFF, Vice Chairman

JAMES H. CLARKE, Member

WILLIAM J. HINZE, Member

RUTH F. WEINER, Member

ACNW STAFF PRESENT:

JOHN FLACK

LATIF HAMDAN

RICHARD K. MAJOR, Designated Federal Official

NRC STAFF PRESENT:

CHRISTINA ANTONESCI

KRISTINA BANOVAC

TOM BOYCE

DAVID BROWN

STEPHANIE BUSH-GODDARD

MATT CHIRAMAL

CLAUDIA CRAIG

BOBBY EID

DAVID ESH

DAN GILLEN

TEKIA GROVAN

KIM GRUSS

NEIL HAGGERTY

ROBERT L. JOHNSON

ERIC LEE

PAUL LOESER

TIN MO

SCOTT MORRIS

TOM NICHOLSON

NRC STAFF PRESENT:

EDWARD O'DONNELL

D. ORLANDO

JON PECKENPAUGH

JAKE PHILIP

PHIL REED

RAFAEL L. RODRIGUEZ

DUANE SCHMIDT

KATHLEEN SCHNEIDER

ADAM SCHWARTZMAN

JAMES SHEPHERD

BROOKE SMITH

TED SMITH

AMY SNYDER

ANITA TURNER

YET VORA

DEREK WIDMAYER

STACEY WILSON

ALSO PRESENT:

VIRGIL AUTRY, SCDHEC

GREG BABINEAU, Yankee Atomic Electric Co.

PAUL BEMBIA, NYSERDA

ALICE CARSON, RSCS

ANN CLARKE, ANC Associates, Inc.

ALSO PRESENT:

COLLEEN GERWITZ, NYSERDA

ELIZABETH HOCKING, Argonne National Laboratory

JIM LIEBERMAN

THOMAS NAUMAN, Shaw Group

ANDREW NEWMAN, Embassy of Australia

PIERRE SAVEROT, GAI Corporation

I N D E X

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

(8:30 A.M.)

CHAIRMAN RYAN: Good morning. It being 8:30, we'll come to order, please.

This is the first day of the 160th 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 Alan Croff, Vice Chair and Ruth Weiner, James Clarke and William Hinze.

During today's meeting, the Committee will conduct a working group meeting on the development of revised decommissioning guidance to implement the License Termination Rule. Richard Major is the Designated Federal Official for today's session.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. We have received no written comments or requests for time to make oral statements from members of the public regarding today's sessions.

Should anyone wish to address the Committee, plese make your wishes known to one of the Committee staff.

It is requested that speakers use one of the microphones, identify themselves and speak with

sufficient clarity and volume so that they can be readily heard. It is also requested that if you have cell phones or pagers, kindly turn them off or place them in a mute mood.

There are sign up sheets just being the podium behind me and if you're visiting today, the staff would appreciate everybody in the audience signing in so that we can record participation and who's present.

I'll now turn the meeting over to Dr. James Clarke for the remainder of the day. Dr. Clarke has been formulating and developing this working group meeting and we appreciate his efforts. I'd also add my opening thanks to all members of the panel who are here to participate and I'll turn over introductions and the rest of the meeting to Jim.

Thank you, Jim.

MEMBER CLARKE: Thank you, Mike. Welcome to this working group meeting. As you know, the NRC has been working on guidance revisions to the License Termination Rule. In April, the workshop was held and this meeting is a planned follow-up to that workshop.

Decommissioning and the License Termination Rule guidance are areas of interest to the ACNW and are also areas where we've been asked to

provide input.

Today, we'll hear several presentations on portions of the guidance, where revisions are being considered and developed. The purpose of this working group meeting is to position the Committee to be able to provide productive and timely feedback for consideration in drafting the guidance revisions.

To that end, we have assembled a panel of experts who have agreed to assist us in this effort. As you can see, we have a full agenda and a busy day ahead of us. Nevertheless, a major goal of this meeting is a good exchange of information and ideas. We've built time into the agenda for questions and discussion and we encourage interaction.

If I have to keep us moving to stay on schedule, I will do that, but note that we have reserved additional time at the end of the day for a round table discussion and wrap up.

Now it's my pleasure to introduce our panel to you. In no particular order other than alphabetical, let me start with Eric Abelquist. Eric is the Director of the Radiological Safety Assessments and Training Program at the Oak Ridge Institute for Science and Education. He provides health physics technical assistance, including independent

verification of decommissioning sites for the NRC and the DOE. He was a contributor to the preparation of the Multi-Agency Radiation Survey and Site Investigation Manual, MARRSIM, and later authored a textbook, Decommissioning Health Physics, a Handbook for MARRSIM Users in 2001. He has undergraduate and graduate degrees in radiological science and protection from the University of Lowell.

Next, Virgil Autry. He is currently serving as a part-time technical consultant for the Department of Health and Environmental Control for the State of South Carolina at the request of its Commissioner and as an independent contractor. Mr. Autry is a graduate of the U.S. Army Nuclear Power School, attended Coastal Carolina University and has associate degrees in electronic engineering technology and business management. He began his career with the U.S. Army Corps of Engineers Power Reactors Group. Since that time he's accumulated over 30 years of health physics and managerial experience with the South Carolina Department of Health and Environmental Control. Until his retirement in July of 2000, he directed South Carolina's radioactive voice management, transportation, material licensing, compliance and facility decommissioning programs and

was directly responsible for oversight of the Barnwell low-level radioactive waste disposal facility.

Eric Darois holds a master's degree in radiological sciences and protection, also from the University of Lowell and is a certified health physicist with 28 years of experience as a health physics professional. He is the owner of Radiation Safety and Control Services in New Hampshire, provides consulting and training to a broad range of clients. He's presently supporting both the Connecticut Yankee and the Yankee-Rowe decommissioning projects in the areas of final status surveys, dose modeling and LTP developing and is currently the technical LTP project manager for the Rowe decommissioning site.

Tracy Ikenberry, Tracy is on that end. Has been an associate and senior health physicist with Dade Moeller & Associates since 1998. He's currently the vice chair of the American National Standards Institute, accredited Committee of 13 on radiation protection and services as an associate editor for Health Physics. Tracy has 22 years of professional experience as a health physicist, including a wide range of activities in environmental and occupational health physics. His recent project involvement includes technical evaluation of biosphere modeling

and radiation protection programs for the Yucca Mountain project, evaluation of preliminary safety analysis reports, the DOE Office of River Protection in Hanford and he's serving as radiation protecting subject matter expert for an operational readiness review of West Valley.

Tom Nauman, vice president of Shaw Environment and Infrastructure with the Shaw Group, has more than 30 years of experience in nuclear project management, construction, engineering maintenance, outage management and decommissioning. He began his career with Commonwealth Edison culminating at the Dresden Unit 1 plant manager in charge of all spent fuel and decommissioning activities. In 1998, he joined Stone and Webster and headed up all the nuclear decommissioning activities for that company, including projects at Maine Yankee, Connecticut Yankee Millstone, Millstone and several other DOE and university D&D projects. He served as a member of the nuclear safety oversight board for the Three Mile Island Unit 2 and Saxton Nuclear Plant D&D projects for the past five years and is currently vice president of the Shaw Environmental Infrastructure, where he is responsible for all nuclear D&D related activities.

Welcome, all of you. Thank you very much for agreeing to assist us in this effort.

At this point, it's time for our first presentation which will be made by Dan Gillen and Andrew Persinko, is that correct?

MR. PERSINKO: Good morning. My name is Drew Persinko. I'm a section chief in the decommissioning directorate at NMSS. With me today, Dan Gillen, the director of the decommissioning directorate; Robert Johnson, who is the lead project manager for our integrated decommissioning improvement plan; and also numerous members of the decommissioning staff are also in attendance this morning, today.

I'd like to say that we're happy to meet with the ACNW working group to discuss our plans and what we're currently doing on our revised guidance, the NUREG-1757 that we're revising.

I'd like to say that what we're going to speaking about today is really a bigger, a part of a bigger plan, the integrated decommissioning improvement plan, whose purpose is to integrate improvements from our LTR analysis and other program improvements, as well as it describes our continuous improvement plan overall for the decommissioning program.

It's my understanding that we're meeting with the ACNW working group today and as a working group, working group implies that to us that it's a collegial, informal discussion, exchanging ideas in order to develop a better end product and that is how we approached our presentations today.

I'd like to point out that much of the information that we're going to present today is preliminary. As the day goes on, you'll see some is more preliminary than others. As the day goes on, it will probably be more preliminary.

We're currently in the process of digesting comments that we received at the decommissioning workshop that we held in April as we are revising our guidance and I know some of the ACNW members attended that workshop. The workshop was well attended and we received numerous compliments from the attendees. I'd like to point out to the ACNW that a draft summary of that workshop is now currently on the website and we're seeking comments on it before we finalize it.

You can get to it through the normal web page going to our decommissioning website, the NRC website, then materials, then decommissioning and if you want later today, I also have the exact URL if

you're interested.

I'd also like to point out with respect to revising our guidance, that we also have formed an agreement state working group who is also working with us to provide comments and assist in our revising the document.

During our presentation today, we will discuss our plans, what we're currently doing, and where we are and we welcome ACNW comments on any and all aspects of our presentations today.

However, you'll note in certain areas we will point out that we will specifically point out areas that we are seeking comments. We'll highlight those areas through the course of the presentations today, but I just want to point out we are also seeking comments on any of the information.

Our schedule is that we plan to publish a draft revised NUREG-1757 by September 30 and that will go out for comment, but the plan is to publish the draft by September 30th. With that, I'll just ask Dan if he has anything he'd like to say.

MR. GILLEN: Thanks, Drew. I'd just like to thank Dr. Clarke, Dr. Ryan and all the ACNW and the consultants they brought in for providing this session. It's a valuable tool that we're taking

advantage of to be able to get such wide ranging set of additional eyes to look at the work that we're doing.

We'll have seven issues that we'll be talking about today, full-day worth of work, plus an additional presentation on Lessons Learned activity that we're doing. All my staff is here prepared to give introductions in each one of these issues and then open it up for discussion.

I just -- I am not going to be able to be here the entire time. I'll be here most of the day. I have a couple of meetings I have to break away from. Drew will be here all day, as well as the staff that's responsible for each one of these issues. So again, I thank you for today's activity.

MEMBER CLARKE: Thank you, and that is our understanding of the meeting as well.

Are there any questions for Dan or Drew? I guess we can move to the first presentation. Robert Johnson and Kris Banovac.

MR. JOHNSON: Good morning. It's a pleasure to be here. I just wanted to repeat what Drew and Dan said. We've had interactions many times before on the LTR analysis and the results and this is just one more of that series to go into a little bit

more detail as we begin to implement the Commission's policy direction with respect to many of the issues that we came up with and analyzed in the License Termination Rule analysis.

Kris and I will sort of be acting as a tag team. We'll try this approach, you know, because our particular issue on institutional controls and restricted use really has two components. One is the long-term control license and one is the legal agreement and restrictive covenant. So I'll focus on the long-term control license and Kris will focus on the legal agreement. And as we go through our presentation, I'll hand off to her and then she'll hand back to me. I think it will go smoothly. But we'll try that out.

Also, what we're trying out is you'll see in our slides, they're just outlines of the guidance summaries that we've provided to you about two weeks ago. I'll be speaking from the guidance summary. I'll refer to the page number. I'll just walk through it so that will just -- that's sort of our script anyhow, to follow and -- but this is an outline just of the major headings that are in that guidance summary.

I'd like to begin, I guess with a little

bit of background. It never hurts to repeat a little bit of some of the things that many of you have heard many times before on the License Termination Rule analysis and because there are some new folks here, the consultants that haven't been involved over the past few years. So I'll just a mention a few things and probably with respect to our issue on institutional controls and restricted use, one of the things to be reminded of is that in the License Termination Rule itself, the Commission prefers the decommissioning option of unrestricted use for obvious reasons. You're done, we're out of the picture, there are no controls staying on for a time. It's the best way for reuse and all that, but in the License Termination Rule, the Commission also recognized that there may be a few sites that would not be able to meet the unrestricted use. And therefore, they put in provisions for restricted use. They also put in provisions for alternate criteria.

They're pretty stringent. They didn't expect these to be used a lot, only in maybe rare circumstances, so it's good to be reminded of that. And that's sort of really the background on our issue. We're looking at restricted use and the use of institutional controls for these two options. And the

reason we got there was under the License Termination Rule, the few licensees that had tried to implement those provisions weren't able to do it for a variety of reasons and so the Commission asked us to come up with suggestions on how to resolve the issue and that's what we did in a Commission paper. The Commission approved the two options for using NRC controls and I'll -- that's what we'll talk about this morning. And they also approved a risk-informed approach, graded approach for institutional controls.

I'm just pointing out to new people that the guidance that we're preparing today is really implementing what the Commission approved, the policy they approved and so we're just putting in details on that.

And for this particular issue, as Drew alluded, we have more progress and more detail on this issue because we prepared interim guidance for the Shieldalloy site on long-term control license and we briefed you last October on that guidance. So we've had a number of good discussions over a period of time on this.

I'd like to then move on page 3 in the guidance summary and first look at the risk-informed graded approach and how we're going to implement that

in guidance. It's really pretty straight forward on this one, I think. We're going to have a whole new section in guidance and I might say that you probably are aware, in 1757, our decommissioning guidance, there's a lot of material on use of institutional controls already. So really, the bigger picture is for the graded approach, risk-informed graded approach and for the two new options of NRC controls, we're just adding those, that information to the existing guidance.

It's very much like you saw in the Shieldalloy guidance, interim guidance. We just sort of did a line in, line out virtually and followed that format.

So what we're doing here for the risk-informed approach is adding a whole new section to the guidance and not to go into detail here, but we'll basically be describing virtually what you'd seen in the SECY paper on the LTR analysis or what you see in the regulatory issue summary. That just describes this approach. It will define the risk framework that is based on hazard duration and hazard consequence. It will describe the fact that there's really two grades of institutional controls, the legally enforceable institutional controls and then the graded

durable institutional controls for high risk sites. It will also describe how risk insights should be used to tailor or customize specific restrictions based on site-specific conditions.

So it will be more laying out the framework that you've seen already. There's a table in the regulatory issue summary that defines the whole approach. That table, you'll see in the guidance, but it will add some more words to licensees to just understand the concept, how they might use it at their particular site, how it's flexible, how they can pick controls, based on their need and based on insight, risk insights from their dose assessments.

It will also explain that they should identify, based on their dose assessments prohibited uses and mitigating controls. In other words, what kind of restrictions on land use problems. It will talk about duration of controls based on the source term half life.

It will also talk about the flexibility to subdivide a site, divide it up and maybe portions of the site may have different types of restrictions or different durations of restrictions, if you're dealing with a complex site. And so it will explain that more to help licensees that might be using this to

understand how they can apply it at their site.

Moving on to page 4, suggestions were made by a couple of state folks that a diagram might be useful to complement the words so that you could see easily in a flow diagram kind of logic for the graded approach, where we have no controls, unrestricted use; where we have the need for controls for restricted use or alternate criteria. And then the graded approach, the high risk, low risk sites and the type of controls that would be needed and then finally where the NRC controls will come in.

We haven't developed that diagram yet, but we have some suggestions from folks and so that's what we will be planning to develop here is a picture to complement the description of the words.

Now moving on to the long-term control license and we call it the LA/RC, legal agreement and restrictive covenant approach. That section is on page 4. We're going to be adding to the existing guidance to give licensees an understanding of these two approaches and how to use them.

First, in Section 17.7.1, the overview, again, this will kind of discuss these two new options involving NRC and it will primarily explain both of them, but it will also explain that this is, in

general, a last resort. These two options are not just anybody can use them. They are and I'll talk about criteria in a moment, but basically, if a licensee cannot find other acceptable ways for institutional controls, then the fallback is one or either of these two NRC options. And I'll talk about the criteria in that in a minute.

Under the LTC license, we'll explain in this overview statement that the license is not terminated. This is a different concept for the License Termination Rule just by the very title, but what's envisioned here and what the Commission approved was amending the decommissioning license, amending it to become a long-term control license and it would contain the conditions, the types of restrictions on land use. It would contain conditions going out, in general, the types of monitoring or maintenance that would be required or the reporting that would be required and lay out the responsibilities of the parties.

So that's an important concept to understand and one of the questions in the workshop and people have raised is we really haven't decommissioned the site if you haven't terminated the license and technically speaking, by definition that's

true. But I answered and I still do the important thing is that this is good to remember is that before the license is amended, all the requirements for restricted use in 1403 need to be met. All the dose criteria need to be met. And so even though you haven't really just done the paperwork to terminate the license, you just amended the license. To me, that's sort of superficial. It's true, but the substantive thing is that you've met the criteria, you've done the clean up that you need, you've put in the controls that are necessary for protection. Now, as far as the definition goes, we will probably have to address the timeliness rule. So there will be some description of how we'll either approve an alternate schedule. I mean it could be 20 to 50 years, depending on the -- or it could be perpetual, depending on the source term. But we'll have to address the timeliness rule, or we'll just have to have an exemption from it in certain circumstances.

So although we don't have the answer explicitly for that question yet, we will be addressing it in the guidance, but keep in mind nothing changes just because you have a long-term control license. A licensee needs to meet all the requirements of 1403.

Okay, now Kris will talk a little bit more about the LA/RC.

MS. BANOVAC: Also in this overview section of the guidance, we will introduce the LA/RC option, which is the legal agreement and restrictive covenant. Under this option, the current site owner or the licensee enters into an agreement with the NRC on the restrictions and the controls needed for the restricted release.

The legal agreement uses a restrictive covenant and the restrictive covenant itself actually outlines all the restrictions of the site use and would also outline any monitoring and reporting actions that are needed at the site.

In the legal agreement, the licensee or the current site owner agrees to abide by the restrictions, the land use restrictions. They also agree to employ the restrictive covenant. Ultimately, the agreement -- NRC will monitor and enforce those controls to make sure that the restrictions on-site use were working.

The legal agreement is only between the NRC and the present site owner or the owner at the time of license termination. And the legal agreement is mainly put into place to make sure that the

restrictive covenant takes effect when the land is sold. The owner is agreeing to report it in the deed and not withdraw it. So that ensures that the restrictive covenant would take effect when the land was sold and would transfer to each owner through the deed as the land is sold.

As Robert mentioned in the LTC option, the license is not terminated. Under the LA/RC option, the license would be terminated. The legal agreement and the restrictive covenant would become the legal tools for maintaining the restrictions on the site use. The guidance will also explain that the LA/RC option could be beneficial for a formerly licensed site if they don't want to obtain an NRC license or for a licensed site where they do want license termination.

And Robert is going to talk a little bit about that criteria that we use to decide whether the LTC license or the LA/RC should be used.

And I'll turn it over to Robert to talk about controls.

MR. JOHNSON: Okay, on page five and in your outline we're going to be talking about institutional controls and Section 17.7.3.2.

Location and type of controls, I guess the

first thing that we could include here would be two new demonstrations to determine the appropriateness of using either the LTC license or the LA/RC. In other words, I said before it was a last resort, and so what a licensee would need to demonstrate is that durable institutional controls are required. Either after they've done a calculation, assuming controls not in effect, if they're above 100 millirem or if they have long half life radionuclides at the site requiring controls for greater than 100 years, they would be needing durable institutional controls.

The second thing would be that the licensee has tried and demonstrated that they have not been able to establish appropriate or effective legally enforceable institutional controls, durable controls or independent third party arrangements. For instance, they may have tried to talk with state or local governments to see if they would take over a responsibility there and they have declined.

So they would have to provide evidence that they have tried and not been able to establish those controls. If those two demonstrations are met, then they can look at an LTC license or a LA/RC. The next decision would be adding criteria to decide which one, LTC license or LA/RC.

The LTC license is preferred by NRC, obviously, because we have experience with licensing and we're more comfortable with that and our enforceability is more clearcut and so we do prefer that for current licensees, unless a licensee requests the use of the LA/RC and that they show that it would be beneficial to them or beneficial to affected parties, like it might improve property value. It would avoid maybe a license stigma. It might help reuse. In other words, if they make a case that will be beneficial, that's one of the things they have to do. They would also have to show that it's effective as well. And so we still prefer the LTC license, but if they really want the LA/RC, then they're going to have to demonstrate that it's beneficial and effective.

For the LA/RC, that would be preferred by NRC for current nonlicensees. We have a couple of cases, former licensees, and they don't want to become a licensee and so if they can show again that the LA/RC would be effective, then we would consider that option. We have examples for each of these that we're currently working on.

Now Kris will talk about enforceability of both of the options.

MS. BANOVAC: In the guidance, we will note that the NRC would enforce both of these options for institutional controls. Under the LTC license, the NRC enforces the restrictions throughout our licensing and enforcement authority under the Atomic Energy Act.

Under the legal agreement and restrictive covenant option, we would enforce the restrictions through the authority that's written into the legal agreement and the restrictive covenant.

NRC, the guidance will note that the NRC would address any breach of the legal agreement or restrictive covenant by taking legal actions in the courts and we could also take action under a broad authority under the Atomic Energy Act to protect public health and safety.

We'll note that the licensee has to demonstrate that the LA/RC is legally enforceable because enforceability of this option is dependent on the laws of the site jurisdiction. So the local property laws have to support this option of the site's jurisdiction and that state and it's up to the licensee to demonstrate that to us.

The guidance will also note that the licensee needs to do some work to understand the laws

of the site's jurisdiction and show that the legal agreement of the restrictive covenant could be upheld. They would have to look at such things as whether the restriction of the land use would indeed transfer to each new owner the property through the deed and run with the land and get an independent legal opinion on the laws to make sure that this option would be supported and could be upheld.

They could also look at things such as if the property was rezoned for a residential use, for example and that was one of the restricted uses of the site, would that rezoning void the restrictive covenants. So they kind of need to do some homework there to understand whether this option would work.

The guidance will also note that the legal agreement and restrictive covenant have to outline the methods and the frequency in which NRC monitors the site to verify that the controls and the restrictions are working. For example, if NRC plans to inspect the site every year or every five years, that would need to be laid out in a legal agreement and restrictive covenant.

And also, the restrictive covenant and the legal agreement should outline how NRC is going to enforce the restrictions if needed, so what actions

would NRC take to restore the restrictive covenant if it was breached and that would have to all be outlined in both the agreement and the covenant and we'll try to describe that in the guidance.

And I'll go ahead and turn it back over to Robert to talk more about institutional controls.

MR. JOHNSON: Okay, on page six at the top, I'll talk a little bit about using the risk-informed graded approach to justify the location and types of institutional controls. I mentioned earlier that there's flexibility to, if you needed to, or found it beneficial to subdivide your site and provide different controls for those portions of the site. Or in some cases you may define just the restricted use area of a site and then an unrestricted use part of the site, but keep in mind that dose assessments should be used to help define what is the appropriate restricted area based on what kind of restrictions you need or maybe what kind of monitoring you need, you would determine the location of the restricted area.

Also, we've talked to you about the issue of subdividing for a private site. If you could divide a site between restricted and nonrestricted in a private site, our preference has been to keep all that site under the license, rather than have the

unrestricted portion released, allowing just the residual restricted release portion.

So we have gotten a lot of comments, not only from you in the past briefing, but also at the workshop that there are pros and cons to this approach. And so this is one of the issues that we talked about more in the workshop. This is one of the issues I would appreciate any thoughts that all of you might have on the idea, but we've included in our guidance here some pros and cons that we've heard about to date and we would include this in the draft guidance right now and ask for public comment on this approach. But obviously, some of the pros of keeping for a private site, this is not a government site, for a private site, because we're concerned about future ownership, transfer of ownership over time, particularly where you're relying on -- where you're meeting long-lived controls, we think a pro would be it's beneficial to maintaining ownership and having future ownership if you keep the whole site together.

And rather than orphan a small restricted portion that may not have any value and has a lot of maybe an appearance of liability, you want to keep that with the portion of the site that may have beneficial reuse, so that a future owner will be

attracted to the unrestricted use portion and yet they'll need to take on the responsibility of the restricted use portion as well.

So the benefit seems to keep the value of the site together, by keeping it together so that future owners will have an incentive to buy the site in the future and maintain the license in the future. That's one of the pros.

The con that we hear a lot about is the stigma of the license, you know that you won't be able to attract future buyers or even people that may want to lease and reuse the site because of the restricted area and the residual contamination on the site. So local community seems in some cases to have concerns with this. And to me, one of the things to understand is that we're trying to achieve here, we're trying to balance protection under the long-term control license, but also we're trying to provide where it's appropriate reuse of the site.

So if there is a large portion that currently has an industrial use going on, if it can be shown that the unrestricted use criteria are met, then the conditions in the license would show what are the permitted uses at that site, as well as the prohibited uses and where they are.

And so it's very clear in the license to the local community, to any purchasers in the future, what can be done on what portion of the site, so they'll know by license what they're buying. They'll know where the restrictions are, what they have to do, that there's an independent trust fund that will provide finances or funding for maintenance and all, rather than coming out of their pocket, but they'll also see what they're permitted to do.

So part of it I think is trying to explain this approach so that people first understanding and then they can come to their own conclusion about whether it's a negative or not, but we're trying to balance protection with reuse on a complex site. We're trying to find a way to do that and so if you have thoughts, we would be happy to hear them.

MEMBER CLARKE: Robert, if I could ask a quick question. How would it work if the LA/RC option were selected? How would you get to the same place, the whole site under control? Would that be through the legal agreement?

MR. JOHNSON: Yes, it would be the same. It's a different legal mechanism in the conditions, but they could be viewed as sort of mirror images, the LA/RC could have conditions in it that are just like

the long-term control license would have conditions in it so that they would be mirror images, but a different legal tool.

MEMBER CLARKE: Thank you.

MR. JOHNSON: Now at the bottom of page six, moving on to restrictions and controls implemented by the licensee. I had said before that the licensee would need to identify adverse access and land use scenarios that should be prohibited. In other words, they're using their dose assessments, they're using their risk insights to be the basis for what restrictions should be put on the site.

They should also balance that with identifying what would be permitted. And not cause noncompliance. Next page, on page 7, based on those prohibited conditions or prohibited uses, then the licensee would describe what kinds of restrictions or controls they would put in place to address each of those prohibited uses.

Kris will now talk a little more about records retention and availability.

MS. BANOVAC: Well, as to the current guidance, guidance 4 of the LTC license and the LA/RC, one of the things we'd like to do is identify the records that should be retained and made available to

the public such as a long-term control plan, monitoring and maintenance reports, possible inspection, NRC inspection reports. So we would identify those records and also discuss the responsibilities of the different parties for maintaining those records and making them available to the public.

Under the LTC license, we would note that the NRC has the primary responsibility for retaining the records and making them available to the public. And we would do that as part of our agency system, ADAMS, docketing, part of our regular system, that's how we would maintain the records.

The licensee would also keep records, but more for its own use in conducting business on the site. Under the LA/RC option, the NRC would also have the primary responsibility for maintaining those records and making them available to the public and once again, the site owner would also have responsibility for keeping records, but more for its use during business. So very similar to the LTC license.

In the LA/RC section of the guidance or in the guidance, we will describe duplicating the responsibilities of maintaining these records, but

help preserve the records and assure that they will be maintained and made available to those who use the site in the future. So we will note that the more folks who are keeping the records, the better chance that everybody who is using the site in the future will know what the restrictions are on site use.

The state or local government agencies or local groups may want to retain records. Once again, the site owner would and also the local government agency or the registrar of deeds would maintain the restrictive covenant as with the title of the property. So when the property was sold, the restrictive covenant would transfer with the deed.

And the guidance will also note that these record keeping responsibilities should be outlined in the legal agreement and restrictive covenant and so there will be provisions in the LTC license saying who has the responsibilities for retaining what records and the same thing would be done in the legal agreement and restrictive covenant.

And with that, I'll turn it over to Robert to talk about site maintenance.

MR. JOHNSON: Right, on page seven, Section 17.7.3.3 in the existing guidance talks about maintenance, but we're adding monitoring to this.

There has not been guidance on this for under the long-term control conditions.

So the approach here is to add new information and describe a risk-informed process or an approach for monitoring. We're not being prescriptive here. We're recognizing that monitoring is very site-specific and it should be risk-informed, so what we'll have in our guidance is just outlining an approach that a licensee would apply for their particular site and then produce as part of the long-term control plan, the long-term control plan would be prepared and approved by NRC prior to the license amendment at the end of the process and it would lay out the details of monitoring, but what would be in the decommissioning plan would be kind of the approach to monitoring.

And it would kind of be derived from -- I mentioned before what the prohibited land uses would be identified for institutional controls, the prohibited land uses and how those could fail as well as we'll talk a little bit under engineered barriers, if it's licensees using engineered barriers, they will look at what are the disruptive processes, both human and natural processes that could lead to noncompliance through the engineered barriers. So the idea here is to look at how the overall system could fail.

What are the disruptions, human and natural, that would disrupt the restrictions on land use as well as the engineered barriers, combine them together and come up with a list of the disruptive events that could lead to noncompliance and I'm trying to use that term instead of failure. Failure can mean a lot of things to a lot of people, right? But the key here, I think is what are the events that could lead to noncompliance with the dose criteria and when you have that list of disruptive events, for your particular site, then item by item you would look at well how would I monitor for this particular disruptive event. What's the approach I would use? Is it merely surveillance on a periodic basis? How often? If I go out there once a year, can I determine if there are any signs or precursors of erosion or do I have to go out there after every big storm. Questions like that.

Also, I think with respect to the monitoring, you would look at the indicators or precursors of these events, identify what those could be and then how again, how you would monitor for them and report on them.

So that's the approach here and I think one of the things we'd like your reaction to is that

we're not proposing a prescriptive approach. We're proposing a risk-informed, tailored approach to site-specific conditions. That is tied, can be demonstrated to be tied to your dose assessments. And that's the general approach here.

With respect to eventually groundwater monitoring, Jim Shepherd later today will talk about our approach to that right now, but eventually this guidance for the long term at the end, after a license amendment or termination, it will eventually link to more guidance in the future on groundwater monitoring. So we're trying to integrate monitoring here. This is sort of the bigger picture, the bigger approach, but then there will be more to come on groundwater -- specifically on groundwater monitoring in the future and you'll hear more about that.

Similarly, with respect on page 8 to maintenance, you would also look at these disruptive events that I talked about that could lead to noncompliance and then the licensee would identify what maintenance might be needed, what kind of corrective actions might be needed. In some cases, and a little later on we'll talk about engineered barriers in the next section, robust engineered barriers may be justified and those might be useful

because they could be designed to preclude reliance on active on-going maintenance.

So there's a link here to engineered barriers and back to the maintenance plan. We also have talked about there's a link to monitoring and maintenance to the financial and the funding for these activities, particularly over the long term and that leads me to my next topic on page eight for sufficient financial assurance, just to say a little bit about this, we'll have a section in the guidance on this because for restricted use sites, sufficient financial assurances are required.

And so one of the things that's very important in the decommissioning plan is to have a cost estimate that would address what are the costs for maintenance, maintaining restrictions, monitoring, maintenance, independent third party fees, trustee fees for maintaining the trust fund. And in the case of where NRC long-term control license or LA/RC would be needed, then it would also include NRC fees for various things like annual inspections or reviews or the five-year license renewal.

So that cost-estimate is very important and then as we've spoken before, you come up with an annual cost, a total cost, but you come up with an

annual cost and then the fund that you put away, the income off of that fund each year pays for the annual expenses based on your cost estimate.

And that annual fund is assuming a 1 percent rate of return on the money and that's consistent with mill tailings guidance.

So that kind of sums up at least the institutional control and financial assurance part under restricted use. What I might mention is that, we sometimes lose sight, or I should, maybe I do, is that restrictions are also needed if we have a licensee that wants to use the alternate criteria provisions of the LTR. We don't have any sites like that right now.

But what we're going to include in the guidance is just to make a link to the alternate criteria guidance that's already in 1757. And it would use all the guidance we have on institutional controls, you know, if one were to do that. Because remember, the alternate criteria is if a licensee would use this decommissioning approach, if they're above 25 millirem using institutional controls, but below 100 millirem, using institutional controls. So it's this type of site that might not be able to meet the 25 with controls. And they'll need the

restrictions in place.

So, all the guidance that we have just talked about would apply to this site if there is such a site.

Lastly, Appendix M in the current guidance describes just another place to go to kind of read about restricted use and get an easier read on the whole process. And, so we'll update Appendix M to give the concepts, just a general description of the concepts for the long-term control license and for LA/RC, similar to what was included in the interim guidance for Shieldalloy.

Just to provide another way to explain some of these concepts to people and the diagram I mentioned earlier might go well in there too. So part of it is trying to find the best way to explain some of these new ideas to licensees so they understand what might be available to them, the flexibility that they have and how to implement it at their particular site. You know, these are new ideas, new approaches. So, communication is important. And so, we're trying a variety of ways to achieve that.

Now, I'll hand it back to Kris to talk about seeking advice.

MS. BANOVAC: In this section of the

guidance, there is guidance currently in NUREG-1757 that discusses seeking advice from affected parties on institutional controls. The licensee is required under 10 CFR 20.1403(d) to seek advice from affected parties on whether the institutional controls that they're proposing would provide assurance that the dose would be less than 25 millirem. That the controls would be enforceable. That the controls would not impose undue burdens on the local community or the affected parties. And that the controls would be backed by sufficient financial assurance to maintain those controls and maintain the site.

20.1403(d) also requires licensees to document in the DP or the LTP, how they sought the advice from the affected parties and incorporate that into their decommissioning plans, if appropriate, after analyzing that advice.

The current guidance focusses more on the process of seeking advice using a site-specific advisory board or other methods. And, even though this issue wasn't specifically looked at in the LTR analysis, we thought that we could add to the guidance and clarify a few areas.

One of the things we like to do is develop guidance that talks about the types of information

that the licensee would share with the affected parties to inform the parties and educate the parties to be able to get advice on the aspects of institutional controls.

One of the areas that we would like to clarify is the different NRC and licensee responsibilities for obtaining advice. 20.1403(d), that is specific to the licensee seeking the advice for the development of their decommissioning plans. There is a separate NRC process in which we seek advice from the affected parties or local communities under 20.1405. And we just want to make it clear that those are two separate public involvement processes that both the NRC and the licensee have separate responsibilities for getting advice and input from the public.

One of the other things we'd like to do in the guidance is note that the licensee should develop a public involvement process using the guidance that's currently in NUREG-1757, but also tailor in its public involvement process to its site and to its stakeholders.

We're thinking of including an example of a way to do this, having an iterative process of informing the affected parties and then seeking

advice. It could start early, more at a general level, you know, what are the reasonably foreseeable land uses that could be, adverse uses that would need to be restricted and as the licensee develops its decommissioning plans and completes its analyses, there could be more interaction with the licensee and the affected parties discussing things such as preliminary results of dose assessments, maybe even cause some maintenance and monitoring into the future. So there could sort of be this iterative process that could work well, so we'd like to include that as an example in the guidance.

We'd also like to clarify in the guidance that the licensee is required to document in the DPR or LTP how it sought the advice and incorporate it as appropriate, but it's not required to reach a consensus with the affected parties. And we want to make sure that the guidance that's currently in 1757 is clear and if not, we definitely want to clarify that, that consensus does not need to be reached.

In terms of undue burdens and looking at whether the controls or the restrictions impose any undue burdens on the affected parties, we would note that the definition of an undue burden would be site specific and would depend on the stakeholders and the

site itself, but the guidance will note that it would be beneficial for the licensee to explain, as Robert mentioned earlier, the permitted uses at the site, what are the safe uses of the site, as well as the prohibited uses, what are the uses that have to be restricted to protect public health and safety.

And I guess providing both sides will present a better picture to the affected parties of what the site could be used for and whether it still could be beneficially used and it would help the affected parties determine whether the restrictions would impose an up or down on them.

So just some clarifications in the guidance for this area, and I'll go ahead and turn it back over to Robert.

MR. JOHNSON: All right. I just have a few words of conclusion. We feel that our goal in developing this guidance is to provide information to licensees on how they can use the new NRC options, if they're able to, or if they need to. We feel the guidance provides a risk-informed approach, graded approach for institutional controls and we're trying to add to that with the risk-informed approach for monitoring, so we're trying to explore new ways to risk-inform the program with this guidance and we feel

that both of these approaches, the risk-informed approach, as well as NRC options, provide greater protection as well as flexibility, to use all those favorite terms, but in reality, that's what we're hoping to achieve with this guidance.

And then I just end by at least two areas that I've talked about, hoping to get some suggestions from you, some comment from you, on the subdividing a site, the pros and cons, any ideas you might or insights or experiences that you might have on that would be really helpful for us.

And then again, the risk-informed approach to monitoring, what are your thoughts, just about that type of an approach? Those are two things.

And then, of course, you know, like Drew said, anything else we have said is fair game, so we'd be happy to discuss with you at this time.

MEMBER CLARKE: Thank you, Robert. Thank you, Kris.

Let's start with the panel and let's start with you, Eric Abelquist.

MR. ABELQUIST: Thanks, Robert. Thanks, Kris. A very good summary of the points.

In preparing for this working group meeting, I did a little research and it sort of

validated what I had heard anecdotally over the years is that institutional controls are very challenging to maintain and recently the Department of Energy has set up the Office of Legacy Management for the federal sites and that was partly in response to the fact that EM has a number of completed sites that really, in some cases, aren't that completed at all. They're just going into a phase of longer term storage or longer term surveillance.

The EPA recently was the subject of a GAO report that indicated not too many successes in both CERCLA and RCRA with their institutional controls. And so my recommendation would be to view restricted release as a temporary condition. I agree with the Commission. Several years ago, the unrestricted release is the favored outcome of decommissioning and I really like the idea of long-term control licenses. I think it puts the burden on the licensee, that if they want to free up this land for future sales, it provides a driver, that the licensee has benefitted over the years, generally, from having the license and if there's a long-term controlled license there, it's going to force a harder look at unrestricted release and if that might be possible, maybe not in 5 years, maybe in 10 years, but it provides this continuing

incentive to look at when unrestricted release might be possible. So I like the direction that you're going with all the flexibility.

MR. JOHNSON: Yes, I would just comment that just because -- if a licensee were to use the long-term control licenses and if it were in perpetuity, like for the uranium thorium sites, that doesn't mean it necessarily stays in perpetuity. That's what you're alluding to, that some time in the future a licensee could basically decide to complete a decommissioning with unrestricted use and of course, we would allow that and that would be fine. They would have to submit the EP and go through that whole process again.

But I think the process is -- I mean I know the process is flexible enough to allow that, if a licensee were to change its mind or if ownership were to change and the new owner feels differently than the previous owner, then they can do that. So the license isn't forever, even though it could be.

MEMBER CLARKE: Thanks, Eric. Tom Nauman.

MR. NAUMAN: Very nice presentation. I agree with Eric. It was very informative.

A few questions came to mind as you were going through the various aspects there, subdividing

the facilities, subdividing the areas, in particular. When you're decommissioning a nuclear utility, at Maine Yankee, Connecticut Yankee, obviously, we're going to be dealing with long-term care of spent fuel in ISFSI, at all those sites for some time into the future. Now the ISFSI site itself will need to be subdivided off so that the rest of the site could be terminated or sold or subdivided and used for other actions, but the ISFSI itself will remain as part of the licensee's responsibility.

How does that affect your plan here in trying not to subdivide? It seems like you want to discourage subdivision, but it's natural that all utilities have to subdivide at least out the ISFSI. How are you looking at that?

MR. JOHNSON: That's a good question. I'll look at it some more.

(Laughter.)

I guess we're, in part, I should say, we're reacting to the cases that we have in front of us and like I said, it's for private sites and it may be I'm just talking out loud. We'll have to --

MR. NAUMAN: It's something to think about.

MR. JOHNSON: It's something to think

about, but it might depend, it might be a case by case. It may be looking at just the -- how should I say the ability to sustain ownership, that question. There may be some cases that you feel more confident with than others. I'm not sure that's one consideration possibly to think about.

I hadn't personally thought about this connection, but I think it's a good question that we'll look at.

MR. NAUMAN: That's one issue. When you transfer a site, ownership of a site, from a licensee to a new licensee, or from a licensee to a nonlicensee, under the LA/RC process, how do you evaluate the buyer in that circumstance? And how is the regulation going to drive that? In transfer of a utility that we've all gone through in the last seven or eight years from Pilgrim and Clinton, some of the sites that were originally the first ones transferred in ownership, it was required that you transfer from a utility to a utility. I this arena, we're talking about transferring from a utility to say Joe Sailboat's Marina, you know?

How do you evaluate the viability of the company that's going to buy the site or the next generation of company that's going to buy the site,

you know? Somebody may be an interim owner and sell it again and sell it again. How is that chain, especially under LA/RC process, how is that chain -- have you thought about how you can maintain controls that the people that are buying the site understand what dose assessment means?

MR. JOHNSON: That's a very good question. Our guidance will address that. We've addressed it to a certain extent, I think, already, in some of the documents we've prepared is that for the LTC license and we do have to look at the LA/RC.

MR. NAUMAN: Yes, the LTC, I kind of understood. I think the control process, as you delve into a nonlicensee arena and the quality of the companies, whether or not they can handle it and understand what they're signing up for.

MR. JOHNSON: Right, I understand.

MR. NAUMAN: And finally, what if the company goes bankrupt, out in the future? I know you have the assured funding of some kind, but odds are, upon transfer of ownership, that is, you're funding, the decommissioning fund would be transferred to the new owner, but the new owner, okay, if there's still money out there on a hook to somebody, that new owner goes bankrupt, who gets that decommissioning fund?

Does it default to the state, to the NRC? To whoever? It gets a little -- it could be a little problematic.

MR. JOHNSON: Your first question would be for the long-term control license, anyhow, we're saying that NRC would have to have prior approval to the sale of the proper and transfer and conditions of it would be that the new owner accepts to be a licensee, agrees to be a licensee and they'd have to become a licensee.

We would need to evaluate though their ability to carry on the functions that they would have to under the conditions of the license. In other words, they would have to understand what monitoring has to be done and they would have to demonstrate the capability to conduct that monitoring.

Any other types of corrective actions, for instance, that might be needed in the event of something, they would have to demonstrate they have the capability directly or through a contractor to be able to address and carry out those corrective actions.

So there would be, although it's not -- we haven't defined that really yet, but I think the bigger picture is that they have to be willing to become a licensee. They have to demonstrate to us and

we have to approve the fact that they have the technical capability to conduct those activities.

How do to do that under the LA/RC is more challenging. And we'll have to kind of explore that. And I think this is part of -- these are new methods. The LA/RC is a whole new methods that's untried, so we're learning as we go and getting ideas and I think this is what's good about the process of having workshops and having different people think about these approaches. So I don't have an answer on that one today, but it's a good question.

MR. NAUMAN: And I'm not expecting answers. I'm expecting just dialogue.

MR. JOHNSON: That's right.

MR. NAUMAN: Could you think about this or what about that type dialogue.

MR. JOHNSON: Now we did think a little bit more about your second question, what if an owner goes bankrupt.

MR. NAUMAN: Yes.

MR. JOHNSON: A couple of things. Of course, the trust fund is independent of the owners, so the trust fund continues, regardless of the ownership and if that changes or if an owner goes bankrupt. So the funding is there. And then if

there's not a new owner, the owner goes bankrupt and if there's not a new owner to purchase the site, then we've described briefly that NRC has a couple of options, either we can work with the trustee, the financial trustee to get a competent contractor to continue the work, that's one option, and of course, the funds from that trust fund would be provided to the contractor, or we would have the courts identify a trustee that would be separate from the financial trustee that would be responsible for conducting the work.

Again, this is new ground, you know, so there's been some legal thought being given to what we would do in that case. And I think there's pros and cons. The good thing is that we would -- we're here under the license to solve what problems come up with the tools that are available at that time. It's hard to think of all the possibilities, but we should develop this more for the event that something like that should happen.

MR. NAUMAN: You might want to consider insurance policy process as a means to be tied to the deed transfer or something along that line. So I know several companies are currently looking at long-term issuance of insurance, in exchange for decommissioning

fund or whatever and that way you have the strength of large insurance companies behind the idea. It's an option that maybe you -- I think it's novel --

MEMBER CLARKE: I'm going to have to jump in, Tom.

MR. NAUMAN: Am I going too long? Okay, no problem.

MEMBER CLARKE: Sorry, but we've got several people --

MR. NAUMAN: That's fine.

MEMBER CLARKE: Thank you for your participation. We're shooting for a 10 o'clock break, so Virgil?

MR. AUTRY: I appreciate the most informative presentation as well. I'd like to say that I'm happy to report that what you're doing here is mirrored already what we did in South Carolina with the old Allied General nuclear facility there, the old fuel reprocessing plant that was put out of business even before it got started by President Carter, back in the 1970s. But that plant, nonetheless, although it did not operate processing fuel, it was contaminated with uranium for testing purposes and also DOE conducted studies there on nuclear nonproliferation using plutonium about 200 curies

plutonium contaminated facility.

Well, it did have an NRC construction permit that was terminated, but also the State of South Carolina that licensed that facility closed those activities there and we did terminate the license. Now we did select a lower threshold of release criteria, 15 millirem and 4 millirem groundwater which was the EPA's requirements at that time because we didn't not want to conflict with them. We didn't have NRC's final criteria. So we did that.

But we did have a restrictive covenant issue on that facility. It was turned over to the State of South Carolina for a tri-county development area, industrial development. Because of the fuel plant itself which was contaminated, it was decontaminated to the extent practical. We did not require complete decontamination because you've got 8 foot walls with pipes running through them. It was kind of ridiculous to tear down a wall just to get a small piece of pipe out with a very limited amount of contamination.

So there was some restrictive covenants placed on the deed when it was transferred to South Carolina to prohibit the use of the facility for anything other than a compatible type industry there,

i.e., low level waste storage facility, a source manufacturer, something like that. We didn't want a baby food manufacturer moving in or something along those lines. So restrictive covenants were put upon that facility and it's worked very well.

Now the rest of the area which is 1600 acres and wooded land, which was separate from the fuel facility itself, was not restricted for use, however, we did have some requirements from our CERCLA folks for groundwater monitoring and those were put in force.

Now before Allied Signal was released from that facility, we did require and they agreed to provide financial assurances for monitoring and to impose restrictions and monitoring of the old facility itself. So like I said, a lot of this has already been worked out and mirrored in what you're trying to do here today. It's been very successful because we've been able to bring in more industry there, wood products industry. We have a nuclear laundry and other types of facilities that we think will be moving into the 1600 acres which helps a very impoverished area of South Carolina.

Mike Ryan is well aware of this facility, so we can help you in that respect.

MR. JOHNSON: Good. Thank you.

MEMBER CLARKE: Thanks, Virgil.

CHAIRMAN RYAN: First of all, if I could just chime in with a quick additional comment there, it's one that I think the agreement states is a wealth of information. I know you have an agreement states working group. The Allied facility is just one in South Carolina. Virgil has been involved in the decommissioning of the shipyard down in Charleston, the power reactor, I guess, is underway now. And so there are several examples and I think about when you say the NRC will negotiate the LA/RC or some other activity, my question to you is how is the agreement state do the same thing at the agreement state level? I assume the agreement, this guidance would obviously flow to them and is it always going to be an NRC responsibility to decommission facilities even if it's an agreement state licensee or how is that -- or will it flow to the agreement state as do other responsibilities and so on?

MR. JOHNSON: No, I mean we're talking about NRC license sites, so the agreements --

CHAIRMAN RYAN: The agreements stay. They do their own thing. They'd be the agent in that case.

MR. JOHNSON: I think these are options

that we're using or could use and they could consider the same and as you probably know, Ohio has a similar idea to the long term control license.

CHAIRMAN RYAN: Sure.

MR. JOHNSON: And I know when we talked to the organization agreement states two or so years ago when we did the analysis, Ohio was the only agreement state that had any restricted use site on the radar screen at that time. So it's not like there's many of them out there.

CHAIRMAN RYAN: There's probably more than you might think coming up. I think South Carolina is one example where there are a few. That might be something to revisit.

The other quick question I had was I think in the guidance it would be helpful to distinguish between a possession-only license which is a current option for agreement state licensees or NRC licensees, versus a license that's in one of the termination options.

I mean right now, for example, Agnes, for a long time, Virgil's example made me think of it, was a possession-only license, but it carried with it the obligation to do a routine health physics program, and a routine operational monitoring program, an

environmental monitoring program, as if it was a license. The possession part was no use of the radioactive material is authorized, just possession.

I mean you could view that if you wanted to as a decommissioning status, I possess it and I don't do anything with it, but it's a different kind of thought process, at least for me in that that's more of an on-going operational ownership of the material, rather than some view toward finally dispositioning the license and the site and the material.

So it would be helpful if you would let folks know that if possession-only license under the normal licensing sections is different from what you're thinking about here. Is that a fair comment on my part?

MR. JOHNSON: Yes, that's fair and we've run into that already trying to implement it, that question or that confusion came up. So even though in our documents we said this is a new kind of possession-only license for long-term control, that's a long word and we tend to shorten it down to LTC, but it really is a new kind of possession-only license, but you have to say -- it's like you say, just like you're suggesting, you have to tell them that it's a

new type. It's not like the one they're used to. So we should emphasize that in the guidance up front and the overview.

CHAIRMAN RYAN: Maybe even with some examples, you know, what possession-only really means and give some examples or what the LTC means and how it's different. Be real explicit about that, I think it would be helpful.

MR. AUTRY: Now let me add one other thing. Mike brought the point up about the agreement state versus NRC. Of course, the agreement states, their programs have to be compatible with NRC requirements and we've always looked to the NRC for guidance, so if you develop this guidance at the NRC level, I'm sure the states will use that in their license termination deliberations as well because it's very useful information and I did look to the NRC. Although EPA came up with the criteria, we kind of all agreed to at that time, we do look at the NRC for further guidance, so it's very, very helpful to us.

MEMBER CLARKE: Thanks, Virgil. Eric Darois, if you would go next, please.

MR. DAROIS: Thank you for a fine presentation. I'd like to address the subdividing of the site and kind of pick up a little bit on what Tom

indicated. But go a step further because in my experience of three nuclear plant decommissionings have all reserved the capability through the LTP process to do a variant of the partial site release process. That's really over and above the issue which is still there, but they're taking large parcels of land through the decommissioning process and removing them from the license. And there's some incentive for licensees to do that as well. So I think there needs to be a balance between those issues. I don't need to belabor that.

I guess a couple of other questions or comments. We don't need answers today, but should this guidance provide some direction or expectation on how the final status surveys should be conducted, moving from the operational license phase to the long-term controls or the LA/RC. It's not, I don't think it's described at all, so far from what I've seen, but should that be addressed in some way?

MR. JOHNSON: I can give a quick reaction to it is that when I said all the requirements still have to be met in 1403, so I think the licensee would go through the same survey and all. It's just a matter, you're not terminating, you're amending and then putting in place a new type of license with

different conditions and all that. But you would, to demonstrate compliance for 1403, you'd have to do your surveys, just like your normally would. I wouldn't -- I'm not thinking of anything different, you know, for that case.

MR. DAROIS: And my only question is should it be laid out --

MR. JOHNSON: We say that, yes, you have to be exact.

MR. DAROIS: Which leads me readily to the last comment that I have is and it's something that Eric, I think brought up, is what's the process for getting out of this and getting into the unrestricted release category. It seems to me it's yet another final status survey to make that final migration and should that be addressed as well?

MR. JOHNSON: Yes, I would agree. If you had a site that was short term and maybe only needing 20 or 30 -- whatever the short-term time period would be, because the assumption would be that you'll reach an unrestricted level in so many years and you'll be able to terminate so you have to demonstrate that with the final status surveyed.

MR. DAROIS: Or maybe it's by calculation and modeling.

MR. JOHNSON: Yes, calculation and modeling. But maybe you would have to demonstrate. So we should say something to that effect.

MR. DAROIS: I would think so. That's all I have, thank you.

MEMBER CLARKE: Thanks, Eric. Tracy?

MR. IKENBERRY: I just had one question, maybe a little bit of clarification. One area where you asked for some more information was on the risk-informed approach to monitoring, so are you looking for criteria or time lines? What exactly are you looking for with that?

MR. JOHNSON: I think my question was more on just the general approach. You know, we're not expecting to be prescriptive and write a lot about how to monitor here. We're just expecting in the guidance to lay out essentially what's in the summary right now, an approach that licensees should think through. They should look at how a site could fail. And they should look at then therefore, what kind of monitoring should I use, what are precursors that I should look for? It's just that general level. Do you think an appropriate level of detail for this guidance for monitoring.

CHAIRMAN RYAN: I was sitting thinking a

little bit about it when you first asked the question, so if I may, I'll just pick up on Tracy's point and your response, Robert.

It seems to me that it's interesting to think about and I will just offer this for you to think about, picking up on what Eric said. There is a pretty comprehensive final survey process to say I'm no longer an licensee with an operating license. I'm going into this termination phase and let's assume we're going into unrestricted release or restricted release that will end up, as you pointed out, maybe 20 years down the line being an unrestricted release.

And when I think about monitoring, I'm thinking about something different than an operational environmental monitoring program or a release survey monitoring program. It's more along the lines you're talking about.

What I hear you talking a little bit about is engineering criteria or qualitative observational kinds of issues, did the barrier fail? Do I have erosion, things of that sort, as opposed to say, air monitoring or perhaps even ground water monitoring because I wonder if you have a limited monitoring program, let's say five wells. What am I going to say about some fraction of a picocurie per liter in that

well?

So I like the idea of we're terminated now and if there is residual radioactive material we're managing through engineered controls or other features, capping, whatever it might be that we look to that engineered barriers performance through some kind of visual inspection or engineering inspection of some kind as the criteria to look at something else rather than more traditional radiological monitoring because I'm struggling with how you would interpret it without ramping all the way back up to another comprehensive survey to then judge it against the earlier survey.

So that thinking, I think, is very good. I like the idea. It's a different kind of set up, a different kind of situation and if a barrier or a control system is at risk of failing, that's what you want to know, not so much a radiological or numerical value.

Is that right? Am I on target with what you're trying to get across?

MR. JOHNSON: Yes. I think that makes sense and we're recognizing that for some of these long-term sites that obviously the cost for monitoring over a time period adds up, it mounts up. And so the

monitoring should be really focused on what makes sense for that particular site, you know, not only what you should look at, but how you should look at it and what's the time period or the time period of monitoring. Maybe radiological monitoring may not help you at all, you know?

CHAIRMAN RYAN: You know, I think if you said things like that or gave examples and created a little bit brighter line from that sort of new phase of thinking to say the more traditional phase of close out in thinking and final termination survey and those kinds of things using MARRSIM or whatever it might be and talk about how this is different. That would be real helpful in the guidance I think.

Thank you.

MEMBER CLARKE: You have a lot of experience, Robert, with the military link sites, 10 plus years in many of them annual inspections, monitoring, database, website and that might be helpful as well.

MR. JOHNSON: Okay.

MEMBER CLARKE: Just conveying what's been learned through that.

MR. JOHNSON: We'll draw upon those folks that have that experience. Good.

MEMBER HINZE: As this discussion has evolved in following up on Mike, one of the concerns that came to my mind is the F word, the flexibility word in terms of monitoring. Once the plan is in place, it's pretty easy to use that as a template to just move on. But what happens during the monitoring if we see variations that were unanticipated, and how do we modify that and how is that written into the -- well, both the LTC and the LA/RC.

MR. JOHNSON: For the LTC, for sure, there's a five-year renewal built in to this process and it's like a five-year review under EPA's approach, but it will be a license renewal process and it would be a review process, so we'd look at all aspects. And we'd look at what the monitoring experience has been. It would look at events that may have occurred, what the corrective actions would be and if something needs to be changed in the license conditions like for monitoring, something needs to be added or something we hadn't expected, then to me that process allows you to make corrections, make course corrections.

MEMBER HINZE: What criteria do you use to decide whether course corrections are needed?

MR. JOHNSON: I can't answer that. Good question.

MEMBER HINZE: I gather that is the NRC making that decision, but they have to have criteria and the people that are doing the monitoring must know what those criteria are going to be.

MEMBER CLARKE: We know how to document failure. Doing anything else is much more difficult.

MEMBER HINZE: You may even want to terminate the monitoring. This is not just a negative aspect of it. It's a positive aspect of it, as well. In other words, you might find that the land can not be freed up. I don't think we should approach from a negative.

CHAIRMAN RYAN: One thing, to pick up on that, Bill, I agree with you. I think you might want to even think about this five-year renewal time frame. Earlier on, I could see where maybe you'd want to look at it in three years, but 10 years down the line, every 10 years may be enough, based on the radioactive material burden.

So I wouldn't look at it as necessarily a fixed issue. I would try and risk-inform it by the source. So if you had, for example, cobalt-60 and something else that's not real long lived, you could very easily see that one renewal and I'm done or maybe I look at it at five years and 10 years or five years

and 15 and it's over. But something that source material obviously, it would have a more regular on-going oversight. So I would tend to maybe even ask the applicant or the licensee if you risk inform it based on your source material, source term, what would you recommend? What within this range of options would you see as being applicable to your facility?

Again, I'm sympathetic to the challenge that NMSS has a tremendously broad range of potential license termination licenses out there that cover a wide range of activities and you multiply that up with the agreement states, it's a real challenge to meet all needs. But given that flexibility to the source that you're trying to manage might be helpful.

MEMBER CLARKE: Just a brief comment. I think the EPA approach is a minimum of five years and I think they allow for flexibility as well.

MR. JOHNSON: And the idea is we'd be expecting maybe every year, I mean so it's more the five years is more of a formal stand back, kind of look at everything and see if changes need to be made, either technically or financially, whatever, but in the interim, you still have a presence at the site. You're getting annual reports. If there are events, you get reports. You're inspecting. So if there's

something that goes on -- I think the idea is that you'd be -- depending on the need at the site of risk informed, you'd be more or less involved.

CHAIRMAN RYAN: And the other part of the matching the source term to the monitoring plan and the technical details and the license reviews and so on, it also has an implication for the financial assurance, because if you can show that the risk is decreasing over time, your financial assurance over time will drop with it.

MR. JOHNSON: Good point.

CHAIRMAN RYAN: So that's not an unlinked issue and I think licensees would appreciate the opportunity to at least address that question as is our financial assurance mechanism the same over time and as the risk decreases, my view would be probably not. So that's something to think about as kind of a linked issue.

MEMBER CLARKE: Let's try to get the rest of the committee in here. Allen?

VICE CHAIRMAN CROFF: Thanks, and if I'm jumping ahead to the next presentation, let me know and I'll defer. But I want to talk a little bit about engineered barriers. You mentioned robust barriers and I can see advantages there. It will last a long

time. You don't have to go in and maintain it as much, possibly. But on the other hand, if it's a very long lived issue, when you do maintain it or have to replace it, it could be really tough because you built most of it so well, and it might be a little bit of an impediment to trying to get the unrestricted use because the licensee would look at it and say I put this really great thing in place, but it's going to be really tough to tear out and do something with whatever is underneath it and get to unrestricted.

Is the guidance going to allow sort of either of those approaches? Is it going to encourage very robust barriers? What's your philosophy or strategy on that?

MR. JOHNSON: I guess we can talk more about that maybe in the next section, but briefly, we would just thinking of the approach, the benefits of a robust barrier when you need it and if you need it, what are the benefits. And the benefit would be to maybe reduce the cost of maintenance, reduce the reliance on maintenance and institutional controls, reduce maybe the possibility of the replacement cost, if you have to -- if the whole thing fails, then you have to replace it.

So again, Dave can talk more, but it's

more site specific and source term specific and it's sort of hard to address it in general, but I think we have a preference for robust barriers, you know, because of the benefits I mentioned, but they would have to be tailored to the particular site.

If you really had a site where you thought eventually within a couple of generations, unrestricted was a reasonable possibility, then you wouldn't, I don't think you would want to be including something that would be an impediment. That would be to me, a consideration in your design of a particular barrier for that kind of site.

But if you're at a site with long-lived radionuclides that you know are going to be there forever, then there may be an incentive to design robust barriers, but again, it would be particular for that site. If it's erosion versus something else, you may have the ability to design a robust area for erosion a lot easier than some other barriers.

VICE CHAIRMAN CROFF: So right now, basically, you sort of have got a bias in one direction, but it's not a hard and fast rule, there's flexibility.

MR. JOHNSON: Right. We're certainly evolving this, so yes, we've got to keep our minds

open to particular cases and be flexible and not tie down because we can't think of all the possibilities that might occur, although there aren't many sites right now that we have that are planning engineered barriers, but the ones that we have will be challenging.

VICE CHAIRMAN CROFF: Thank you.

MEMBER WEINER: I want to thank you for a very good presentation. I just have a couple of questions.

You're dealing right now with sites that are looking at decommissioning and that were formed or contaminated under completely different conditions. In other words, you're looking at the grave end, not the cradle end.

Suppose a utility wanted to build a new nuclear power plant, started to apply for a license. Would they be informed of this license termination activity or the various proposals for license termination when they applied for their construction license at the very beginning? Have you consulted with them at all about how this would work?

MR. JOHNSON: I guess our approach may be a little bit different than that. In the license termination rule analysis, we were concerned about

future licensees and preventing -- use the term preventing future legacy sites. We realized we were stuck with the ones we had and we had to find ways to deal with them, but we also had two issues, one that was related to the operational, operations of existing sites or future sites, another one related to financial. And it was all aimed at trying to prevent these sites from -- these kinds of sites from recurring in the future.

So our requirements next year, there will be a rulemaking to put in place requirements that your new licensees would be made aware of, that would show what they need to do to prevent, ideally, to minimize future restricted use sites. We don't want to have a process that encourages that or will lead us to that inadvertently. So we're trying to -- next year in the rulemaking and the guidance that's related to it, that's the goal is to put in place for future licensees requirements and guidance that would help minimize this happening in the future.

MEMBER WEINER: I was looking at it from a slightly different perspective. Do these regulations and guidelines now become so daunting that nobody is ever going to apply for a new facility in the first place? In other words, how off-putting is

this addition? Do you have any sense of that or is it not? I don't know with respect to licenses.

MR. JOHNSON: If the preference is unrestricted use, they need to plan their facility for eventual decommissioning that way.

MEMBER WEINER: So you really are guiding them to plan the facility for unrestricted use?

MR. JOHNSON: Right.

MEMBER WEINER: Okay. How do you define an affected party?

MR. JOHNSON: Hm, well, it's not defined anywhere right? An affected party would be a party whether it's state, local, governments or community members that have an interest or are impacted in some way by the activities that are being proposed. It's a range -- so therefore it's a broad range of -- depending on the particular facility, its influence, its stakeholders, you know, and whether they believe they have a stake, whether they believe they're affected in some way.

MEMBER WEINER: In other words, the affected parties define themselves?

MR. JOHNSON: I think that's our approach. And I think we've heard that a little bit in the workshop is that don't try to define it. Let the

parties that are interested and feel like they have a stake and feel like they're affected, become involved.

MEMBER WEINER: So there's no -- once you have involved them, heard them in some way, I recognize you don't need to have them -- come to a consensus with the affected parties because I can see this ripple effect that everybody thinks they're an affected party, can go statewide, regionwide, etcetera.

MR. JOHNSON: Right.

MEMBER WEINER: The question of dividing up a site, have you looked at or consulted with anyone who has looked at that effect on property values? In other words, yes, I can see where you'd want to keep a site together, not just peel off the unrestricted use problems, but does that -- how would that affect the value of the property for future purchasers for resale and so on? Have you looked at that?

MR. JOHNSON: We haven't done research on that.

MEMBER WEINER: I would encourage you to consult with some of the social scientists like perhaps Hank Jenkins-Smith who have done some work on the effect of some of these sites on surrounding property values and on what that kind of regulation

might imply for future land use. I think that would help you in your guidance.

MR. JOHNSON: Okay, all right, thank you.

MEMBER WEINER: That's all.

MEMBER CLARKE: I have a couple of things, but I think I'm going to save them. I just want to say I think you've tackled an extremely difficult topic and from what I can tell you're doing very well. Everyone is wrestling with these issues. Anyone who has responsibilities for contaminated sites is struggling, as you know with the same issues.

MEMBER HINZE: Jim, before you close, can I ask a point of clarification?

MEMBER CLARKE: Sure.

MEMBER HINZE: One brief question. In the write up here, you state in the legal agreement, NRC agrees to monitor and enforce the restrictions. This is under the LA/RC. Does this mean physical monitor? Does this mean actually conducting the monitoring?

MS. BANOVAC: With the monitoring, I guess in that statement, that would be monitoring -- I mean it could be through inspections, seeing how the land is being used.

MEMBER HINZE: So it's administrative rather than --

MS. BANOVAC: Yes.

MEMBER HINZE: I see. Okay. All right. So this doesn't call for a lot of resources then that would be required in a physical monitoring situation.

Thank you. I appreciate that.

MEMBER CLARKE: Before we close for break, does anyone from the public want to comment?

MR. HAMDAN: I have a question, Jim.

MEMBER CLARKE: Go ahead.

MR. HAMDAN: Robert, you may have done that already or you may have not, but it seems to me that you would benefit a lot from reviewing past histories of institutional control applications, like the ones that Eric mentioned here. I'm talking about something that was careful and vigorous reviewing in order to inform the guidance and even provide a basis for it.

MR. JOHNSON: Okay, we probably tried -- we try to maintain an awareness of what others are doing. We did in the original analysis, so that we could learn from cases or learn from like EPA, some of the recent reviews of EPA's lessons learned on institutional controls so a lot of that has helped fill in some of the things that we have, so I do see a value in that and since this is an evolving area,

it's important to stay in touch with how others are tackling the same or similar issues, so we do intend to do that.

MEMBER CLARKE: Okay, we are scheduled for a break. Let's take it and let's come back at 10:20, if we can get away with it.

(Off the record.)

CHAIRMAN RYAN: Could we get started again, please? Thank you. I'm going to turn it over to David Esh and Robert Johnson, engineered barriers. Thank you.

MR. JOHNSON: I will just give a really short introduction and hand it off to Dave. But I wanted to mention a little more about the background and where this issue has come from.

It's not an LTR issue. However, we felt that it was related, of course, to our restrictive release sites. and our guidance in 1757 on engineered barriers was very young and very thin and needed -- it was an opportunity to do something about it.

Actually, the guidance in 1757 was our first attempt to sort of risk-inform guidance for designing engineered barriers. In it, we asked licensees to describe or evaluate and describe the contribution of the barrier to performance.

That was about as sophisticated as we got, but it was a first step. It wasn't prescriptive. It was, again, laying out an approach, an evaluation process that we wanted licensees to think through. So that was a start.

Also, in the existing guidance, we made a point of explaining that engineered barriers are distinct from institutional controls. Of course, they're related, but the important thing here is when you do the dose calculation assuming institutional controls are not in effect, that means institutional controls are not in effect from day one.

But for engineered barriers under that circumstance, you would analyze how they degrade over time. So it's not a case of assuming engineered barriers failed instantaneously on day one, like we do for institutional controls. We tried to explain that difference. That was important.

We've already talked a little bit about the fact that, you know, we encourage or were more interested in robust engineered barriers for the reasons we had talked about. That was in the original guidance.

We also referenced existing guidance and design of the engineered disposal cells from mill

tailings in the erosion protection covers. And we told licensees this could be a valuable source of other guidance if they're designing similar covers and just noted that they should look at the benefits that this guidance could give to their particular site condition.

But that's about as far as we took it in the guidance that we had. And so we thought this was an opportunity to take it the next step and to explain more about a risk-informed approach. And that's what Dave will talk about.

MR. ESH: Thank you, Robert.

I know you all are probably disappointed you're not going to get to listen to Robert for another hour, but I may not be a better alternative to that.

(Laughter.)

MR. ESH: So be careful what you wish for.

We saw this as an opportunity for improvement. And it's a difficult task, I think, because the sources, sites, and the barriers are going to span essentially a three-dimensional continuum if you want to think about it that way of different levels of performance or different types of barriers. So it's hard to write one set of guidance to apply to

all conditions. So we have to balance this activity that the guidance must be helpful but not too prescriptive, and it has to be flexible.

Some of the main elements that we think we're going to have in this new guidance -- we're on the second slide, please; actually, the third slide, but we can go ahead. Our new guidance is going to have five main sections. We believe this guidance is a tool for staff as well as licensees or other stakeholders.

If you look at the existing guidance in NUREG 1757, volume II, section 3.5, it's roughly 2 and a half pages. And I think it served its purpose at the time. It provided some of the higher-level elements that we wanted in the guidance for people to consider that were using engineered barriers.

But we also felt that maybe we could do better now. So that existing guidance that this may be two, two and a half pages, we're thinking maybe it's going to end up in the high single digits, low double digits type of thing as the level of information that we need to apply or need to generate.

We also believe that this guidance is going to be challenging for a number of reasons. There are a couple of sections we would like to get

your feedback on as to the breadth and depth of the information that we should have in this section. I'll talk about the reasons why we have those sections.

The guidance is going to have a regulatory flavor for a couple of the sections and then a more technical flavor for some of the other sections.

The first section, 3.5.1, the risk-informed graded approach, then, to the engineered barriers, that's an important section to us because our whole regulatory philosophy is based on a risk-informed graded approach.

And what that basically means is that for these sites to have long-lived contaminants for the barriers playing a very significant role but reducing the hazard to a high degree, you will need more basis, more support for the barriers.

And in this risk-informed graded approach also, there are a couple of other elements that we are planning on highlighting. The robustness and the amount of technical basis must be commensurate with the amount of risk reduction I already said and that the risk-informed graded approach then, the engineered barriers, is going to be linked to some other sections.

So Robert talked about maintenance in his

previous presentation. You can't get something for nothing. So maybe you put more money into making a less robust barrier. If we had a question on that, maybe we could try to talk about it, put more money into putting a less robust barrier but have higher maintenance and monitoring or maybe you put in a more robust barrier, which means you should be able to have less monitoring and maintenance.

So there's a definite -- all of these costs are related, and all of these cost processes are related. The guidance is going to be written to try to reference those other areas and other sections.

In this approach, though, what should be understood is that the barriers are one element to achieving safety. There's also the institutional controls. And at the first level, the ultimate goal is cleanup, removal, and achieving unrestricted release without relying on a barrier.

So there are multiple elements to achieving safety, and we feel like we can't be prescriptive in saying that somebody has to choose any one of those elements. Certainly in the long run, cleanup is the most reliable in terms of ensuring safety. The other ones that we talked about were institutional controls and engineered barriers, as I

will discuss. Depending on the time frames, they get lesser and lesser reliable as to achieving the goals.

So the first section is going to be kind of a regulatory section that is going to just talk about the risk-informed graded approach. The second section on the barrier analysis process is going to provide a summary of the calculations that somebody is going to need to provide. Robert touched on that a little bit, but the main elements are going to be that you do an analysis with the institutional controls taking credit for monitoring and maintenance. That's the restrictive release part of it.

Then under that evaluation now, you will have to also do an analysis assuming that the maintenance and monitoring fail. So that means that if the barrier's performance is related and relying upon the monitoring or especially the maintenance, then you have to evaluate the potential degradation of the barrier over time and see that you can meet their restrictive release limits.

In addition to that, the two other main elements that we're going to talk about under the analysis process are that the analysis of the barriers must consider natural processes that may decrease the performance over time.

There's a big difference between conceptualizing a barrier and then actually applying one in the real world. That's idealized conceptualization placed into a real world environment, real world potentially disruptive processes.

And this guidance we hope is going to provide some direction on how to do that process, what should you consider because the existing guidance is two and a quarter pages.

While I think it is very good, it basically brings in the punter. It says, "Engineering barriers are case-by-case analyses. Talk with the NRC. We encourage you to talk with the NRC if you fail."

So we were hoping with this guidance that we could provide enough detail that somebody could get a good start on it and then come and talk to us about needing to just say, "Well, I have no idea what I need to do here to use a barrier in my decommissioning process." And then the --

CHAIRMAN RYAN: Just a quick question, if I may.

MR. ESH: Sure.

CHAIRMAN RYAN: I want to apologize in

advance. I have a meeting with one of the commissioners at 11:00, and I have to duck out about a quarter of. So that's not a lack of interest. It's just a higher call.

The question is, are you going to run the gamut in your recommendation for analysis methods from deterministic up through PRA as options and how they might apply them? I can see at simple sites more deterministic kinds of views would be helpful or appropriate; whereas, more complicated barriers or barriers for which there is a higher expectation or a longer expectation you might use a range of probablistic risk analysis approaches or outcomes in that scheme. Are you going to touch on those issues, too?

MR. ESH: I think we didn't plan on emphasizing a particular analysis technique. What we planned on emphasizing is that uncertainty needs to be considered. And there are a variety of approaches that you can use to address uncertainties.

Deterministic analysis with sensitivity uncertainty analysis, probablistic is also one Bayesian type analysis and possiblistic and fault trees. There are a lot of different approaches you could come at the problem.

While we might have one that we would recommend that is at that stage, we recognize that sometimes people don't have the capabilities to do that type of analysis. And we don't want to make a market out there for consultants in probablistic analysis.

CHAIRMAN RYAN: And I appreciate that, but if you could maybe at least talk in terms of the technical views of how various sites might take advantage of one tool or another, where simple approaches are more appropriate versus more complex apparatus.

MR. ESH: Yes.

CHAIRMAN RYAN: Just a little bit more of your insight into what works and what doesn't and what your expectation might be for a particular type of case would be helpful.

MR. ESH: Yes. I understand the issue. I think we can reflect that in the guidance.

CHAIRMAN RYAN: Okay.

MR. ESH: There are definitely circumstances where one analysis technique may be advantageous because of the type of problem, especially when you get to these problems that are higher-risk or long-lived and you have a really high

reliance on long-term performance of the barriers. Those are circumstances where certain analysis techniques to address those techniques might be better than others.

CHAIRMAN RYAN: Yes. If you could lay that out?

MR. ESH: Sure. I understand.

Okay. The last element in this new section, 3.5.2, the barrier analysis process, is that it's not just the disruptive natural processes that need to be considered when you have loss of institutional controls but also reasonably expected human disruptive processes to the barriers.

Now, we realize that is probably going to need some interpretation because you could get into endless speculation about what are reasonably expected human disruptive processes. So maybe we'll provide some examples in the guidance as to what we believe those are.

Those are really going to need to be determined on a site-specific, scenario-specific basis, I think in my opinion, with the input of the stakeholders because those are the people who live there and operators and stuff are more familiar than us when we're doing our review or evaluation of what

consideration should be taken into account.

Those were the two parts of the revised guidance that we believe are more regulatory-based or sliding into technical. And the sections 3.5.3, 3.5.4, and 3.5.5 are the more technical-flavored sections.

3.5.3, technical basis for engineered barrier performance, it's going to emphasize that there is significant uncertainty in these types of problems. You can't just ignore the uncertainty because it's difficult.

Engineered barriers, while you can use it in the decommissioning process, they come with a price. This guidance, not trying to drive people away from using engineered barriers, is going to try to lay out, what do you need to do to successfully use barriers in the decommissioning process.

In this section 3.5.3, the three or so main elements that we believe we're going to have, the first element you can view as what is the conceptualization, fully describe the design features and the functionality of the barrier.

The next main part is your application of the barrier, why do you believe that this conceptualization is going to perform and what have

you done to evaluate its performance. And then also, as we talked about earlier, the consideration of uncertainty in that performance is a key element.

The goal is to have confidence in the safety without relying on long-term institutional controls. In this case, we don't like to rely on any one element. So we don't want overemphasis of an engineered barrier. We don't want overemphasis of controls. Cleanup is a good way because it's a highly confident way.

So engineered barriers can be viewed as one of the elements of a multifaceted approach to safety. And then another element that is going to be in this section 3.5.3 is talking about parametric or component sensitivity analysis.

If you're going to generate risk insights from your barriers, you need to understand what they are doing for you. That ultimately relies on a large degree analysis because of the time frames involved and those sorts of things.

One of the things that is really important in the engineered barrier arena is model support for the engineered barrier performance. In some cases, simple engineering calculations to show how your barrier is performing may be sufficient to have

confidence that you're going to provide for safety, but when you get into these more difficult problems with the high hazards, you might need to go to multiple lines of evidence to ensure that you have adequate support for your models.

There is one saying that I like, and it goes something like if you torture numbers long enough, they'll confess to anything. So that is the way I look at model support.

And then the other element for this section is the combined and synergistic effects resulting from real-world conditions expected for the barriers. So in many cases, if you have two barriers, say you have an engineering cap and a cementitious barrier, the failure of one might be dependent on what is happening with the other barrier. So your analysis process has to consider that. Are there dependent or interdependencies between the barriers or common degradation mechanisms?

And then in our section 3.5.4, this is a section that we want to get your opinion on if we are trying to bite off more than we can chew. We're going to try to leverage the resources of our research people, such as Jake Philip and Tom Nicholson. And we are here to leverage your expertise, too.

We are going to try to address in this section common barriers. They are main degradation mechanisms that somebody should probably consider when they're using them and then the typical levels of performance for those types of barriers.

We understand that, in particular, the typical levels of performance is going to be a difficult area because lots of people have different opinions about how things behave. We're going to try to use experience where we can to apply in that area, but our question is, should we even attempt that.

Is there value to try to provide typical levels of performance? In my opinion, I think there is because this whole approach of how much basis you are providing, what analysis you are doing, et cetera, is going to be dependent on how much you are relying on the barrier.

And if you are doing something consistent with practice and experience that people have, then that is going to definitively rely on less support or rely on less information. You need less information than when you're really stretching the limits of experience and what people have done.

In section 3.5.4.3, our typical levels of performance, one thing I need to highlight is that we

plan to break down the performance by the functionality of the barrier.

So a barrier can have multiple functionalities. In this case, we gave an example for a concrete, cement, or grout. And it could be used as a hydrologic barrier, chemical barrier to modify the chemistry and release such absorptions and solubilities, to prevent intruders getting into the way, or to limit erosion.

So it's important to distinguish the level of performance based on the functionality because one barrier may be able to last for a long time, say, from a chemical perspective but hydrologically it's subject to degradation mechanisms that would render it ineffective.

And then the final section that we plan to provide is the summary of the existing guidance. And to this point in the existing section 3.5 of NUREG 1757, volume II, we have basically provided a link to some of the NUREGs that we thought were relevant.

We think going forward, should we just provide a link to the pertinent NUREGs? Should we be more broad than that? How broad should we be? What sources should we consider?

Basically we want to try to put all of the

elements in the guidance that we think would help people doing this type of work but then provide them the links, understanding that there are a lot of site-specific issues and problems that they can go get more information if they need to.

And so our other question that we would like your feedback on is the scope of the summary of existing guidance, how broad should that be, what sort of information should we put there.

There may be one source of information that you may or may not be familiar with. In the back of NUREG 1573, which is our low-level waste performance assessment methodology document, there is a section on engineered barrier guidance documents. It's like four or five pages long or something like that of various references.

Now, we have a few people working part-time on development of this guidance. So we would spend a lot of time going through all of those references and trying to pull out the good ones. We could just provide a few pointers in key subject areas. You know, we have a lot of flexibility at this point as to the content of that section. So that is another area that we would like to get your group's feedback on.

That's pretty much all I had to say. Robert, do you have anything to add?

MR. JOHNSON: We will entertain questions.

MEMBER CLARKE: Let me just start with a comment. I would encourage you very strongly to do just what you've outlined. Section 3.5.4 I think is going to a very valuable addition to the guidance. It's a challenge, but I think it can be very helpful.

As you mentioned, you have the type of barrier in its functionality, but the other important piece, as you know, is the environment in which the barrier finds itself. And some work well, especially well in arid environments, for example, evapotransporation barriers and others are better suited for human environments.

MR. ESH: That's a very important point that I forgot to mention. One other points that we wanted to get your feedback on before we go on is that are there any main elements missing that we have down here to our overall structure.

And then the environmental exposure conditions are very important to us. There are many circumstances where there are long-lived barriers or items in the world that were subject to a certain exposure environment and moved to another exposure

environment or that environment changed where it was located and its performance changed significant, whether it's a metal or a cement or other engineered materials.

So we understand that is a very important element. And we hope to highlight that in the section on the degradation mechanisms when we are talking about some of the higher-level general aspects. I don't know if we plan to get into the detail of trying to say, "Well, this type of barrier typically works in this type of environment." It might be beyond --

MEMBER CLARKE: I think all you can do is provide what is known about the performance. And there are a number of resources for that, as you know. Again, the UMTRA program probably has the longest-running attempt to look at performance of barriers after they have been installed.

MR. ESH: Yes, sure.

MEMBER CLARKE: You know, there are hundreds of them in the Superfund program, but I've yet to find all of that information in one place. But there is a potential source of performance information there as well.

As you know, the challenge is that the current designs have only been in service for decades

at best.

MR. ESH: Yes.

MEMBER CLARKE: And we're expecting them to perform for hundreds, perhaps thousands of years. And that's the rub.

But thank you, David. Let's start with the committee this time. Allen, do you want to pick up or --

VICE CHAIRMAN CROFF: I don't have anything.

MEMBER CLARKE: Go ahead, Ruth.

MEMBER WEINER: Just following on Jim's last comment, there has been considerable experience in the defense facilities on the DOE sties with engineered barriers. I'm sure you're aware of that, but in some cases, they've now got a couple of decades of experience, especially with cementitious barriers.

You raised the question of modeling, modeling the future performance of barriers. Are you going to require some kind of consistent modeling, give some guidance as to what performance assessment model or code to use? Because, as you know perfectly well, if you use different models, you get different answers.

MR. ESH: Yes. We hope that the guidance

provides the element that the assessment done with one type of analysis or computational tool or package or computer code will result in a similar answer, not an identical answer, but the similar answer as if they used a different approach.

We're really caught in a somewhat challenging situation of we want to allow flexibility and not be too prescriptive, but we want to make sure things are done well, too.

So in a way, we don't believe that we can specify that they have to use a certain type of model because in many cases, for these more difficult sites, the sites will hire a contractor of some sort to do the analysis work for them. And the contractor is going to use whatever tools they're familiar with.

They usually don't bid in in the competing process. They'll learn a new tool and use a new analysis package. There are certain ones that we use that we look favorably on for a variety of reasons, but generally we can't limit them to use a certain package.

MEMBER WEINER: I was thinking of the EPA analogue for chemical analysis. EPA does prescribe laboratory methods quite detailed as to how you analyze for certain substances. You know, I hear you

saying the contractor is going to use what the contractor is familiar with.

MR. ESH: Yes.

MEMBER WEINER: But unless you calibrate these models carefully against each other, you can say, "How similar is similar?" But it may not be similar at all. I mean, are you within an order of magnitude or what?

I would encourage you to look at the question of at least some guidelines along the guidelines of what you do for, for example, air pollution dispersion. I've forgotten the number of the guidance document now, but there is one that suggests consistent methods of looking at that. I know NRC has others. They just don't come to mind just right here in your presentation.

MR. ESH: Part of the problem we see in the computational tool area, in particular, is some of the things I mentioned up front: the source and site specificity of the problems.

So there may be a computational tool. Like say you're dealing with release problem and we like and have evaluated, just hypothetical, a model like dust MS. And we understand how it works and its release mechanisms and how it's represented and it's

been evaluated.

The model may not be able to be used at Shieldalloy site compared to West Valley. You know, there are enough differences in the systems that you have to allow for that in the process. So I think if we specify the high-level things that need to be there, then you have to get into an individual review process.

And we would hope that from our review process, which is fairly rigorous, that even if they're using a different tool, we're still confident that their numbers are reasonable, that sort of thing.

MEMBER WEINER: Yes. I would always encourage people -- and this is what I do myself -- to use models where there is a great deal of input that the user defines the input and the scenarios and everything else and all the model does is the mathematical computation.

MR. ESH: There is certainly a danger to picking up something that somebody else has built, not understanding the decisions that have made into it, --

MEMBER WEINER: Exactly.

MR. ESH: -- and then applying it to a problem it shouldn't be applied to. Yes.

MEMBER WEINER: Yes. That's a biggie.

How are you dealing with the question of chemical contamination in your engineered barrier design? I recognize that has to be site-specific, but a number of these sites are going to have long-lived and infinitely lived chemical contaminants. And in some cases, they have gone to pumping and removing the chemical contaminants.

Just in general, how are you going to work that out, recognizing that it's site-specific?

MR. ESH: I think in general I'll say something and then let Robert answer. We would look at the impact of the chemicals on the retention and mobility of the radionuclides, but we wouldn't necessarily evaluate the risk from the chemical species.

MEMBER WEINER: Okay. You leave the risk from the chemical species to another agency or --

MR. ESH: Well, for instance, if there were like an organic substance that would be considered hazardous but acted as a chelating agent, --

MEMBER WEINER: Yes.

MR. ESH: -- we would consider its effect on the mobility of the radionuclides, but we wouldn't assess the risk from the release of that hazardous

component.

MEMBER WEINER: I see. Are you forging some kinds of agreements with EPA on these questions or do the two agencies just act independently?

MR. JOHNSON: Well, I think for the few sites that this pertains to, the other agencies are already involved in their respective areas of authority. And there are some, like West Valley, there's a lot of coordination amongst all the different regulators and their respective regulations so that they're doing their portion, we're doing our portion.

MEMBER WEINER: My last question really relates as much to the last presentation as this one. Suppose the dose criteria change. What happens then to your guidance termination rules, risk assessments, whatever? Specifically, let's just for the sake of argument say that dose criteria become more stringent. I can't see how that would happen, but let's say it does.

Do you grandfather in the sites you have already terminated or got a LARK agreement with? Have you thought about how to handle that?

MR. JOHNSON: No. I think we're focusing right now on implementing our regulation that we have

today and the policies the Commission has asked us to do. And we have limited resources to do that. So we're not looking at that possibility that you are suggesting, although you can recall that when the LTR went into effect, sites that had been regulated under STMP action plan criteria were grandfathered, there was a guidance on which sites could be grandfathered, which sites could not.

MEMBER WEINER: Okay.

MR. JOHNSON: So that when the regs were changed, were put in place in the rulemaking process, that transition, you know, was defined very clearly. So all I can think of is that we would do the same, but there are no plans for doing that.

MEMBER WEINER: No. I would think that you would do very much the same. And it might cause you some grief if criteria become less stringent and then you get somebody who said, "Well, we had to meet this one and they only had to meet that one." But that is good to know.

And I would encourage you to put some kind of a statement to that effect in if there are changes in the standards that have to be met, that there is a transition process, that you have a transition process. It doesn't say what it is.

Thanks.

MEMBER CLARKE: Allen?

VICE CHAIRMAN CROFF: Yes. First, I very much encourage you in this direction. I think it is the right direction. It would be interesting to see if you could get it in the ten pages you estimated but okay.

Second, our mind-set here, we're mostly, I believe, thinking about engineered barriers as something surrounding radionuclides in some kind of a matrix, but I'm assuming this guidance will also address use of engineered materials added to stabilize, in other words, as waste forms. That's going to be part of this.

MR. ESH: Yes. I think we will try to address all types of engineered barriers. And we believe I think the waste form. We consider that a barrier. Okay?

If the circumstances of where we're dealing with the restricted release and the use of barriers is limited, the circumstance where we are dealing with a waste form, in addition to that, is even more limited. So it might be pretty infrequent that we deal with that situation, but we will try to address it.

VICE CHAIRMAN CROFF: Okay. And so when I look across -- let me call it the engineered barrier technology in multiple applications -- I look, for example, at the repository program where the Department of Energy has poured a lot of money into the long-term performance of spent fuel or various metals or other matrices and glass, for that matter, for many, many years. And there's a fair body of literature. And it's been summarized and I guess resummarized.

When I look at the kinds of barriers we tend to talk about here, while there is some experience with it, it doesn't seem to me that it's -- let's call it the state of the art and understanding, if you will, has been brought to the same position for many of the materials we consider in decommissioning, whether it be caps or cements or whatever.

It would seem to me that there is some kind of room for this. This doesn't directly address your section here, but there is room for encouraging -- let me call it the system to move in this direction. And, as a corollary to that, maybe there is room for a philosophy of, gee, if we head in that direction, let's maybe not do anything real permanent in some of these sites in anticipation of maybe

something else coming along if we were to invest in it.

Now, you know, this is sort of a philosophical kind of thing, but I'm beginning to see in this engineered barrier business, I mean, we're talking about decommissioning, but there is a number of other applications coming down the road that look just like this almost with a different label on it.

And it's starting to get to the point where -- I hate to use this phrase, but we may be getting sort of a critical mass of need, if you will, for this kind of information just because of where the industry as a whole, DOE and civilian, has gotten to.

Maybe we should think about going in that direction. I think maybe we'll hear a lot more over the summer about it. But if you have any thoughts, I would be interested.

MR. ESH: Yes. I think you raise an important issue. As I emphasize, model support is very important. And in many cases, I don't believe that that support is just going to come from the existing literature.

As was mentioned earlier, there might be site-specific conditions that you need to consider. In many cases, I believe that there could be a cost

savings for doing some work, some research on the particular barrier and situation that you have.

I can think of a number of circumstances in my experience where somebody might have been dealing with a particular problem in a particular isotope. And if they went and collected some information on one aspect like the distribution coefficient for a particular species that was driving the risk, they might have been able to save a lot of money on the design of other parts of their engineered system. They might not have had to rely on such an elaborate engineering cap or something like that.

So I think in this process, the technical element is there. Whether people actually do things in it or not is another matter, but there is a big benefit to collecting information. I mean, we learn from new information all the time. And it conditions our previous state of understanding.

So all I can say is I agree with you, I guess.

VICE CHAIRMAN CROFF: Thanks.

Go ahead.

MEMBER HINZE: Briefly, if I may talk about uncertainties for a moment, you mention in 3.5.1 here introducing the uncertainty of assessing

performance over long temporal scales. Are you going to be giving some guidance as to what you mean by the term "long" and how well you're going to evaluate that and what is going to be evaluated?

MR. ESH: Our decommissioning regulations right now specify 1,000 years. There probably are circumstances that a longer period could be analyzed, I guess.

Long still has to be defined. It's kind of like expertise. Expertise is defined based on a group of people you're with. You may be an expert compared to them, but put you in a new group, and you're certainly no longer the expert.

I think long is the same situation. In many cases, we believe long is stretching into the hundreds to thousands of years time frame and beyond. We would consider that long. But it depends on the problem, too, and the source, et cetera.

MEMBER HINZE: Certainly, certainly.

MR. ESH: As you get outside of the range of our experience, engineer experience, and observations, that starts getting where you get more uncertain. And when you get more uncertain, then that has to be considered in your assessment process and your model support in all of the other areas.

So I think we will talk to what I just explained now as to long, but I don't know if we'll give a number, like greater than 500 years is long, less than 500 years is short.

MEMBER HINZE: But it is site-specific and I think would be helpful to give some boundary conditions on that.

MR. ESH: Yes. I think it also applies relative to your barrier.

MEMBER HINZE: Sure.

MR. ESH: So say there is experience with geomembranes and they have been used pretty widely to control filtration. If you're using the geomembrane for 30 years, that's one thing. If you're trying to use the geomembrane for 300 years without monitoring and maintenance, that's something completely different.

So it's long relative to the problem and the barrier.

MEMBER HINZE: But some of the conditions would be very helpful I think, too, --

MR. ESH: Yes.

MEMBER HINZE: -- in the guidance here.

MR. ESH: What we hope to do is within the guidance provide some examples like this on these

sorts of topics, even like in a text box, something that stands out to the user that they can see, "Okay. Here's an example of what I would need to consider for my problem."

MEMBER HINZE: Your recognition of the parametric and model uncertainties is very important in this guidance. But also uncertainties are a good hiding place for not doing a sufficient amount of work analysis. How do you handle this problem?

MR. ESH: We in general, I would say, understand the issue and I think in some cases rely on our experience to identify those circumstances where uncertainty may be being used to hide something.

There are a number of parameters. I do performance assessment. There are a number of models and parameters, especially parameters, that if you specify them as more uncertain, you're going to reduce your risk.

We understand that process. We're very cautious when there's an over-reliance on generic information for a difficult problem because that's the exact situation where you may be hiding something with your representation of uncertainty.

MEMBER HINZE: Well, you do a good job here of recognizing the multiple lines of evidence,

but it might be helpful to have some suggestions or guidance on when these might be imposed; in other words, when expert judgment -- we'll get back to that old problem -- needs to be brought into this.

MR. ESH: Yes. I think in some cases, we don't use expert judgment enough. It's a resource that's as valuable or more valuable in many cases than a numerical analysis. And I think we don't use it enough. But I also think that one thing that must be understood is that in our review process, in many cases we'll do our own independent analyses.

So if somebody has presented analyses to us and they're "hiding something" in their uncertainty treatment, it's very likely that we identify that in our own analyses.

MEMBER HINZE: David, it seems to me that's obvious that you are going to do that. But also the people that are preparing these documents need to know what you are going to be doing and what criteria you are going to be using.

MR. ESH: Sure.

MEMBER HINZE: That's only fair. My former friend over there who is chairman is cutting me off.

(Laughter.)

MEMBER CLARKE: Please, Dr. Hinze?

MEMBER HINZE: I did want to say one more thing in this whole societal states uncertainties. You I believe used, if I may, the scapegoat of putting the burden on the stakeholders.

How do you constrain this? You know, in the high-level waste area, Congress pulled us out of the problem. So we don't have to deal with it. You're going to have to deal with it.

MR. ESH: I think that's a good segue to our next presentation.

(Laughter.)

MEMBER CLARKE: Thanks, Bill.

Let's take the panel in the reverse order. Tracy, do you want to start?

MR. IKENBERRY: This issue of trying to describe the typical levels of performance of the barriers is really kind of a sticky wicket. You know, some aspects are best described very qualitatively. And others can be described quite quantitatively.

It makes me wonder if it might be useful to set up some type of a multi-attribute analysis so that you could combine all of the aspects and put them together in one tool and weight these appropriately depending upon how much knowledge you have and at

least set something up recognizing the weaknesses and also maybe provide it in some type of a tool for a licensee who might be able to use this, at least some aspects of it, as well to select the barrier that might be best for their specific application.

MR. ESH: Yes. We understand it's a sticky wicket, too. And that's why we wanted to get your feedback. I'm somewhat skeptical. I'm positive that we can generate something in our draft document. I'm skeptical that we can get agreement amongst the various parties as to that output that we would generate because of a variety of reasons.

So there may be some value in doing like a multivariate attributed analysis. I don't know if we can accomplish that with our resources in our time frame for this guidance development, to be quite honest. And we can certainly consider it and try.

MR. IKENBERRY: You have the knowledge of the work that you have done. So you might need to think about it. Even if you just do it very simply, just a quick look to see if it's useful at all.

MR. ESH: And the reason why I ask that question of the group, too, is because if we provide something, there could be some value to it because it identifies if somebody is trying to use a barrier,

when they could look at it and say, "Okay. When am I going to need to do a lot of work to support my performance? And when am I going to be able to do something much more simple to support my performance?" That's what the value of it would be.

If we make it too soft, then it loses its value because it just drops back to the case-by-case basis. And they have no way besides coming in with some information and saying, "Does this look okay?" So that is what we are kind of struggling with in that area.

MEMBER CLARKE: Okay. Eric?

MR. DARIOS: At Maine Yankee and at Connecticut Yankee and to a lesser extent at Yankee-Rowe, we included an analysis of diffusion of primarily tritium in concrete in deep structures, which is not unlike the analysis you're talking about here. In that case, it was an *in situ* barrier that we took credit for. In various ways, credit was taken.

And also I see why they were in the process of finishing up or backfilling a very large excavation. And the backfill soil that is being used was evaluated for KD and selected based upon the KD and minimizing risk.

So those are some examples that in my mind

are gray in this regard. Are those engineered barriers? And should they be included or are they not? I mean, we did the engineering analysis, but it wasn't built for that purpose.

MR. ESH: Yes. I think there might be a -- maybe there's a need for us to address -- there can be a difference between an engineered barrier that is designed and placed and put into function in one of these decommissioning problems in an existing engineered system or material that may play an important role in limiting releases.

MR. DARIOS: Right.

MR. ESH: I think this should probably address either case or both cases, I mean, because in some cases, you may be designing something that you want to take credit for. In other cases, you may be taking credit for something that is already there --

MR. DARIOS: Right.

MR. ESH: -- which are like the circumstances you addressed.

MR. DARIOS: Right.

MEMBER CLARKE: Virgil?

MR. AUTRY: For my clarification, is there any scenario for the use of engineered barriers where you have unrestricted release?

MR. DARIOS: Eric's example. Yes, absolutely.

MR. AUTRY: So it can be unrestricted release, too?

MR. ESH: Yes. We talked about this amongst ourselves. And we believe that the goal, of course, for unrestricted release is not to rely on engineered barriers, but we don't want to be limiting either and say that the only way to achieve unrestricted release is cleanup.

Humans, man is intelligent and makes new inventions and new technologies and should be able to use those technologies to achieve their goals if they can. So if they are able to use engineering to achieve their goals, we can't eliminate that possibility, but cleanup is certainly in some cases an easier, more direct way to achieving the goal.

MR. AUTRY: The other thing is a comment on the performance objectives of the barriers. I highly recommend that you do establish some criteria for those.

It's very helpful to a licensee to know what that criteria is. We, of course, have a lot of experience in engineered barriers and establish specific criteria for those, which has been very

helpful.

MR. ESH: Okay. Thank you.

MR. NAMAN: To expand on what Eric and Virgil touched upon there, at first I was thinking okay. An engineered barrier is only for a restricted release, not an unrestricted release. But then Eric pointed out what they're doing, and it made me think about it a little bit more.

Is that engineered barrier then part of the mass averaging to meet the site release criteria? You need to think about that. The fill that you're putting in, let me ask you, Eric, at CY is that being considered?

MR. DARIOS: Well, it's not part. It's not a formal part of the final status survey process per se. I think I mentioned it's a risk minimization.

We chose a particular soil so that we were confident in the backfill operation that we were going to pass the final status survey criteria, which in this particular case is going to be groundwater monitoring. So we selected the backfill soil so that it would retain whatever might be left in transportable through groundwater and wouldn't become a groundwater source.

So, you know, as I say, it was a risk

minimization. And if they fail that criteria, then they're not going for the unrestricted release and are passing. So it's gray.

MR. ESH: And that's what we talked about and Robert talked about and I reemphasized that under unrestricted release or restricted release, there is an analysis that you have to do. In restricted release where your controls have failed and natural processes, human processes, no monitoring or maintenance occurring but the barrier can degrade over time, can you meet your unrestricted release criteria? And I think that applies to the unrestricted case.

In the unrestricted cases, you're not relying on the monitoring and maintenance of the barrier for its performance. You're just analyzing how it's going to degrade over time and showing that you can meet your unrestricted release criteria.

MR. NAMAN: The only other aspects under a situation like Allen had mentioned where you're using the barrier to fix contaminants *in situ*, such as you have an underground tank -- and I'm trying to find the practical application of this -- you have an underground tank that has crud on the bottom that you cannot remove in a reasonable manner and you end up grouting that tank *in situ* and leaving it.

That's an engineered barrier of sort, the tank itself, even the area around the tank and the grout that you put in. It fixes it in place. But, then, does that set you up for a long-term care situation that you can't release it, nor can you factor that into the site release with the tank *in situ* and unrestricted release of the site? You know, it's kind of a cross between the two topics that you both have been discussing.

At West Valley, they are grouting. They clean the fuel pools. You've grouted the floor, thus encapsulating contaminants, but ultimately you may rely upon that engineered barrier to release the site for unrestricted release.

MR. ESH: I think you can as long as you evaluate that barrier's degradation over time and so you can still meet your criteria considering its degradation.

So if you consider it's natural and human-disruptive, reasonably foreseeable human-disruptive, processes, that's what you would need to do to show that you need to demonstrate the release in that circumstance. But I believe that is, in fact, use of a barrier in an unrestricted release situation.

MR. NAMAN: Yes. That's my question, the issue being it's hard to characterize the contaminants that are underneath the floor of that fuel pool and whether you might have had figures in practice and whether it had migration of contaminants. And it's hard to characterize that.

MR. ESH: Sure.

MR. NAMAN: And so it's hard to prove your point that the engineered barrier will protect against an unknown level of contaminant. So that's where it gets a little more murky, I would guess.

MR. JOHNSON: It would be a real judgment, then, as to how much confidence you'd have in your --

MR. NAMAN: Characterization data.

MR. JOHNSON: -- uncertainty there is resulting from not knowing that. And maybe the result would be you can't prove it because you can't demonstrate its performance.

MR. ESH: You certainly wouldn't have wanted to take that action before you adequately understood all the other implications. I think Allen's comment earlier wrote on the back here about choosing a robust barrier affecting your ability to meet unrestricted release at a future data, paraphrasing. That's a very difficult one.

I understand the issue. I don't know what the answer is, to be quite honest. You could have that situation. My opinion is that if you have made bad decisions in the past, that shouldn't be a basis for achieving a future better decision, but the world doesn't work that way in all circumstances.

So in general, on a robust barrier, our approach is that you should know pretty well going into your problem before you have taken these types of actions whether you are dealing with a situation where you need to go for restricted release now and at some point you could achieve unrestricted release or you're looking at more a permanent type of situation that you're under restricted release.

It's because there may be mixes of contaminants in the source. You may have short-lived component fission products, like a strontium-90 and a cesium-137 that are causing you a problem that need to go for restrictive release, but, then, the long-lived component is such that its contribution is low enough that you could meet unrestricted release from the long-lived component.

You know, that's one type of situation. You may have another situation where the long-lived component is what is causing you to need to go for the

restricted release. Well, that's going to apply out to extended times.

So it's very problem-specific, but my hope would be that there's an understanding before these types of elaborate actions are taken that what the potential future implications could be of those actions.

VICE CHAIRMAN CROFF: Well, I first agree that there is no one answer. I thought and a number of others here have thought about this. It to some extent gets almost to your philosophical approach to life and this kind of thing.

But what might be useful is maybe just some organized thought on the pros and cons of a long-lived barrier or of a very robust one, as opposed to a less robust one that might be replaced more often. There are indeed pros and cons.

There's no right answer everyplace. But it might be useful just to get those down as a basis for thought, almost a checklist, thinking checklist, and let's see what happens in the future.

Like I said before, my sense is there is going to be a lot more attention paid to this whole engineered barrier issue in the next 5, 10, 15 years. We've just got so many things coming at us. I think

the system is going to find it worthwhile to make more investments and do a lot more thinking about it. And we may know a lot more then than we do now, but I agree there's no right answer.

MR. JOHNSON: I would just add a perspective, I guess. Just as we said, you know, the initial guidance we had was very, very, you know, young. And we're trying to take it to the next step. As we apply this, particularly at the two cases that we have that really represent quite a range in challenges, you know, from West Valley to Shieldalloy, we're going to learn a lot from applying that guidance and working on those problems.

It wouldn't be surprising to me that we would be, you know, evolving our guidance, I mean, because that's really what we have been doing. And I think that will continue.

So I would look at this as, well, this is going to be the final guidance. You know, it will evolve based on our application, what we have learned from using it at these two really diverse sites.

MEMBER CLARKE: Eric Abelquist?

MR. ABELQUIST: Just real quickly, I would again restate what Ruth added earlier, that the Department of Energy has studied this issue for over

a decade, had offices set up to study all kinds of new technologies. We would not be seeing the successes that accelerated closure is claiming without engineered barriers. The clay liners, the caps, they're the order of the day.

And I would say any information that could be shared with licensees on what has been done, they may not be aware of all of the successes the DOE world has enjoyed. So I would spend less resources re-creating what has been done and more resources just communicating those successes in the DOE world.

MR. JOHNSON: In particular, for instance, we'll be involving other input from the mill tailings experience on our side, you know, the cover designs and all of that. We will be drawing upon that experience, DOE and our regulation of that, you know, to bring in to our guidance development here where it's applicable.

But yes, that's what we would eventually do. Maybe we'll do it in steps. We can only do what we can at this point and then see where we go from there.

MEMBER CLARKE: Robert, did I understand you and David to say that you are compiling a bibliography, as it were, of resources and you would

be interested in anything anyone in this room knows about, encourage us to send it in to them?

MR. ESH: Yes, yes. That's correct. And I think from our searches and information, that we could say we could agree with you very much that there is a lot of information out there on the development of technologies and evaluation of technologies. There is much less information out there on an assessment analysis process of those technologies and the steps that you need to go through to demonstrate their performance, that sort of thing.

So there is some out there, and we want to leverage whatever we can find. We strongly don't believe in re-creating the wheel. If it's out there, we would like to know about it. So, you know, help us out to the extent that you can.

MEMBER CLARKE: Ruth has one more comment.

MEMBER WEINER: This is just following on Eric's comment. I would encourage you to go out and look at Sandia and Los Alamos. Those are the sites I'm particularly familiar with. And the so-called mixed waste landfill at Sandia has just gone through this process, made the decision for an engineered barrier, went through the entire public comment process.

And Sandia has closed a number of sites over a number of years. And there's very, very good documentation on how this has worked.

MR. ESH: Okay. Thank you.

MEMBER WEINER: So I'll be glad to give you some guidance off-line, sites to look at.

MR. ESH: Thank you.

MEMBER CLARKE: Thank you both very much, Robert and David. I really do need to keep us moving. I think we have lost some ground. We will have a wrap-up at the end of the day. So if I haven't given you an opportunity to ask a question, please come back and help us in the roundtable.

Our next speaker is Thomas Youngblood. The topic is on-site disposal.

MR. SCHMIDT: I'm Duane Schmidt. I work with Tom in the same group. Tom is not available to talk to you today. So I am going to try and fill in for him.

So this issue is the issue of on-site disposals. And I've got the title here saying, "Under 10 CFR 20.2002." The first thing I wanted to mention is we have a lot of interest on other disposals, if you will, under 20.2002 off-site disposals. That is not what we are talking about at all here. And I just

wanted to mention that.

I guess I sort of wanted to start with saying what the issue is that we are trying to address here, trying to clarify, really. Considering the connection between the license termination rule and potential disposals of material on site and the fact that on-site disposals need to be accounted for at the time of decommissioning, an issue is what dose criteria ought to be applied to approvals of on-site disposals. So that is the focus I think of this issue.

If you have the summary that we provided on pages 16 and 17, I won't refer extensively back to that. And then just a little bit of background information. This issue was an LTR analysis issue. So it was covered in the SECY-03-0069.

One important point that was made in that SECY paper is that the existing regulation, 20.2002, does not provide a clear basis for how NRC should approve requests. The 20.2002 does say that the doses must be ALARA and must be within the limits of Part 20, which includes 100 millirem public dose limit that we'll refer to. But there seems to be flexibility in implementation of these regulations since there's not a lot of detail in the regulation itself.

Just a bit on the motivation, I guess, for why we care about this. In one regard, we want to provide flexibility to licensees. And, in fact, one of the questions that Tom asked at the workshop, his session of the workshop, was, are there licensees who are even interested in on-site disposals because it's hard to tell. We don't get a lot of requests. But licensees said that they are interested. They think that that flexibility can be useful.

But, on the other hand, one of the things that we are concerned about nowadays is preventing legacy sites. So we have got two issues opposite, sort of opposite, sides to provide flexibility but also to do that in a way that we're not going to end up with problems in the future.

So now on the bullets on the top, we've got three bullets listing what the options are that we're considering. The first of these two options was from our SECY paper. The third option was recommended by the Commission in their staff requirements memorandum.

So the first option is the current approach allowing approval or approving requests under criterion of a few millirem per year. The second option was to allow approvals up to doses, the public,

of 100 millirem per year providing that there is additional financial assurance committed by licensees so that the disposal could be cleaned up, if necessary, at the planned decommissioning.

And the third option that was suggested by the Commission is to allow approvals under a dose criterion of up to 25 millirem per year for mainly short-lived radionuclides, where there is little likelihood of creating legacy sites. And it relates a little bit to the later discussion.

We've got the exact words that the Commission gave us in the summary in the middle of page 16. Part of what they said was they wanted this to be for short-lived radioactive materials that will significantly decay in a few years without requiring additional financial assurance, et cetera. In that few years -- well, I guess I'll get back to the few years.

So what we are planning to do for guidance development, we think that mostly this issue is new. There are places in the existing guidance where we could put in bits and pieces that relate to this issue, but we're planning to produce a new section for guidance to add to NUREG 1757.

The SECY paper and the SRM we think

provide a good start. There's not a whole lot of details that we feel like we need to add in order to produce useful guidance, but a couple of points, I guess.

On option 2, the 100 millirem, we need to make sure that we're consistent with the existing financial assurance regulations, which, at least in part, are fairly prescriptive in prescribing dollar figures for financial assurance for amounts of possession.

We think there is enough flexibility in the 20.2002 regulation that we can suggest to licensees that additional financial assurance be provided in exchange, if you will, for higher dose limits.

Regarding option 3, a detail that we need to fill in is sort of the definition of what is short-lived. Do we want to come up with a half-life cutoff or some other basis? This is where I'll get back to the few years that were mentioned in the Commission's SRM.

I guess one thing that we have thought of is our first option that we have already been using is a dose limitation of a few millirem per year. So we could make a connection in option 3 to say maybe a

reasonable approach or one approach would be 25 millirem per year now or at the time of the on-site disposal coupled with a requirement that the dose be reduced through decay or other means if that related in a few years to a few millirem, to get back, in essence, to our first option.

So that's one thing we have thought of as a way to sort of get at the short-lived question. Another option would be to say that the dose ought to be less than 25 millirem per year now and that the half-life ought to be less than some number, perhaps one year or on that order, so that the dose would be reduced to within a few millirem in a few years. That's one area where we do invite particular feedback if you all have thoughts.

Let's see. The last bullets here I'll just go over quickly. We want our guidance to remind licensees that there are other requirements that relate that they need to keep in mind. Buried material may count toward their possession limit. They need to keep that in mind.

Whatever dose limit might be used for an on-site disposal, if that is impacting off-site people, then that contributes to -- you know, that has to be added to the doses from effluence and other

things. So there are some things like that that we want to just remind licensees of.

And there is a potential connection to engineered barriers. I mean, on-site disposal certainly could involve the use of engineered barriers. So we're going to have the guidance refer to the discussions of engineered barriers.

And then, just briefly, some other issues. We had a number of comments at the workshop on this issue. One of them was a request to define "short-lived." And I've talked about that. We're going to try and come up with something.

Folks also brought up questions about the difference between on-site storage and on-site disposal. And there was a question about whether on-site disposals must be retrievable. I think our plan at this point is to clarify that on-site disposal generally refers to burial. It's a more permanent solution and does not need to be retrievable.

There also were comments or requests to describe the financial assurance that might be needed for on-site disposals. And our thought at this time is that we have essentially enough guidance in the financial assurance sections of NUREG 1757 that we can refer to in terms of cost estimates and things like

that for providing financial assurance. So we don't think that there is a lot that we need to add.

There also was a request to define a few millirem. I don't think we resolved at this point whether we will do that or not. Some documents now that we have I think presented the range of one to five millirem. I'm not sure whether we will do that in this document or not. I think that is sort of where staff is ending up these days.

And, then, finally, a nontechnical issue, I guess, that we face, this issue is not really a decommissioning issue. I mean, it's related in the end because on-site disposals have to be addressed, but at the time a licensee is considering on-site disposal, it may be an operational issue.

So something we are wrestling with in the decommissioning side of NRC is how do we get this guidance into the appropriate other places in the agency so that the operational facilities know about this?

We have got a couple of other guidance documents that we are hoping to be able to get it into, but we don't control those. But we're working on that.

That is how much I wanted to say right

now. So I will open it to feedback, questions from you all.

MEMBER CLARKE: Thanks, Duane.

We will start with the panel again. Eric, do you want to go first?

ROUNDTABLE DISCUSSION

MR. ABELQUIST: Thanks, Duane. I have a couple of questions that come to mind with this topic.

The first one is, when I think of on-site disposal, I think of decommissioning in that context. And one site that comes to mind is the Chemetron site, where what they put back was uranium-contaminated soils.

And one of the big issues that came up was, how are they going to demonstrate what they're putting back. The source term, complied with what was acceptable.

And so there are two issues. One is the issue that you addressed, whether it's a few millirem, 25 millirem, 100 millirem, but the issue that logically follows that is what source term is related to the few millirem, 25 millirem. So that you get into the issue of, do we have a model that specifically handles on-site disposals.

And then the next issue, once you come up

with what is the acceptable source term, what survey guidance can be provided, you know, we are clearly outside of the normal surface soil, building surface criteria.

So I think if a licensee were to consider on-site disposals, they quickly get to a point, how can I do it, what do I need to demonstrate, and I see it very logically following what we have provided for the surface soil and building surfaces. So those are my initial questions on this topic.

MR. SCHMIDT: Right. I think those are all good points, Eric. And I guess at this point, we haven't considered or we haven't thought about adding new guidance on those topics specifically related to the on-site disposals. I think it is a good point that it may be helpful for us to consider that.

I think some of our existing guidance, while it is not going to be extensive for buried material, surveys for bulk quantities that you bury or dose modeling for buried material, we have at least some guidance for some of those areas. And I'll acknowledge they're not extensive.

So that is a good point. I think we need to consider whether we can beef up some of those areas. Yes. Thanks.

MR. ABELQUIST: Thanks.

MR. NAMAN: As an ex-operational guy and now a D and D guy, I see starting with the end here putting guidance in place for the operational side as truly important in making sure that there is a good tie.

I see a hazard as a D and D guy in all the rad waste guys around all the utilities will take full advantage of it and leave more of a problem for me as a D and D guy in the future.

So there is that balance that you are going to have to strike there. But I see a real value in that because we disposed of a lot of soils and other very, very low-level waste on sites that we didn't need to that could have stayed and would have met the in-site criteria just fine. So I see a real value to the operating world and ultimately the utilities as a whole.

MR. SCHMIDT: I think that's the flavor that we got back from reactor folks about wanting to keep this flexibility, that there are a lot of cases where it's lot of cases where it's low-level stuff that --

MR. NAMAN: All the time they're shipping train loads to envirocare, you know, that they

wouldn't necessarily have to.

MR. SCHMIDT: Yes. Right.

MR. NAMAN: And I guess we'll get into more of that later on this afternoon in discussions of intentional mixing of soils and soil-like material.

The only other topic that really jumped to mind was underground piping, contaminated systems that, you know, rad waste discharge lines, the likes that you could survey and dispose *in situ* that you wouldn't have to. You know, you need to know the contaminant level.

I see a real value from the decommissioning world in defining these parameters for that. So we can leave a lot of buried pipe and systems in place. And okay. You know, you're calling it disposal, but it's no different than the whole site is a disposal site that is released at the end because you are leaving contaminants on site in reality to the limits allowable.

MR. SCHMIDT: Right. I think that's a good point. In fact, there might be cases where a facility would actually want to dispose separately with pipes.

I guess the difference between a 20.2002 on-site disposal and the sort of disposal when you

finish is there is a difference in the way we evaluate it, you know, if it's part of decommissioning and what you're just leaving on site and it's under a decommissioning plan or license termination plan, there the criterion is clear. It's 25 millirem from all sources.

MR. NAMAN: Right.

MR. SCHMIDT: So there are differences in the way we treat it. I mean, I appreciate the fact that they are similar in a lot of regards, really, yes.

MR. NAMAN: And I think in the 5075(g) methodology for keeping track of spills and radioactive material on site at an operating plant, isn't that where it would probably fly the most anyway?

MR. SCHMIDT: I think so, yes.

MR. NAMAN: Okay. That's fine.

MR. SCHMIDT: That's a good point.

MEMBER CLARKE: Virgil?

MR. AUTRY: Here again I want to draw on some of my experiences. We did authorize a number of on-site disposals at some of the nuke reactors in state. And you say, "Well, why did you do that? Why didn't NRC? You said you didn't many of them,

requests." But we were authorized to approve these on-site disposals.

Several reactors come to mind: Duke Power, the O'Connor reactor, Catawba reactor. They had a lot of pond sludge and floor drains, steam generator tubing, a lot of incidental hardware, that if they were required to get rid of in a low-level waste site, it was quite costly. So we were able to allow their disposals.

We adopted a five-millirem total effective dose annually. Also, we tagged the radionuclide, which is predominant in its materials, cobalt-60. And we did see over a period of time that that would decay to insignificant values.

We did require that to go into their engineered trenches with engineering covers. We did require some groundwater monitoring on a limited basis and then backed it down when we didn't see some of the problems that you would think you would see. So we did require it. And I'm not sure what the schedule is now, but we did require that.

Now, one of my experiences in the past with the RM reactor at SM-1 when I helped decommission that, they had disposed of tremendous amounts of materials on site at the Fort Belvoir reactor. And

then we removed that and then sent it to Barnwell. So that is a reversal on on-site disposals. So it was quite significant, some of the materials and some of the nuclides that were in that.

So if you can get away with on-site disposal, that's good. But if you can't allow it to minimize costs, they have been within reason with low dose and short nuclides I think is a good thing to follow to.

MR. SCHMIDT: Right. Thanks. Those are good examples.

MEMBER CLARKE: Thanks. Virgil or Eric?

MR. DARIOS: I think I have slightly different experiences, which I will share with you a little bit. And I will try to be brief.

First, in regards to the dose criterion that you mentioned, I think you need to define. I think, Eric, you touched on it a little bit. What is the scenario we're using to establish this dose?

If, in fact, we're using whatever occupancy the site might have and they're putting stuff in a controlled area on the site, the occupancy might be very low. And you might be calculating a dose to members of the public or occupational workers that fall into the few millirem criteria. We turn

around and get into the decommissioning world. And that concentration of material means something different now. So that I think needs to be considered and somehow crafted in this guidance.

As far as the half-life considerations are concerned, I would offer that you think a little bit about not so much a value, single value, for half-life but what kind of decay is going to be expected from the point of disposal until decommissioning.

If that time frame is 5 years versus 20 years, it may have a different significance relative to the dose criteria. So it may, in fact, want to consider a sliding scale based upon that variable.

The things that you might want to think about considering is whether or not you need to invoke the Part 20 controls on something that was buried on site, posting control, labeling, security of radioactive material, you know, concentration values that would invoke that and whatnot.

I know we have been through this. At Connecticut Yankee, they had a land disposal area that was used for a number of different things during operations, one of which was inadvertently radioactive materials put up there. But once it was identified earlier in the decommissioning process, we immediately

put a fence around this rather large area to meet the Part 20 requirements.

But in some regards, maybe posting would have been fine because people would have had to have come in with dump trucks and excavate the area to get enough material. But, nonetheless, I think those are issues that certainly we have been through. And there's no good, clear guidance on a lot of that.

The next thing is recognize the fact that all disposals are retrievable. It's just a matter of price.

(Laughter.)

MR. DARIOS: I think the last thing that we have learned most notably probably at Connecticut Yankee -- and I know it's not in NRC's jurisdiction but has a huge impact on the licensee -- is the potential non-radiological constituents in the waste. And I don't necessarily mean chemical constituents.

In the State of Connecticut, we have requirements from the DET side to dictate what bulky waste represents, for instance. And it can't contain metal rebars, plastic. And there's a whole laundry list of things like that that bulky waste can't contain.

Well, this area at Connecticut Yankee had

a lot of that material in it. Radiologically it passed the criteria. And we could have kept it there, although I've got to tell you it was very heterogeneous material when we went to evaluate it. And, Eric, you know that. You've been there.

So based upon how this material got there, the fact that it was not homogeneous led us to a real big problem. And we had boulders that were the size of this room mixed in with dirt and asphalt and concrete and metal, et cetera, et cetera, et cetera. How do you survey that?

Because of the bulky waste issues and that it didn't meet the state criteria, there was an evaluation done, saying maybe we should dig through it and pull out all of this material we can't keep there. Well, it turned out to be cheaper to take and haul this material off. And we ended up disposing of it.

So although not an NRC issue, a licensee may be lured into thinking radiological I'm good with this, but you're going to fail eventually and have to dispose of it, either for radiological reasons or non-radiological reasons. So whether there's room in the guidance to put a big caution I don't know, but those are real considerations.

That's all I've got.

MR. SCHMIDT: Thank you. I appreciate all of those.

I think there could be room in the guidance. And we'll try and at least put in a few words. I mean, it might be hard to cover the whole issue.

MR. DARIOS: Oh, yes.

MR. SCHMIDT: But even to let licensees know, "Hey, think about this" might be helpful.

MR. DARIOS: Yes.

MR. SCHMIDT: I think your point about the Part 20 controls is one that we hadn't specifically thought about. I think it fits along with some of the other things that we had been thinking, but that's a good thing to add.

And your point about scenarios I guess I'm not sure if we had been explicitly thinking about sort of that difference of, you know, you're really saying there is an exposure scenario now when you do the on-site disposal. That may or may not be the appropriate exposure scenario at the time of decommissioning.

MR. DARIOS: Right.

MR. SCHMIDT: And we need to recognize that. I don't know if we had captured that yet, but

that's definitely a good point. We need to make that clear. So thanks.

MR. DARIOS: Yes.

MEMBER CLARKE: Thanks, Eric.

MR. DARIOS: Yes.

MEMBER CLARKE: Tracy?

MR. IKENBERRY: I just had one question. Your viewgraph said there was a potential connection to engineered barriers. And so what exactly did that mean in terms of are you thinking of tieing it to the other parts of the guidance there or in terms of on-site disposal doing it with engineered barriers or --

MR. SCHMIDT: I think, at least in my mind and I'm not sure in Tom's mind, you know, depending on what a licensee proposes to do, they could bury materials and use some type of engineered barriers. And so I think the idea is that in our section on on-site disposals, just to mention that and refer them back to Dave's sections on engineered barriers.

MR. IKENBERRY: Okay.

MR. SCHMIDT: Just so they get connected so people are aware that that may come up.

MR. IKENBERRY: Okay.

MR. SCHMIDT: You know, I don't know. It

certainly could.

MR. IKENBERRY: It's in all the guidance from the engineered barriers and would apply directly for the on-site disposal.

MR. SCHMIDT: It could. And so the idea I think would just be to refer to it, not to try and replicate parts or anything.

MR. IKENBERRY: Okay.

MEMBER CLARKE: Okay. Let me just turn it over to the committee in general. Mike?

CHAIRMAN RYAN: Thanks. Again, I apologize for being away for a few minutes.

In your last slide, in the last thought you asked about more input on, have you thought about windows on-site storage become on-site disposal?

Let me tell you why I'm asking this question. If a utility, for example, has some contaminated soils or reconstruction materials or something, they say, "Well, if we were allowed to store this for a time," where we have a decommissioning plan ten years down the line, how do I get to where I can deal with it as part of my overall decommissioning versus having to deal with that today? That might be something that's worthy of thinking about.

If I could have some kind of an on-site disposal or something like storage in between disposal or some way to deal with that, it might actually be an economy.

Now, I caution from the other side that sort of raises the bar from your other point of view that if there are materials on site in that fashion, that may, you know, raise your inspection concerns for is a site doing as much as it can to avoid being a legacy site.

So there might be a trade-off there, but I think this touches on when something is disposal and not storage. And I think if you could review that idea with this in mind, that might be something that would make for more flexibility.

Just something to think about. I would be curious if the folks that work around reactors think that is a reasonable thing to think about.

MR. DARIOS: There's a big gray area here certainly, Mike. At Connecticut Yankee, once we got there and really engaged in the decommissioning, we chose to add, search out all instances of soil relocation on site that had occurred historically.

After finding that -- and we went through purchase orders. We went through lots and lots of

records. After locating as many as we could, we actually added that to our 5075(g) database. 5075(g) doesn't really require you to put that information in with that database.

It's only a record of spills and events, not necessarily soil relocation. So, you know, we didn't qualify it as disposal of storage. It was just soil relocations.

CHAIRMAN RYAN: All I'm suggesting is get out in front of that.

MR. DARIOS: Yes, I know.

CHAIRMAN RYAN: I mean, if Connecticut Yankee was catching up on, it was really something, it was more rigorous and regular going forward, you know, plants that are dealing with the question now going forward might have a clearer path.

MR. DARIOS: It's way more difficult to catch up.

CHAIRMAN RYAN: Yes.

MR. DARIOS: It's much easier to go back though the record and find events and spills but much more difficult to find where you dug soil and moved it to.

CHAIRMAN RYAN: Well, maybe something we can think about.

MR. NAMAN: There are other issues associated with the operating side of the house, especially if you take a site that is a multiple site that has a decommissioned unit or safe store unit on an operating site. You stumble across many of these sites, one being the control of radioactive material from the operating side license and the perceived lack of control and some of the problems that you come in contact with as well as the amount of square footage and remote RCAs within the site. It becomes very difficult to manage. And typically they try to steer clear of that as much as possible.

CHAIRMAN RYAN: And, again, all I'm suggesting, if the guidance could at least address is there a connection between these types of on-site storage. It's a little bit more deliberate. And it's in preparation for a decommissioning plan that is up and coming, you know, maybe with some longer time horizon. That might be useful to think about. It might avoid some of these --

MR. NAMAN: Boneyard issues.

CHAIRMAN RYAN: Yes, boneyards.

MR. SCHMIDT: Yes. I think that's a good suggestion, yes.

MEMBER WEINER: Just two comments. I

imagine you'll include some kind of uncertainty in the dose standard, especially if you go to a few millirem because when you get down to a few millirem, there's a tremendous amount of uncertainty in just how you get to that dose. So I would encourage you to give some sort of guidance there.

The other question is I applaud your notion that there is no retrievability, but you might be pushed into retrievability. And one of the questions we wrestled with in the very, very early days of the high-level waste repository was, does retrievability mean you have to design for it or does it just mean that you don't do something that prevents retrievability? And I would encourage you to look at that distinction and make some decision.

MR. SCHMIDT: Thank you. That's a good point.

I think on the first one about the uncertainty, maybe that is a reason for not wanting to put a number on this few millirem. I don't know where we're going on that. Thanks.

MEMBER CLARKE: Allen?

MEMBER HINZE: Just a quick comment. It seems to me that we have discussed the surveying and monitoring here, but this is an especially important

issue on these on-site disposals. And I think that you should err on the side of heavy in the guidance in that area, rather than light. And this is true in the few millirem problem as well. This is an area where guidance is really needed.

MR. SCHMIDT: Thank you. Yes, I think that's a good point.

MEMBER CLARKE: Okay. Anyone else?

MR. HAMDAN: Could I make a comment?

MEMBER CLARKE: Please. Go ahead.

MR. HAMDAN: Duane, you do not include anything environmentally in back on this. Do you think there's room for it in the guidance or not?

MR. SCHMIDT: Good question. I'm not sure. I think the guidance for the most part is focused on the technical analyses by licensees and the technical evaluations by staff sort of separate from EA, environmental assessments, that do need to be done.

So I'm not sure. You know, I think we can think about that. And there might be something to do there.

MEMBER CLARKE: Duane, thank you.

MR. SCHMIDT: Thank you.

MEMBER CLARKE: And, Chris McKenny, take

us to lunch.

(Laughter.)

MEMBER CLARKE: You're going to have to interpret that literally.

(Laughter.)

D. REALISTIC DOSE SCENARIOS

PRESENTATION OF GUIDANCE

MR. McKENNY: I'm Chris McKenny. I've presented this a few times at different stages since this is an old LTR analysis issue. Ever since we went to the dose modeling approaches in 1997 in the license termination rule, always then comes the issue of, well, what is the scenario?

Concurrent with that, of course, is from the '90s on, there has been a large change in the modeling approaches done and the scenario generation approaches done and all types of environmental analyses in the level of conservatism in scenarios that are being used for compliance.

I mean, we have been trying to do a continuous improvement in adding flexibility in people to use, allowing licensees to use much more realistic scenarios for compliance, rather than constantly requiring the use of bounding scenarios.

In fact, right now we're still -- but this

is what -- what this LTR analysis is trying to do is trying to bring us more in line with actual EPA in this place in the fact that EPA was able to go in 1994 to get out of doing residential farmer as their compliance scenario. And they went into more stakeholder-driven, looking at what is realistic land use and other things in the area. So we're trying to get into that groove also.

Now, the big question is, of course, that we have a 1,000-year compliance time frame. And so when we first did the license informational changes, scenarios were fairly new to the staff, fairly new to the Commission on doing a lot of the analyses for compliance, that it was very much of a conservatism approach that basically the approach was, what could happen in the next 1,000 years under your compliance scenario. Other scenario modifications or limitations were based on physical considerations, not on social issues.

We believe that we can use a risk-informed performance-based approach, which is based on reasonable assumptions of what could happen in a site in the next few decades as being the compliance scenario, the basis for the compliance scenario with analysis of unlikely scenarios that could occur over

a long period of time at the site to risk-inform the decision for the decision-maker to make sure that the site is safe for the public. And that is what the LTR analysis paper said is the approach, and that is what we are trying to change our guidance to do.

As anyone who has looked at 1757 knows that there is a lot of stuff in there already. That means that I don't actually have to write a new section for this. I just have to modify the sections currently on scenarios.

The factor is that there are going to be a lot of little changes throughout because what really is needed is a tone change. The tone in the guidance right now is really much more driven on the conservatism approach, the focusing on physical basis for your scenarios, and other things.

So I'm going to have to do a lot of modifications to try to bring it in that you can have all those sorts of changes, which will then be supported in appendix I, which is our much more detailed guidance on much more discussion on how to potentially go about that, how to come up with not only what possibly is considered foreseeable but also what is considered unlikely, what level of analysis is needed for the applicant, what level of justification

is needed, and then how they're going to be reviewed.

So those are in a nutshell the basis for the changes we are going to be doing. And we are also going to possibly have a discussion in there about the fact that one of the concerns is trying to make sure it's not a shell game, that somebody goes around and says, "You know, my site has been industrial. The neighbor sites are industrial. They have been that for a long time. So I'm going to use industrial scenario for mine because that's reasonably the next use for the next 20-30 years."

Well, right across the road is an apartment building. And, you know, in those sorts of situations, you're saying, "Well, reasonable scenarios are not industrial. And if you want to make it industrial, you're probably going to have to have a deed restriction." Now, a deed restriction requires restricted release.

So there is a concern out there that using reasonable scenarios is just a shell game to get around the restrictions, the potential use of restrictions that may be needed, especially these low, for a low, hazard environment. So we're going to have to put some guidance in there to caution that use.

I mean, it is fully driven on the fact

that we are adding flexibility, we're not actually making licensees do all of these extra analyses. And that's why we're going to try to make modifications and point to the decision-making framework, which is what you do is you go through and do analyses until you can show compliance and if you can't show compliance and you decide whether you want to make a change of scenario, remediate, or change to other parameters. And the licensee can go through that until they find a set that allows them to show compliance, which means they may go with a conservative scenario.

We may not get many of these real seriously realistic scenarios that really have tons of other scenarios that have to be compared and other things. We're not sure how many we're going to get in of actually real complex, realistic scenario systems, but we want to have the flexibility in the guidance.

I mean, we have always had the flexibility in there. And a few licensees have taken advantage of it in the past. And we're thinking about doing some stuff on the Web site also as a parallel to the guidance development so that we can point to what land uses licensees have used in their DPs or LTPs so that others can look at their application to say, "Why did

they select that? How did they justify it? How did the NRC review it?" and stuff like that because the Web site is more living, of course, than the 1757.

And I don't really want to put in licensee, direct licensee, summaries in the 1757 because they tend to get dated and aged. And it would be much easier to keep the Web page as a source of more current sort of view on how we're doing things.

MEMBER CLARKE: Chris, you just referred to the Web site. This is the Web site that was being demonstrated at the workshop?

MR. McKENNY: Right. And I think it's active now or it is becoming active very soon.

MR. PACEKO: Soon. It's not active yet. We still have our existing Web site.

MR. McKENNY: Right, right.

MR. PACEKO: It won't be up until probably sometime in July.

MEMBER CLARKE: Is there a link on the existing Web site to this one or how --

MR. McKENNY: There will be. I mean, since it's not active yet, we're still --

MEMBER CLARKE: I don't think you've got the address on any of your slides yet.

MR. McKENNY: I don't know.

MR. PACEKO: We don't have the actual address yet for the new Web site.

MEMBER CLARKE: Okay.

MR. McKENNY: That's, again, a potential as a parallel to have sort of this sort of simple --

CHAIRMAN RYAN: Jim, thanks.

A quick question, Chris, on the scenario. And I understand what you are laying out here. It's interesting. The question that I'm thinking about is this. You've talked a little bit about the risk triplet. You know, you made John and Eric smile. What can go wrong? You've talked a little bit about that in the scenario and what the consequences are in the scenarios.

MR. McKENNY: Right.

CHAIRMAN RYAN: How about the middle question. How likely is it?

MR. McKENNY: We're doing --

CHAIRMAN RYAN: We always get stuck with we assume it will happen at year X.

MR. McKENNY: I know that we do and --

CHAIRMAN RYAN: Is that something we can address or --

MR. McKENNY: Well, there is a way to actually have duality scenarios under this where you

could assume a certain land use for a certain period of time and then swap to an uncertain land use later in time because, of course, you're much more certain earlier than later. I mean, that's obviously a hybrid of the whole approach that would be also viable and probably honestly a lot more sellable to various stakeholders.

But I don't think we're going to go for societal-based scenarios to probability weighting them at all. We are going to have general categories of likely, unlikely with basically logical descriptions.

CHAIRMAN RYAN: The question --

MR. McKENNY: I mean, it would be -- I just wonder at the complete benefits of going to actual true probability analysis. I mean, we can do that in natural systems in a way of comparing conceptual models and coming up with some sort of probability of some frequency of events and some other stuff that is purely a natural system, which is, like Tom Nicholson is doing research on hydrologic systems in that manner.

But to do that on a societal basis, I think we would be laughed at a lot.

CHAIRMAN RYAN: Well, I think the ranges idea is not a bad one.

MR. McKENNY: Yes.

CHAIRMAN RYAN: For example, if you took an on-site disposal at a 27,000-acre facility and just did what's the random probability you hit this one acre, do the math, --

MR. McKENNY: Right.

CHAIRMAN RYAN: -- I mean, it's a very small probability on a per square foot basis that you would randomly hit that disposal. So there is information there that I think is helpful.

MR. McKENNY: Yes.

CHAIRMAN RYAN: Is it an absolute probability that you might want to -- I mean, you know, that's silly to think about.

MR. McKENNY: Right.

CHAIRMAN RYAN: But I think if you can somehow guide folks to think about what very unlikely might mean --

MR. McKENNY: Right.

CHAIRMAN RYAN: -- and you would have a lower bar for demonstrating performance than highly likely --

MR. McKENNY: Right.

CHAIRMAN RYAN: -- and something along those lines, that would at least help folks I think

say, "Where is the bar of information requirement that I need?"

MR. McKENNY: No. That specifically has to be addressed because, I mean, the guidance already comes along the point of view of separating out scenarios, at least into three categories of reasonable, likely, and unlikely.

And there's, of course, a third one, which would be it's just not practical or wouldn't occur because, you know, of physical situations or some other situations that are beyond that that wouldn't occur.

CHAIRMAN RYAN: That's one part of the question. Then, of course, the other part is advertent intrusion versus inadvertent intrusion. There is a difference there.

MR. McKENNY: I know that.

CHAIRMAN RYAN: And when people intentionally, forcefully, and knowingly dig something up, that's a different risk profile than inadvertent intrusion, whether it's the farmer or industrial or whatever it might be. So a little bit more help on that might be useful --

MR. McKENNY: Although I think --

CHAIRMAN RYAN: -- when you go from one to

the other.

MR. McKENNY: I think we would fall back onto the policies of the Part 61 in that one, which would be that we tend not to use advertent intruders as a basis for compliance.

CHAIRMAN RYAN: I absolutely agree with you, but my point is, when do I change from one to the other? When do I become an advertent intruder?

If, for example, I build a concrete barrier that says, "Radioactive material. Do not dig" or some other warning situation and somebody decides to violate that barrier, are they now an advertent intruder?

So, again, just a little bit more of a firm view of where I change from one to the other might help folks design their barriers or, you know, have features and so forth that might help in that area, something to think about.

MEMBER CLARKE: Okay. Ruth, go ahead.

MEMBER WEINER: This is just to echo something that you said and that you and I both heard at the workshop, which is that if a licensee can meet the bounding case, they're not going to go to realistic scenarios.

So I suspect that you are quite right that

there will be relatively few licensees who go to some form of realistic scenario. And I imagine you'll write your guidance that way.

MR. McKENNY: Right.

MEMBER WEINER: Because what you will end up with -- and everybody here knows it -- is endless arguments over what is realistic. And I would encourage you to, first of all, recognize that most licensees are not going to go realistic and most stakeholders aren't going to accept going realistic anyway.

MR. McKENNY: Right.

MEMBER WEINER: So that you focus on what do you consider within the bounds of realism and what do you consider not. That's all.

MR. McKENNY: Okay.

MEMBER WEINER: Thanks, by the way, for a good presentation.

MR. McKENNY: Thank you.

MEMBER CLARKE: I just had a quick question, Chris.

What is the planning horizon that is being considered for developing this scenario? Is there flexibility there as well? What is the foreseeable future?

MR. McKENNY: The foreseeable future is I think it really depends somewhat on the rate of change, first of all, in the local area of that region. We're still looking at possibly a few decades.

Some areas change so slow that you could probably say up to even a little bit further, but still, I mean, the National Academy and everybody else has always said that out beyond 30 or so years, really, you're stretching to make any statement that you know what potentially could be there.

I mean, when you are talking sometimes with a contracted industrial site and some other things like that, where you are putting a power plant in in the next case, which is like the Rancho Seco case, where Sacramento municipal utility district has a generating plateau basically, it's just a large area of the land that they keep on putting different industrial power generators in to that area.

Well, for that site, I mean, you can make a good estimation that it's going to be pretty much that is going to be doing in that region for quite a while. They're putting in brand new natural gas plants. Well, they have a fairly long life, you know, multiple decades. So you can tell that that is going

to be there.

If you go down to where like a lab was in the middle of a suburbs, you know, you're going to have a very short life as to what could be the zoning in that area or what could actually be that land used for, although then you would be clearing out some other things because the likelihood of it ever going back to farmland is highly unlikely.

MEMBER CLARKE: In any event, whether the land use is considered to be likely or unlikely, you're asking for documentation in --

MR. McKENNY: Right, right. We want it based on like land use planners from the locals. When the licensee talks with the stakeholders, the licensee looks at trends in the area of how the land is being transformed, those sort of bases for making a societal decision of what the likely land use would be.

MEMBER CLARKE: Thanks.

MEMBER HINZE: A quick question along those lines. What is the experience in the strength of deed restrictions?

MR. McKENNY: Personally I don't put much on deed restrictions. But, secondly, deed restrictions by the NRC technically put you into restricted release with just the deed restrictions.

That is the minimal most restriction that will put you over into 1403 from unrestricted release.

And so if we're talking -- realistic scenarios can be used in both restricted release or unrestricted release, but we generally talk unrestricted release. Then a deed restriction would kick you over to that, which would pretty much void the use of why you would want to try to be using realistic in the first place.

MEMBER HINZE: If someone wants to break a deed restriction that's a local affair, do they come back to the NRC or how does that --

MR. McKENNY: We do have a case where with a deed restriction, NRC is probably going to be a party of it.

MEMBER HINZE: Okay.

MR. McKENNY: And so we would be an agent that could take action if the deed restriction were to be violated. But in other cases, there potentially could be another third party or the state or somebody else would be in position to make sure that deed restrictions remained in place over time and were violated and if were violated to be able to take legal action to right this situation.

I mean, personally it's always an issue of

remembering to check it over the long term, whether it's really considered a serious issue by the agency, and all of those other things.

And there are so many other historical examples of deed restrictions as being, all of a sudden, disappearing off the deed so that the new owner didn't even know there was a deed restriction because it never appeared. It wasn't that there was a violation of a deed restriction.

MEMBER CLARKE: The way you're setting it up, you have either a long-term controlled license or you have a legal agreement with the NRC. So you've got some protection there. Is that right?

MR. McKENNY: Well, it all depends if there's a deed restriction of some other third party. It could be the state could be the -- or DOE if we could transfer it to DOE or some other group.

You know, in Sequoyah Fields, we did, of course, look at -- we at least discussed with the local Indian tribe whether they wanted to be the third party.

You know, that sort of thing would be looked at. There would be some third party involved in possibly any restriction situation so that there would be some sort of custodial care.

MR. JOHNSON: Dr. Clarke and Dr. Hinze, I just wanted to add something. This is Robert Johnson. On the deed restriction, I mean, when you could use the deed restriction, in our graded approach, it would be for the lower-risk sites, those that would have short-term need for control, not long-term need for control.

You know, that approach was trying to take into consideration all the examples of failure of many more routine type institutional controls that are happening after a few years. So we're trying to recognize, you know, that vulnerability of use of deed restrictions and not in our approach rely upon them for the long term.

MEMBER CLARKE: Thanks very much.

MR. AUTRY: Let me comment on deed restrictions. In the low-level waste area, of course, when the Barnwell site is closed, whenever that occurs, the license will be transferred to the state as well as the lands. And we do see deed restrictions placed on any additional lands, not just the disposal areas. There are other areas of the properties that will be transferred to the state. There will be deed restrictions placed on those particular properties.

The other comment I had was on the land

use. That is another performance objective in low-level waste. One you vacate a site, such as low-level waste, you want to work with your local governments on any code or ordinances they may have for any future land use. So that's also an important aspect, Chris, too.

CHAIRMAN RYAN: Just one further to throw this out just to think about. Virgil, your comment about disposal facility, if I understand it, the low-level waste sites are owned by either a state or federal government. That's a requirement of 61.

Is there any thought for the sites where this is an issue, to have a custodial owner?

MR. McKENNY: Actually, that is one of the reasons why the LTR analysis was started.

MR. JOHNSON: Yes. If I could add to that? Robert Johnson.

For a number of years, we worked with that option for DOE to be a potential transfer to DOE ownership. And that hadn't worked out. And that is what Chris was alluding to. That's what led us to where we are now.

We haven't given up on that possibility and that option, you know. We have pursued it. We will continue to pursue it with DOE to look at that

option.

CHAIRMAN RYAN: I was just wondering in, for example, the state or the local case, you know, if a custodial owner with some funding or some access to institutional control funds under the circumstances and for the right reasons was a possibility.

I just throw that out to think about. I don't know if it's a good idea or not.

MR. JOHNSON: It is a possibility.

CHAIRMAN RYAN: It's a point. But, I mean, I would suggest that maybe the agreement states working group you are formulating might give you some interesting thoughts on that idea.

MR. JOHNSON: Under our existing guidance, that is a possibility. And, yet, what I was alluding to earlier in my talk was that they haven't -- state or locals haven't wanted to accept that responsibility. And so then the licensee really has no option.

CHAIRMAN RYAN: Well, I can understand --

MR. JOHNSON: But they can do that.

CHAIRMAN RYAN: -- maybe they don't want the financial responsibility.

MR. JOHNSON: Yes.

CHAIRMAN RYAN: But if they have kind of

a control aspect with regard to deed restrictions or, you know, the local --

MR. JOHNSON: Right.

CHAIRMAN RYAN: -- town council or county council is the organization that will be immediately called if there is a question about this property changing hands with regard to the deed restriction, it sort of gets it back up to the local political infrastructure to say, "No. You can't take that deed restriction off."

I'm just wondering how to best do that to overcome this question of deed restrictions that somehow magically go away. It's something to think about.

MR. JOHNSON: What we tried to explain in the graded approach was that for those types of sites, lower-risk sites, that you would try to layer it, layer your controls. You may have a deed restriction.

But you would want maybe a local government, some local or state government, to be a backup and to be the enforcing party. And that would add assurance that that deed restriction would work or that the restrictions on the land would work, not only the deed restriction, but there would be some backup by the local government or state government.

So that is a possibility and can be used if they can work on an arrangement like that.

CHAIRMAN RYAN: Again, I guess what I'm thinking about is the idea that it's kind of like when you own a car and it's person A and person B own the car, they both have to sign. If it's person A or person B, either one can sell it. What I am looking for is to put an "and" in there, --

MR. JOHNSON: Yes.

CHAIRMAN RYAN: -- you know, the owner of the property plus some governmental entity or something like that where both have to be a participant to get that taken away.

MEMBER CLARKE: Let's see. Let's go to Tracy.

ROUNDTABLE DISCUSSION

MR. IKENBERRY: A couple of questions. When you select your reasonably foreseeable scenarios, does that also give flexibility in selecting the critical group as well?

MR. McKENNY: Well, each scenario would have to be analyzed to see what the critical group is. Then, of course, for each scenario, then you would have to look at from your reasonable scenarios which is your critical scenario.

And then you would derive -- based on that, of course, that adds a complication factor if you have a mixture of radionuclides because 60 percent of your radionuclides can be controlled by one scenario and 40 percent by the other scenario. And then you come up to how the licensee will have to deal with establishing DCGLs from that sort of situation.

We have had licensees who then selected DCGLs based on each scenario and then just do the summer fractions, ignore the peak doses for each radionuclides were from different scenarios, which is the most conservative approach, or they could set up a dose modeling approach where they establish some interim DCGLs and then would show the calculation back that they met it for all scenarios.

MR. IKENBERRY: Right.

MR. McKENNY: So, I mean, it does add a very big complication factor. It could. And we are aware of that. But, as usual, when you add flexibility, it doesn't make things easier. It usually makes things tougher.

MR. IKENBERRY: Right. But, once again, as you said, it could kind of reduce the number of reasonably foreseeable scenarios that you get people to go to because of the added complexity.

MR. McKENNY: Yes. Yes because it is still engineering over moving dirt. Sometimes it's cheaper to move dirt. Sometimes it's cheaper to analyze and engineer. And it all depends on your situation.

MR. IKENBERRY: If there is any way you could provide some guidance on that aspect of it, in particular? The scenario part itself is fairly simple, but the critical group part is --

MR. McKENNY: Right. We're intending to put some stuff in our flexibility section that really does talk about the pros and cons of going the deep approach because of the fact that we don't want people to go over, we're going to go realistic and not realize that they have to do all of these other scenarios and that that adds competing issues, more analysis time, and can lead to some sticky situations of trying to then back that out to figure out how you are going to survey for that and show compliance.

So I do want to add guidance that isn't all positive. I want to make people aware of the difficulties of this.

MR. IKENBERRY: Yes. I guess I would make it very clear what you are requesting for their justification when they do their scenarios. That is

going to be a very important part.

MR. McKENNY: Right.

MR. IKENBERRY: If you have the extreme from a reasonably foreseeable scenario for the screening scenario, for example, are you going to let them take a range in there with a -- you know, clearly they would like to get as far under the limit as they could, I mean, just from a public perception standpoint.

Are you going to let them move in that range with less requirements between screening into a -- you know, I can see a range of where they could do a reasonably foreseeable but, yet, move towards the unlikely with maybe less requirements for justification. Is that possible?

MR. McKENNY: Yes. That's usually possible where you can say that's usually just -- that's sort of another view on how to make a bounding argument that you have these following land uses are possibly possible, are likely to be used in the area.

However, we are stepping back and taking a scenario that attributes to these other scenarios and analyzing it as our compliance, which is slightly a more conservative case and is actually one of the reasonable likelihoods. And that is always a

possibility.

MR. IKENBERRY: Yes. It's kind of encouraging to take a graded approach to that to give you I guess a more risk-informed basis when they do their scenario selection.

MR. DARIOS: I once again have a little different viewpoint on some of these things. And that goes to Ruth's issue a little bit. Representing reactor sites, where there are multiple radionuclides, I think it certainly would be attractive to us I think to certainly use a more realistic scenario in the way that you describe, although I didn't read it in any of the guidance document, that being the first 30 years use a more realistic scenario and then from year 30 to year 1,000 use some of the others. Maybe the resident farmer scenario would be appropriate.

Where this is going to benefit us is not a matter of whether we pass or failed the survey. And I think you understand this. It's what the DCGLs are that we're surveying, too, which drives number of samples. It drives sensitivity for laboratory analysis, yadda yadda.

So, really, with very restrictive DCGLs, what the resident farmer can give you for very soluble nuclides, you can drive your MDAs to a really

challenging point. We have seen that with tritium, for instance.

So if we know that in the first 30 years, we can take credit for no resident farmer being present. Tritium becomes a non-issue; whereas, today it is an issue at some of these sties. So I offer that.

My only suggestion to you, Chris, is make sure that that is well laid out in here. I didn't read it, but you did say it. And maybe I missed it, but, you know, the whole business of mixing --

MR. McKENNY: Hybridization?

MR. DARIOS: Hybrid, right.

MR. McKENNY: Different scenarios kick in at different times.

MR. DARIOS: Right, right.

MR. McKENNY: I think that may be a guidance approach.

MR. DARIOS: That's important. And I think people will take advantage of it under certain circumstances.

MEMBER CLARKE: Anything else? Tom?

MR. NAMAN: Just a question. Of the LTPs that are under review right now, how many of them are site-specific versus the defaults?

MR. McKENNY: Pretty much every complex site has a site-specific analysis. Actually, quite a few of them right now, we have nine or ten that have some aspects of realistic scenarios involved with them, some sort of justification based on societal or some other estimations.

Out of the complex sites, almost every one of them -- I think Trojan will remain probably the only reactor to ever use screening criteria. Everybody else is tending to go with some sort of site-specific analyses.

That doesn't mean the scenario is very realistic. That just means that they're doing site KDs. Also for the fact that by us defining it as a complex site, it usually involves some source term that's not soil or, you know, most every one of our complex sites has groundwater. We don't have scoring cards here for groundwater. So, therefore, it forces them into that place anyways.

As to comparison of the number of licensees that terminate every year, a very small percentage because we have hundreds of licensees that terminate every year. Most of those use screening criteria.

MR. NAMAN: I see. So yes. I guess I am

tending to look at the more complex sites in my own experience.

MR. McKENNY: Right. But most of those are forced to anyways because of our limitations on our screening criteria. Therefore, they have to do this sort of thing.

MR. NAMAN: I see the intent, then, of your tone shift --

MR. McKENNY: Right.

MR. NAMAN: -- to help those other ones --

MR. McKENNY: Right.

MR. NAMAN: -- move in more site-specific and give them some advantages that could be -- that's all.

MR. ABELQUIST: I think there's an area where the staff can provide additional guidance that would be very welcomed. Most licensees if they can possibly wrangle it would like to use the DCGLs that are provided from the screening models. That is certainly the first look.

If they can't make those cost-effective, getting back to what Eric said, that is usually when they look at MARRSIM and how many samples, what survey instruments are needed. They start down the path of looking at other scenarios.

I think there is a middle ground that is right for additional guidance. And that is those sites that don't necessarily want to come up with a different scenario. They just want some flexibility, some guidance on how to change a parameter or two, stick with the default scenario, residential farmer, if you will, so that they don't have to thorium, uranium, or radium DCGLs that are on the order of background, a little bit above background.

They're not a complex site. They really have no extensive residual contamination to speak of. The sites are generally clean. What is driving the aggravation is that they can't live with the DCGL from the screening model and they want to know how to go forward, what parameters to tackle, on what guidances they are doing sensitivity analyses to see which parameter I should tackle.

And there are sites that when you look at it from a risk perspective, there isn't much. They just happen to have had some thorium, some uranium, or some radium.

And they're not the complex sites we usually think about. They fall into this middle ground. And I think that is an area that the staff could provide some additional guidance that would

really be well-received by these mildly contaminated sides, I'll put it.

MR. McKENNY: Yes. That's alternate screening, regional screening. Some sort of hybrid, some sort of background from just the screening criteria has been on the books in a possible research action for quite a while. It's just it tends to get pushed back by other priorities.

It's always a consideration for an analysis. I mean, obviously in the time frame for this guidance, it's not going to be able to be done. We have like three weeks to do it in this guidance. We need a time schedule.

But it is probably the one that we would potentially address a number of sites and to just get them just to the point where they can probably be used, rather than go even further into site-specific analysis. We can always look at that. We can usually bring that up, float that back up every year with our research needs and consider that.

CHAIRMAN RYAN: I was just going to ask you, is there a way to structure at least the framework for that guidance? I mean, you probably can't give me the details obviously in a quick go-around, but why couldn't you offer that as an

alternative?

I mean, the one I am thinking about, if someone did site-specific KDs and decided to do a site-specific analysis and that was it and that changed nothing else.

MR. McKENNY: Well, technically it's 1757 that's already there. There is some guidance on just saying -- it goes through whatever you want to change. I mean, that is what the whole decision framework was about that's in chapter 1 of the section, that you look at what may be easier cost-effective to change and then run that through and then compare that to your measurements and some other decision-making to be cost sampling and some other -- and whether those DCGLs are now going to be acceptable to you as a business.

And that is how the decision framework already runs. Most of the guidance right now is not about scenarios. I mean, we have a lot of stuff on dose modeling there about just modifying parameters or removing a pathway between the easier justified than actually moving it, changing the overall scenario.

There is limited guidance on how to do sensitivity analysis. I will give you that. But there is a lot of guidance I feel to have that.

And, secondly, the standard thing to apply is that any site in that situation, if that is what they want to do, they should call their project manager and just say, "We'd like to talk to you guys on how we can do this." And we'll set it up, and we'll talk to them about it.

I mean, that's always the best. That's always the other way. If you can't figure it out from the guidances to get some face time to try to work with the staff on figuring out what is the best approach for that site.

MR. ABELQUIST: I think the issue is not one of whether the flexibility is there to do that. I think it's the fact that these non-complex sites typically do not have the resources to know what parameter to attack. And, like you said, it comes down to a sensitivity analysis.

There are dozens of parameters that could potentially impact it. And what we are talking about is maybe .5 picocuries per gram for thorium-232 is too difficult, but if I could change a couple of things legitimately to get it to three or four picocuries per gram, I now can go forward and do a MARRSIM survey, demonstrate that there is nothing there but background anyway. But at least I'm able to get off the blocks

and go forward.

Like I said, I think there is guidance in there that provides the flexibility to do it. What is missing in my opinion is the guidance to navigate through cost-effectively without asking a non-complex site become a complex site.

MR. McKENNY: Okay.

MEMBER CLARKE: Any other questions?

(No response.)

MEMBER CLARKE: Okay. Thanks, Chris. At this point let's break for lunch. Am I taking my life in my hands if I ask that you keep to the schedule and come back at 1:30? Let's come back at 1:30.

(Whereupon, at 12:42 p.m., the foregoing matter was recessed for lunch, to reconvene at 1:36 p.m. the same day.)

MEMBER CLARKE: Okay. Can we get started again?

Our Chairman had another meeting with another Commissioner and will not be able to join us, but at least now I'd like to get us started.

And before we turn it over, one announcement. We're permuting (phonetic) the presentations a bit. Jim Shepherd is going to go through this with both of his, and then we will turn

to intentional mixing of soils.

But before we do that, John Greaves would like to make a comment. I was remiss in not recognizing that before we broke for lunch.

So, John, would you?

MR. GREAVES: Good afternoon. Thanks for giving me a moment.

I really just wanted to interject after Chris McKenny's discussion, which I found to be an excellent discussion, and I would encourage the staff and the committee to especially look at this realistic scenario issue. There's a number of owners out there that are facing this challenge. It has festered for a couple of decades, and there's a large handful -- I'm saying like ten, 12 -- of owners out there who have uranium and thorium. It's not an option to wait for it to decay. It's long-life material.

Some of these owners include the Department of Energy and states, and they need an answer on what these realistic scenarios are. This business of thinking you can dig this stuff up later is just no a solution. If you're going to come up with something you really need to define it.

The Commission gave the staff direction to look at realistic approaches, and that's the challenge

Chris and company have, is to define what that is.

Kind of the vantage point that I have is that you're going to have multiple views. You're going to have stakeholder views as to what realistic scenarios are. You're going to have the owner's view as to what the realistic scenario is. You're going to have the staff view, and then ultimately it's going to get to the Commission on these hard cases. They all go up there.

So I encourage the staff, the committee, to look at this issue hard. I think it's good use, good risk informed use of staff resources to focus on this issue because you're going to do everybody a favor, but the owners need help here.

What is a realistic scenario? And defaulting to some conservative end to the constraint is not really going to solve the problem. So I just wanted to give encouragement and compliment the staff in making that presentation, encourage the panel here to give your own views on it, but there's a critical need for a large handful of sites that have been festering for some time out there as to what is a realistic scenario for these uranium, thorium, long-lived radionuclides.

And thank you for the moment of

interjection.

MEMBER CLARKE: Thank you.

Okay. Are we ready, Jim?

MR. SHEPHERD: Thank you. Thank you for bearing with me.

As those of you who have visited here for any length of time know, there's occasionally a slightly different kind of mixing that takes place on the Beltway in the afternoons. So Derek was kind enough to let me precede him.

What I'm going to talk about this afternoon is our plans to address what we call legacy sites, and thank you for the introduction to legacy site.

These are sites that have, very simply put, more contamination than they have money to remunerate, and generally they are sites that have uranium, thorium, long-lived contamination where waiting for decay is not really an option.

So we are proposing changing rules and additional guidance on how to reduce the likelihood of occurrence of these sites in the future. We're not talking about, for example, medical sites that already have a decay and storage option. We're talking about those with the long life.

During this fiscal year, we will be identifying the sites or types of sites that have this problem with what we're calling a hazard informed process as opposed to risk. Generally there's not a significant health and safety risk, at least not imminent to either the public or the staff. So we're using the term hazard informed so that we don't generate an unnecessary reaction.

The outcome of this is that we will come up with a list of sites or site types and inspection procedures to enhance what NRC will do at these sites in order to prevent them from becoming a legacy site in the future.

Next year, fiscal '06 and '07, in parallel with the changes to the rules, primarily 20.1406, we will get into the detailed inspection procedures that will be added.

Our approach will be a full range of parameters that can contribute to subsurface contamination will be identified. The very obvious ones, large volumes of liquid at the facility. Underground piping is something that we've had problems with. External tanks, goes outside the building that can leak into the ground and not be noticed.

Then we're going to gather a group of experts, people who are familiar with this, and evaluate these and come up with some method to prioritize those that we feel are the most significant contributors. This then will help us focus on what inspection procedures would be necessary.

There's a number of techniques to do this: straight expert elicitation. There's one I've used in chemical safety analysis called relative risk ranking. As you know, if we have to select from among a large number of alternatives, it's very difficult to do.

There's a fellow named Saudi (phonetic) that came up with the analytical, hierarchical procedure that reduces that to a pair-wise comparison. So we went two at a time, and then there's some fancy mathematics. We'll try the item matrices and item vectors and all of that that come up with a way of ranking relative importance.

Then next year we'll get into the specific NRC inspection guidance. I think in a number of cases we will be able to utilize existing guidance perhaps from reactor inspections; apply those to material sites; and in the event that we find some areas that are not covered by existing inspection procedures somewhere in the manual, we may then develop personal

guidance.

Along with this, again, next fiscal year, we will be developing additional guidance for the licensees on what to expect and how they can operate and ultimately design their systems for the new licensees in order to minimize the likelihood of subsurface contamination.

And that is essentially what I have to say on that particular topic. So if there are any questions, I'd be happy to entertain them then.

MEMBER CLARKE: Okay. Thanks, Jim. We do recognize that some topics are further along than others.

Ruth?

MEMBER WEINER: I'm curious as to why you're not using multi-attribute utility analysis as in Keane and Raphos (phonetic) books instead of the hierarchical ranking method.

MR. SHEPHERD: We haven't actually picked exactly which method we will use yet. I think those that are less mathematically sophisticated will probably be more useful.

What I expect is with the limited number of parameters that actually contribute to subsurface contamination, there may not even be a need to do a

sophisticated analysis. If there is, we will then look at the methods that are available. I just mentioned two possibilities. I didn't intend that to be a complete list.

MEMBER WEINER: I encourage you to look very carefully because MUA really, especially if you only have a few parameters, it's really not that difficult, and it's more robust mathematically than the hierarchical ranking, and you're less likely to get attacked for the ranks you come up with.

MR. SHEPHERD: Okay.

MEMBER CLARKE: Bill?

MEMBER HINZE: I assume in these parameters that you're talking about in terms of subsurface contamination problems that you're including all of the geoparameters. Is this -- I would have thought that this would have been broken out as a very special issue since we're dealing with subsurface contamination here.

MR. SHEPHERD: In my next presentation shortly, I'm going to talk in some detail about subsurface monitoring. In this case we are looking primarily at the prevention of the subsurface contamination, which really occurs before it gets there in the operation and the design.

I'm going to go on to groundwater monitoring definition, and it becomes difficult to pull them apart. For example, we could tie it into the 20.2002s. If you put it in the wrong place, you now have instant other sources of contamination.

MEMBER HINZE: In terms of identifying potential sites, I think that the geoparameters ought to be right up there in number one. Am I correct in that?

MR. SHEPHERD: The reason it's not is that -- well, certainly for the existing contamination that would be true because however they operate, the fact that the contamination got to the surface and spread is the major problem. Our goal initially will be to prevent future occurrence of that, which puts slightly less emphasis on what happens after it gets there, but certainly when we come to facility siting, the geoparameters should be a very driving factor.

MEMBER CLARKE: You know, one way to look at this, Jim, and other states have done this, is to look at it in terms of groundwater vulnerability. A lot of work is focused on site selection and where you would want to put things that could possibly contaminate groundwater and where you wouldn't want to put them, and I just want to follow up with Bill.

I think the subsurface hydrology, geology, all of the subsurface characteristics are pretty important up front. Groundwater monitoring is a device to insure that we have put it in the right place or it may be determined that we haven't, but when you're looking at prevention of the legacy sites, subsurface characteristics are critical.

MEMBER HINZE: And monitoring is always suspect. We've heard that from the practitioners here, if you will, and that's true, I believe. And so the selection of the site is really much more important than the monitoring. Monitoring is just a matter of validating it.

MR. SHEPHERD: With that direction in the questioning, if you'd bear with me, to talk a little bit about groundwater monitoring, which is really the next piece of the presentation, but there are obviously --

MEMBER CLARKE: Let's see if there are any other questions on this part and then we'll move to that.

MR. SHEPHERD: And then we'll go to that. Okay.

MEMBER CLARKE: Allen, do you have anything? Eric, we'll start with the panel. Tom?

MR. NAUMAN: Like Eric, at various plants that I've worked for in the past, nuclear utilities have incident reports that deal with spills. Is that the kind of thing that you're also using as a --

MR. SHEPHERD: That would be one of the sources of information, yes.

MR. NAUMAN: The thing is a lot of times at sites, you have degradation of underground piping and not know that you're -- you know, especially in rad waste discharge lines and ISFSI lines and water storage tanks that Eric knows what I'm talking about there.

There's a lot of different scenarios where you could have that, and just have to -- are you going to classify all of the nuclear utility sites into this category do you think?

MR. SHEPHERD: I'm not sure yet.

MR. NAUMAN: Okay.

MR. SHEPHERD: Basically we're looking at, Bill, whether it comes from a reactor type facility or a fuel cycle facility which has similar physical constructs in some areas and look for commonalities. I mean, one obvious one is the sites that we have today that have the extensive contamination are old, and that means a couple of things.

One, it means the equipment has been there a long time and is perhaps degraded. Another thing it means is one of the comments I got in the workshop is, "Well, we don't operate this way anymore, but you know, back 20, 30 years ago, if there was a spill we'd put a rope around it and tell people not to walk through it," and that was about the extent of the remediation, and ultimately it went wherever it went.

We're going to try and find other more slightly more scientific bases for the classification, but we'll just have to see where it leads us.

MEMBER CLARKE: Please.

MEMBER HINZE: Well, let me ask you. I think one of the things that would help me a good deal here is if you could give me some examples of the subject matter experts that you might have on your expert elicitation.

MR. SHEPHERD: Drew, with his experience in NRR. Myself, I've been in the business since about the turn of the last century, since 1976. We have four people from the states, a couple of whom have experience. We will draw on NRR for their experience as we see fit.

MEMBER CLARKE: Thank you.

MR. AUTRY: I'd like to go back to another

one of my little war story experiences with the old Allied General facility. This was quite a shock to us, but they have the large, high level waste tanks beneath the facility to accept the processing fluids from the separations area.

Well, we didn't think that anything had ever gotten into those tanks, but unfortunately they had many spills occur in the plutonium lab, and a lot of that was piped to this tank, and then when the natural uranium in some of the UF-6 facility, it got in there.

Well, also, for about 20 years, while this was a possession only license, they had in-leakage of rain water. So we were surprised to find about 300,000 gallons of contaminated water in this high level waste tank, and that had not been factored into the closure plan or the financial assurance monies that had been posted to clean the facility up.

So I highly recommend that you look at these facilities or put your criteria to make sure that these type of facilities are checked with tanks and whatever because you can have some surprises you don't know about in there.

MR. SHEPHERD: Thank you.

MR. DAROIS: You mentioned a focus on

external tanks, and I've had a little experience with that at Connecticut Yankee, but I don't think you can ignore internal tanks as well. If they leak onto a concrete floor, our experience is concrete is pretty porous to tritium. So that can't escape this.

And I think the other comment I had is, again, tritium related, but we've had, as far as I know, several problems in operating plants with spent fuel pools. We've had instances where plants were very confident that their spent fuel pools weren't leaking, and all along Salem was a good example of that. They had a problem with their tell-tale leak system not working.

Seabrook Station had a recent leak develop, a fairly new plant. At Connecticut Yankee, there's some suspicion that they have got an ongoing leak, albeit small compared to some of the other things, but still in the big scheme of things, it's a source.

So I think you should specifically target for nuclear plants at least a careful look at spent fuel pools.

It certainly begs the other issue. If you find them leaking, there may not be anything you can do about it other than define it and monitor it.

There are other safety issues involved in fixing it, but you know, it's going to vary depending on the plant, I suppose.

MEMBER CLARKE: Tracy?

MR. IKENBERRY: I guess I would just echo Dr. Weiner's comment about the use of the multi-attribute analysis might be real handy in the ranking process here. It might be real useful.

MEMBER CLARKE: Any other questions from the staff or in the audience?

(No response.)

MEMBER CLARKE: Okay. Thanks, Jim.

If you want to go into the next one.

MR. SHEPHERD: Okay. On groundwater monitoring, which is, as you can tell, closely related, and again, most of this work is going to occur in the next year, fiscal '06 and perhaps '07. So there will, I'm sure be additional interactions with the committee.

The guidance here will be directed primarily to the licensees in support of the rulemaking, and one of the first things we want them to do is define the subsurface. Now, this will occur ideally in site characterization at the time of site selection before the plant is constructed, and we will

look at things like what is the construct of the subsurface. How many subsurface aquifers, if you'll allow the term, are there? How many water bearing units are there?

Our experience has shown that there are many times connections between surface water and subsurface that provides a very viable contaminant flow pathway. We'll get into where should wells be, how many should there be, how often do they need to be monitored, and these parameters, particularly the how often will change as a function of where in the plant life the facility is and what has been found.

For example, if there is contamination found, we would then specify that there will be an increase in the monitoring frequency.

There will probably also be a review of the estimated cost to decommissioning with perhaps commensurate increase in the financial assurance to remediate the site.

We may also have the option of if a facility determines that there's a leak and they elect to clean it up at that point in time, that we would not have to put additional financial assurance in. One of the problems we've had, well, Sequoia fuel site, for example, they have some 110 wells in 85

acres, which is fairly dense for most of the monitoring. They have a fairly complex subsurface with alternating layer of sandstone and shale that are typically one, two feet thick, and they have ten foot streams in all of their wells.

So now they have created pathways and run-ons for the contamination to move, and when we take a sample of the well, we're not sure exactly what we're sampling, other than a sum composite of whatever got to the bottom.

We're also going to work with NRR, Tom Nicholson's project to help define a monitoring program that will support the performance assessment model which he used in the dose calculation for license termination and compliance with the release period.

It also goes to a piece of the post remediation guidance that Robert talked about earlier this morning where ground water is one of the things that will need to be monitored periodically during the long term. Again, most of this work is going to take place in the next year, in the following year in support of the rulemaking. So we'll have additional interactions with the committee to address it in more detail.

And that's the extent of what I have to say.

MEMBER CLARKE: Just one comment for me. I think you have a real opportunity here. One is that there are a great deal of lessons learned in groundwater monitoring from the early RCRA programs. The EPA, the one up gradient, three down gradient approach in the early days that was believed to be productive and then factoring in the complexity of the subsurface, all of the things that you've mentioned.

There's been a great deal that we've learned in some cases the hard way from monitoring hazardous waste facilities and designing monitoring programs for CERCLA sites.

And the other is that I think you have a real opportunity to be risk informed and performance based here, factoring in these lessons learned, and looking at the extent to which you want to be prescriptive and the extent to which you don't and, you know, focusing the guidance in a way that would be helpful, you know, from a risk informed performance based approach.

Bill.

MEMBER HINZE: Well, I'm sure you're well aware, Jim, of the need for geological and hydrologic

information well beyond the confines of the site. I assume that you're going to provide some guidance on the breadth, as well as the depth that needs to be investigated or needs to be brought into place.

MR. SHEPHERD: Yes, we intend to do that. Exactly what that guidance will say, of course, will be the challenge because the physical extent will vary from site to site. So the question is: how do we define what's big enough or small enough and deep enough, but the intent is to provide that kind of guidance.

MEMBER HINZE: Yeah, that will be a problem, but it can be done, I'm sure.

Of the sites that are up for decommissioning, what percentage have a comprehensive view available of the geological properties, of the site and the vicinity? Fifty percent of them, zero, 100 percent of them?

MR. SHEPHERD: They all have some. So we're into what really is comprehensive.

MEMBER HINZE: Well, I guess my question goes to the question of will they be actually characterizing the subsurface as part of the process here.

MR. SHEPHERD: Yes. In order to reach

license termination, they have to demonstrate that any residual contamination on the site will result in a dose of less than 25 millirem. So first they have to find it, and then they have to quantify it.

So if they haven't already done this, and many of them, for example, did some amount of geotech boring before they built the buildings 30 years ago, and they may or may not still have that information in a file. You know, if they don't, they they're going to have to go out and do some more monitoring, and this is what we found particularly at the reactor's sites who have their environmental program out around the site boundary and very little close in.

What we found is far and away the majority of them have some amount of ground water contamination, but the plans usually come in with we have no data indicating groundwater contamination when it's really the first half of the sentence that's true, because they've got the one well upstream and almost nothing downstream because nobody has measured the groundwater to see which way it's flowing.

So they then, as part of the decommissioning plan or license termination plan, have to do the additional characterization.

MEMBER HINZE: It seems to me that there

resides within the NRC a lot of guidance on this, and you should be able to liberally steal from these other areas to bring this in and to have it based upon lessons learned and a lot of thought.

A concern that might also be raised is the advisability of putting down holes, and you talked about the holes that sampled multiple aquifers, and so you don't know where the water is really coming from.

Well, there are ways around that, of course, but I guess I'd be concerned about plugging these holes. There are about as good a paths as you could find from the surface or the near surface to the subsurface, and I would -- frankly, I think that if I were involved in this, I would be very much interested in noninvasive techniques of characterization as much possible and would be fostering studies to determine that the existing wells are not just conduits, and that there are plugging guidance provided for holes that may fall into that category.

VICE CHAIRMAN CROFF: I hear what you say about groundwater monitoring, but I may be hunting for some context. Is this monitoring the guidelines you're going to provide part of a larger monitoring effort that addresses things other than groundwater or is this pretty much the focus?

MR. SHEPHERD: Groundwater, because it is so broad, literally, encompasses a lot of things. It is a piece, for example, of the long-term performance monitoring. It is a piece of the site characterization because certainly contamination exists in places other than groundwater. Surface water is obviously going to.

So I think the answer to your question is it is a part of a broad program, one of several broad programs.

VICE CHAIRMAN CROFF: What I specifically have in mind and where guidance may be needed is monitoring, for example, a cap over some contaminated situation, monitoring the performance of the cap itself in order to predict how well is it performing. Is it outside of guidelines and does it look like it's failing before bad stuff gets to the groundwater to start with.

MR. SHEPHERD: Right, and that's part of what basically Robert talked about some of that earlier this morning in Section 17.3.3.

VICE CHAIRMAN CROFF: Engineered barrier place?

MR. SHEPHERD: Long-term performance, right, and then the second piece was the barriers.

VICE CHAIRMAN CROFF: Well, I mean, if it's someplace, great. But, you know, my impression this morning is that he wasn't talking so much about monitoring the cap, if you will.

MR. JOHNSON: This is Robert Johnson. I'll just answer that.

I meant to include the cap and the guidance. In the summary it talks about disruptive engineered barriers like how a cap could degrade. That's part of it.

So the intent, at least of that portion that I talked about this morning was a general approach to what are your overall monitoring needs for the whole site, whether it's you know, the engineered barrier piece or other pieces.

Jim is just focusing on groundwater, but in different phases of the life of a facility. He's emphasizing more the operational phase and decommissioning, and then to some extent, you know, if there's a need for groundwater monitoring in the long term, then there would be some guidance for that.

VICE CHAIRMAN CROFF: Well, as long as it's in there someplace.

MR. JOHNSON: Yes.

VICE CHAIRMAN CROFF: I'm not telling you

how to organize it. I didn't want it to fall through the cracks.

MR. JOHNSON: Right.

MR. SHEPHERD: One of the questions that we need to address is where do we put this guidance physically? NUREG 1757 is read by those sites who are either imminently or have already started decommissioning. Where we would like to see this done ideally is back at the beginning of the plant life.

Typically an applicant for a license is not going to spend a lot of time reading decommissioning guidance. So we need to sort out where exactly are we going to put this so that people are aware of it throughout the life cycle.

VICE CHAIRMAN CROFF: Ask for a big enough decommissioning fund up front and you might get their attention.

(Laughter.)

MEMBER WEINER: I have a couple of questions. One of the problems with naturally occurring radionuclides is how much was there before the site was there, before the site contaminant. So I really have two questions.

For a brand new site, would you require a certain amount of monitoring before they do any

construction to get a background level?

And the other is: is there any way to determine that on sites that are already contaminated? Is there any way to determine or do you try to determine how much of the naturally occurring radionuclides is due to contamination and how much was there anyway?

MR. SHEPHERD: Well, the simple answer to both questions is yes.

MEMBER WEINER: Oh, that's nice.

MR. SHEPHERD: Yes. In the reactor world, for example, there is a requirement to do roughly two years of monitoring before construction begins.

MEMBER WEINER: Groundwater monitoring.

MR. SHEPHERD: We would like to include that in material sites as well.

In terms of an existing site, how do we determine what of what's being measured is attributable to natural background? The best we can do is to go upstream, if you will, either natural slope of the land, groundwater flow, predominant wind direction, and take samples in areas that we believe are not directly affected by plant operations.

Now, the fact that the plant is there and has disturbed the surface to some degree has a

negative impact on the purity of that data, if you will, but ideally we can get at least a reasonable estimate by moving out away from the site in an upstream area.

MEMBER WEINER: How do you treat monitoring results that are below detection limits or at detection limits? How do you treat those in your analysis?

MR. SHEPHERD: For the modeling that I've done, I've treated them as a no detect. It's not something that I'm worried about.

One of the question is: what should be the MDC, which is a function of the instrumentation, count time? You know, how well did they take the sample? Did they filter it? Did they preserve it and all kinds of other technical details?

MEMBER CLARKE: Is this an area where the NRC does have guidance? And some folks who will use half the detection limit, you can argue against using the detection limit itself, and you can argue against using zero, and a compromise that seems to have some statistical basis is using one-half the detection limit.

Is that an approach that the NRC follows?

MR. SHEPHERD: I'm not aware that we have

any written guidance on it at this point.

Eric?

MR. ABELQUIST: The MARRSIM Committee would recommend just using the value. If the detection limit was seven and you had a value that was four plus or minus three, the number to use is four.

MEMBER CLARKE: Yeah, because, again, there's a basis for having a detection limit and not quantifying at all until you get to another level. In other words, there's an area between the detection limit and what's called a practical quantitation limit. That's an area of very high uncertainty, and so some laboratories, as you know, will have reporting limits that are not the detection limit. They're higher than the detection limit.

Now, you can always calculate the number. You know, you can always use your calibration curve and come up with a number. I guess it's a question of policy, of what you do in that range between detection limit and quantitation limit and what you do below the detection limit.

MR. ABELQUIST: The answer that I'm familiar with is always use the reported result. That way you don't bias it one way or the other.

MEMBER WEINER: If I can weigh in on that,

I agree with Eric. You use the reported result, and when you can't get a result, that's not a datum that you use. You just say this was BDL or whatever, but you simply don't use those data.

MR. SHEPHERD: Oh, I agree. In a number of the tables, we will have numbers that may be above or below the detection limit, and then there will be blanks or dashes or whatever that are simply the licensee's way of reporting that however low it was, they couldn't get a meaningful reading out of it.

MR. DAROIS: If I may just offer something on this topic, I think it depends a little bit on what the goal of the measurement is. If you're looking to say is something present or not for the purposes of identifying whether there's groundwater contamination present, I think you need to make a statement on whether something looked like it was detected or not.

If, on the other hand, you're doing long-term trending or some other statistical analysis, exactly, Eric, use the value as reported. So using the value as reported doesn't help you if the question at hand is do I have groundwater contamination.

MEMBER CLARKE: Okay. Well, Eric, do you have any other? I think we're to the panel. So let's just go back to you.

MR. ABELQUIST: Okay. Thanks, Jim.

The one question that I have is what minimally triggers a licensee during decommissioning to begin a groundwater sampling campaign, and let me provide some boundaries for my question.

On one hand, you have licensees that for years, decades, during their operations they know they have groundwater contamination. It's no surprise, and a number of sites currently have that condition that we're dealing with.

The other end of the spectrum is the site is minimally contaminated, if contaminated at all, and has no indicators of potentially groundwater contamination, no underground buried tanks, no buried piping, and so that would be an easy answer.

The question I'm struggling with is what about those sites that have surface, subsurface contamination, have done some groundwater investigation, but not extensive at all, maybe just put a couple of holes in the ground and came back negative, nothing there. Is that sufficient for them not to embark on a groundwater sampling campaign, or is there enough guidance there for them to feel confident that they don't have to go down that route?

MR. SHEPHERD: I think right now there is

not enough guidance to answer that question. Our goal is to insure that there is enough. If there are, say, two holes and they show negative on their first test, well, what does that really tell us?

Almost nothing until we know where the sources of contamination are and which way the groundwater is going. So we need to develop guidance that will define a minimum program that will give us enough information to decide whether more monitoring is necessary, and we have to know where the aquifers are, water variables. We have to know which way they're flowing, something like how fast they're flowing, which will go to the frequency of monitoring or tell us whether there could have been something, but there was no monitoring. So a slug could have gone through.

But right now the guidance is not in enough detail to answer that question.

MR. ABELQUIST: And I would just add to my comment or the comment to my question is that in some instances, even with all of that additional information, it's still negative, and I think what's necessary is the ability to say we're not going to go down this route at the very beginning. That may be putting nothing in the ground to check the groundwater

was the right answer to begin with, and it's easy to follow this rabbit trail to say, well, if there was something, you didn't look hard enough, and so you end up in a situation where how much effort is going to be expended to prove a negative that they do not have groundwater.

So any guidance on easy outs as far as groundwater monitoring campaigns I think would be a valuable addition to the guidance.

MEMBER CLARKE: MR. AUTRY: Virgil.

MR. AUTRY: Our experience with groundwater monitoring, of course, is quite extensive, dealing with a lot of life sites since we're putting a lot of our materials into the ground there that will impact groundwater, which it has. So we relied on groundwater monitoring quite extensively.

We've got a lot of experience in that, but here, again, we only want to put a well when it's necessary to put a well. We'll only commit that surface with the groundwater. So be cautious about that.

Use of cluster wells is very reasonable, too. At different elevations, you can locate them in the same area. You could put elevations on that.

In our state we have well construction and

abandonment regulations which we require our licensees to use which are very prescriptive type requirements for putting the well in with qualified people and then what you do to abandon that well once you're not using it. We do have a well abandonment program which worked real well. So if you're not using that well, get her out of the ground and get it abandoned.

MR. SHEPHERD: Thank you.

MR. DAROIS: Let me share some experiences here from Rowe and Connecticut Yankee. The first thing I probably want to caution you on, and I think you have probably already thought this through is the issue of fractured bedrock and how complex that can make a groundwater situation, but as I say, I'm sure you thought that through.

You mentioned MDCs, minimum detectable concentrations in groundwater, but I think even before that we need to identify what's the suite of radionuclides we're looking for.

We ran into this at Connecticut Yankee, the groundwater monitoring program initially involved probably a dozen wells, well locations. Some of them were deep, some of them were shallow. In the first year or two monitoring was limited to gamma emitters and tritium gross alpha and gross beta.

Lo and behold, we decided to do a full suite of radionuclides and there's a story to that, but we found substantial amounts of Strontium 90, for instance, and I know the staff is well aware of that situation.

So in an operating world, the focus may be a little bit different, and I'm not sure you can say here's the list you always have to look for. In fact, at Yankee Rowe, there were times that we have a monitoring schedule where some quarters we look for this suite of nuclides and some quarters we look for that suite, but that's specific to Yankee Rowe, and they have different issues in Connecticut Yankee.

With regards to possibly contaminating multiple aquifers, we certainly ran into a problem at Connecticut Yankee with the wellheads not being maintained over time. Of course, it's a decommissioning site. You've got big Tonka trucks driving all over the site, but some of the wells turned into yard drains. Not a good situation.

So I think the lesson there is your guidance document needs to address that certainly, and they can get degraded to a point where it's problematic.

Also what happens when these things turn

into yard drains is they silt up, and the screen should be ten feet thick, and now the bottom five or six feet is full of silt, et cetera, et cetera. I think there's some issues we need to look at there.

As far as geocharacterization during site construction, you know, Connecticut Yankee and Rowe, they did quite a bit of characterization of their geologic environment, and I think most of the focus was seismic and structural issues. Plenty of information on that, but we had no idea in the case of Yankee Rowe that we had sand lenses with multiple aquifers, in some case went down to several hundred feet. So that was never characterized as part of the construction effort, you know.

So if we were to look at new plants, maybe that's part of the focus. It's not just the seismic and structural issues, but the aquifer characterization.

The last thing I'll leave you with is just to let you know EPRI is putting out a groundwater monitoring guidance document in another month or so. I know it's complete. I was one of the contributors to it. So I know it's done and it's probably in the printing stages, and I'm sure it's not perfect, but it does address a lot of these issues, and I don't know,

but just to let you know, take a look at it as you put your document together as well. And it's for nuclear plants. It's not for licensees as a whole.

MR. NAUMAN: If I might follow up on Eric's comments, all of the plants have their original design basis geological evaluation, but at Dresden we found that the way they thought the groundwater was formed was wrong, and we had fuel pool leaks there and some pipe leakage there, too, and we went in and put wells around the site, and we found that actually the migration was opposite of the way they thought it was.

So I think you're going to have to address whether or not their original parameters were correct. So you have to watch that.

And the other thing besides maintenance on the wellheads is maintenance in the fire protection systems. The sites have protection for their tank bottoms and their underground piping designed in, but it's a non-safety related system, low priority and at various sites you'll find the protection has been out of service for two years or a year, for five years, for maintenance and it doesn't get the focus that it needs, and it ends up resulting in leakage.

So those are other issues.

MR. SHEPHERD: On your groundwater flow,

was it that the original data was wrong, or was it that the construction of the plant actually altered what was going on?

MR. NAUMAN: You know, we weren't able to determine that. We just knew what it was, and we knew what it had previously been projected, and you're right. Maybe the construction of the site shifted the direction, but there's no way to get there other than trying to shoot bedrock where you come up with some kind of analytical decision on what you've found.

MR. SHEPHERD: Okay. Thank you.

MEMBER CLARKE: Tracy.

MR. IKENBERRY: Just a quick clarification, I guess. It wasn't clear to me how the revision to 1757 would be effective in helping on the design, construction and operation phase. Is that going to tie in with other existing guidance or how are you going to do that?

MR. SHEPHERD: That is an identified issue. As I said, people who are applying for a license are not likely to reach 1757.

MR. IKENBERRY: Right.

MR. SHEPHERD: Where we put this guidance exactly is not yet well defined.

MR. IKENBERRY: Okay. So it's an issue

you've identified and has to --

MR. SHEPHERD: Right. Any suggestions that you might have as to how we can get this guidance in a place that is available and will be used before people start thinking about decommissioning will be appreciated.

MR. IKENBERRY: Okay. That might be hard.

MEMBER CLARKE: Other questions for Jim? Staff?

MR. HAMDAN: Yeah, Jim, you asked representation about a place where you can go after monitoring, and I was thinking maybe one possible place you can put it is lessons learned. And the big lesson we learned over the last 50 years is that monitoring is an integral part of all these sites in all of the phases of a site operation. You need monitoring before licensing to establish the existing groundwater quality.

You need monitoring during operation to detect contamination when it occurs. You need groundwater monitoring to characterize the contamination of the evidence, and you need groundwater monitoring to achieve remediation efforts that you are doing that they are working.

So if you can't find a place for lessons

learned in your guidance, that's where I would suggest to put it.

MR. SHEPHERD: Okay. Thank you.

MEMBER CLARKE: I guess all of the different purposes and uses for groundwater monitoring, original baseline characterization, determining whether or not there is a problem from a potential existing source, monitoring whether there has been a release from a new source, all of these different uses for groundwater monitoring. It might be helpful.

MR. SHEPHERD: Well, I have a diagram of an octopus with those pieces on the leg.

(Laughter.)

MEMBER CLARKE: Robert mentioned a flow chart in the beginning, and that may be how that ends up as well, but there are a number of pieces to this undoubtedly.

Any other questions?

(No response.)

MEMBER CLARKE: Thank you.

MR. SHEPHERD: Okay. Thank you very much.

MEMBER CLARKE: Our next presentation is on intentional mixing of soils. Derek Widmayer will give that.

MR. WIDMAYER: Thanks for giving me the opportunity to follow up on a presentation I gave last year, and at that time I was kind of catching up to the rest of the LTR analysis. So as a prelude to my discussion today, it's sort of like having gone through the exercise of catching up. It's been sort of a good thing and a bad thing.

The good thing is when I presented to you last year, I felt like there were a number of things that I needed to develop in the guidance, and that there was going to be a great difficulty in some of them.

The good news is I am not quite sure it's going to be as hard as I thought. The bad news is that having learned more about some of the things, there are probably some things that I would have done differently when I wrote the Commission paper, but anyway.

Now, I want to present the information today very, very briefly, an organization of how we're going to put this particular set of guidance together because it is a new subject. And then also one thing I want to do is cover some comments that I received at the decommissioning workshop because they provided me with a variety of different perspectives on this

particular topic that I hadn't been thinking of before.

First of all, the existing guidance in NUREG 1757, it basically breaks down what the licensee needs to put in their decommissioning plan into three types of things, and Section 17.1.3 tells them what we need to know about how they're going to decommission the soil, how they're going to decontaminate and clean up their soil.

So right there is where I will refer to use of intentional mixing as something they need to tell us information about, and then we'll have a new appendix that defines everything else that we need to know about mixing.

So all of the remainder of the guidance, I think, can go into a new appendix, and the format of that will be essentially following the format that's in the rest of 1757, where I'll discuss some background, and then I'll have a section on what the licensee needs to provide, and then a section on NRC's evaluation criteria.

So to start off with, in the background section I would provide a brief background as far as what was in the SECY paper on intentional mixing, and just as a reminder, what the Commission approved was

the following: that we would allow intentional mixing to meet LTR release criteria in limited circumstances on a case-by-case basis, in addition to the current practice, which is allow mixing to meet waste acceptance criteria at disposal facilities.

And we went on to explain that any proposed mixing is part of an overall approach to the site clean-up, which includes application of the ALARA principle and considers only cases where it can be demonstrated that removal of soil would not be reasonably achievable.

So in the background section I need to explain what's meant by this overall approach to clean-up and what's meant by that soil would not be reasonably achievably removed.

So in the case of an overall approach, I think basically it's just consistent with what we've seen already in comprehensive decommissioning plans. What we don't want to see is someone who basically decides that they can just use mixing, you know, in a hodge-podge fashion to meet release criteria for their entire site. You know, what we want to see is an overall approach which includes decontamination of buildings, removal of materials from buildings, and just an overall approach where some use of intentional

mixing might be included in places where they are going to achieve the release criteria.

Now, as far as removing of soil being reasonably achievable, I've mentioned two examples of that in the past, one of which was that somebody was running out of money and, therefore, had no way of paying for the amount of soil disposal that they needed to do.

And the other was in a case where there was no burial facility to receive that particular type of waste that they're trying to get rid of.

The next bullet is one of the areas that came up in the decommissioning workshop, and also one thing that I forgot to preface my talk on, there are four specific things that I was going to mention to the ACNW and to the working group that I think would be good for you to think about and provide me with some feedback on. And this particular fourth bullet is the first one.

My breakout session at the workshop, the attendees were comprised primarily of licensees and people representing contractors who worked for licensees, and it was very limited attendance by anyone from the public or public interest group. So the feedback that I got at the breakout session was

that basically mixing is a great idea, and that anything that helps us get our job done should be advantageous, and NRC should promote it.

To the extent that they went so far as to suggest that given that NRC is trying to be more flexible and more performance based and more risk informed, that there was no need really to put any kind of limiting conditions on the use of mixing at all, that it should just in the context of risk informed regulation let anybody propose whatever they want to do as long as it meets the criteria and they have processes in place that they can show that they're controlling it.

So that was one thing I was going to ask the ACNW, is maybe a little bit of feedback on that. The Commission paper did say that there ought to be limited circumstances and the somewhat lopsided viewpoint at the workshop was that consistent with the way the Commission is moving, there should be no limitations on the use of mixing.

Now, the conditions under which the staff said that they would approve cases, there were two of them that were in the Commission paper. The first was that the footprint, the resultant footprint of the area that included the mixed material would be equal

or smaller than the footprint present before the decommissioning work began.

And the second condition was that clean soil from outside of that footprint should not be used in the mixture to lower the concentrations, and the second condition was caveated that there might be cases that you would need to include soil from outside the footprint if it was the only reasonable solution that the licensee could come up with.

So in the information to be submitted, one of the things that needs to be defined by the licensee is what they mean by footprint. What are the areas in which they want to use mixing as a process for clean-up?

And basically for the guidance in this area, there are a number of different ways that you could think of the licensee presenting the footprint, but it basically would be, you know, something that's reasonable, not to include large areas of uncontaminated soil so that they have a huge amount of area to include in their footprint and achieve the release.

You're looking at it in a way that you're going to have some hot spots, and there's going to be, you know, lower concentration material in between, and

some kind of reasonable area that would be defined by the mechanism that you're going to use for cleaning up, for example, whatever the equipment is that you're going to use, typical no digging and mixing kind of operation. It will probably partially be defined by, you know, what machines you're going to be using. So you can't just add on areas, you know, out of convenience, but something reasonable that's based on what machines you're going to be using.

The second bullet is really no different than what's presented now in a decommissioning plan. The licensees will show us the areas that are contaminated and the areas that are not contaminated and have some sort of approach for cleaning up the contaminated areas.

The other things that the licensee will have to tell us will be actually how they're going to perform the mixing. Now, I have done a little bit of research now in development of the guidance and have found a number of cases of mixing. I found different types of equipment that can be used for mixing.

Of course, one thing that we're familiar with is the mixing that's used for concrete. Now, that includes, you know, water as far as one of the materials that's being mixed, but there's also a

number of machines that are used to mix dry materials together also.

So whatever the machinery is that they're going to be using, that needs to be described and how the parameters and whatnot of the instruments are going to be set and, you know, how long it's going to be mixed for and how much material is going to be mixed at each lift or however they're going to do the mixing operation.

The instrumentation in support of mixing refers to any kind of measuring that they might do after the mixing is over to demonstrate whether or not they've achieved the homogeneity that they were trying to achieve and/or if they were going to be using the approach where they are meeting the waste acceptance criterion of a disposal facility, how it is that they've decided that they, you know, are putting into each drum or each shipment the material that meets that waste acceptance criteria.

The next bullet is another one that I wanted to ask for help from the ACNW on. When I wrote the Commission paper I used soil as the term, and that was in reference really to I mentioned before the decommissioning plans typically have three different things that they're trying to discuss.

One is the equipment and the buildings and things like that that need to be decontaminated and decommissioned.

Another area is the water, their surface water, their ground water that needs to be addressed, and then that which remains is typically lumped into the soil. Whatever else that's there that has potentially been contaminated.

So that's what we were kind of addressing. Could they use intentional mixing on that last thing that they need to address in the DP?

Well, as we learn a little bit more about what the licensees might want to do with mixing, you know, we were confronted with whether or not they can utilize mixing for other material, other than what you might just call soil.

So we have a couple of cases where licensees have slag and some of the slag can be relatively large. So the question has been posed, you know, can they use intentional mixing when they have something that's not really soil-like to begin with.

So I'm sort of -- I don't know -- between a rock and a hard place as far as whether -- not so much eliminating it, but when to make slag more soil-like, and one approach here would be that it depends

on the scenario that the licensee is presenting for his final analysis. Some slag might be advantageous to not break up some slag because you create an inhalation pathway or whatnot. So the question is: do we need to make slag more soil-like?

And if the answer is yes, you know, what kind of guidance should we put in there?

MEMBER HINZE: Could I interrupt you just a second there if I may?

MR. WIDMAYER: Sure.

MEMBER HINZE: Is slag typically contaminated homogeneously or is it just a series of hot spots?

MR. WIDMAYER: The slag?

MEMBER HINZE: The slag. What contamination in slag? Is it homogeneous throughout the slag or is it a hot spot?

MR. WIDMAYER: It can be both. I mean, some of them are very, very large piles of slag, you know, in a discrete area, and others it has been spread out all over the place, and you know, there will be hot spots that are just slag.

MEMBER HINZE: I was thinking more in terms of --

MR. WIDMAYER: In the slag itself?

MEMBER HINZE: -- a discrete --

CHAIRMAN RYAN: Do you mean is it biometrically contaminated or surface contaminated?

MEMBER HINZE: Well, that's another question, but I was thinking of individual particles of slag or materials of slag.

MR. WIDMAYER: I think typically slag tends to be homogeneous.

MEMBER HINZE: Homogeneous. That's what I thought.

CHAIRMAN RYAN: If it's biometrically contaminated, it doesn't matter what size the particle, I mean, what size the chunks are. If it's uniformly and biometrically contaminated, big chunks, little chunks, it doesn't matter, does it?

I'm thinking aloud here.

MR. DAROIS: I think it depends on not just the scenario you pick, but how you've modeled it to come up with DCGLs, and if you modeled it right, it may not matter how big it is.

MR. WIDMAYER: Along this particular line of thought, I got a comment at the workshop also whether or not I'd be willing to consider pretty much anything in mixing. In other words, rubblization, if we could take gigantic pieces of the containment

building and smash it up and mix it, and I mentioned at the time that the Commission had already addressed that particular situation and wasn't particularly in favor of that approach.

So I think we are just talking about the areas that need to be cleaned up, you know, the areas and the property that need to be cleaned up after removing the building or whatever else needed to be decontaminated.

On the final configuration, what I'm talking about there is if the licensee decides that they're going to take an approach where they dig a trench or something like that rather than just digging it up and mixing it and putting it back where it had been, that we'd need information on what that final configuration was going to look like.

And then if the mixing operation included a step or steps where the mixed soil needed to rest in another location while they prepared their disposal cell or whatever, how they were going to control that to make sure that it didn't become unmixed or wasn't remixed with something else, you know, just kind of basic good control of the soil after doing the mixing.

And finally, the evaluation criteria that NRC would be using in reviewing on a case by case

approvals, just determining that the foot print was the same size or smaller.

The second bullet addresses one of the comments I got actually from my state working group member. They were very sensitive to whether or not clean soil from outside of the site could be used, and previously what I had talked about was clean soil outside of the footprint.

So I think that I haven't quite determined this entirely to make sure I'm consistent with the Commission's approval of this, but I think that soil from outside of the site actually would not be used, but that we would consider using soil outside of the footprint. So I'll have to work on that a little bit.

What we might need to see in the ALARA analysis, stakeholder involvement was a concern of the Commission when they approved the SECY paper, and we told them that we thought that the process that we had in place would include stakeholder involvement in the development of the guidance, and also it would include stakeholder involvement in the case-by-case approvals.

But what we will do is specifically address stakeholder involvement when the institutional controls are going to be used because it's a requirement in the rule for them to have stakeholder

involvement in that case.

Now, the last two bullets are the last two things that I was going to solicit help from the ACNW or at least feedback. One suggestion from a person at the workshop was the use of a soil cap. If you used mixing, that you could tell them to put a soil cap on it. First, that would reduce the uncertainty in the use of this unique technology and help you with modeling.

And it would also contribute to perhaps making the case that the doses are as low as reasonably achievable, if you've required them, if you will, to cap it with something that you're certain is not contaminated.

And then the other area was some of the licensees said that it would be really advantageous for them to be able to use mixing for small volumes or insignificant areas, particularly perhaps around the edge of these areas they've declared to be contaminated areas, and they thought that, you know, it would be good to address that in guidance; that not necessarily they'd have to follow the footprint rules or anything, but they could just use it on a limited basis and in small areas.

Let's see. There was one other thing I

wanted to bring up. At our decommissioning counterparts meeting that we have once a year, it was discussed whether or not the use of mixing was on the edge of controversy enough that NRC would want to track these things in a separate database or something so that we would know when mixing was used and could have a readily available source of information for somebody that wanted to know how often has NRC approved mixing.

So we will be taking that under consideration also.

I'll entertain any questions. Of course, I don't expect anybody to have any.

(Laughter.)

MEMBER CLARKE: It will be nice if we surprise you. Let's start with Tracy.

MR. IKENBERRY: Well, I have several, I guess. I don't have them completely formulated yet, but this is an interesting area most definitely. Now, so far you have at least initially that removal of soil is not reasonably achievable in two cases, and that's if there's no funding and no burial facility available, and that's all at this point that you have.

MR. WIDMAYER: Right, at this point, yeah.

MR. IKENBERRY: Okay.

MR. WIDMAYER: I have had some suggestions as to if we took a more holistic view of it or a more risk informed view. If you had a case where a facility had a lot of chemical contamination and was dealing with a whole host of problems, there might be a case where the use of mixing of the radioactive waste that they had, you know, kind of pales in comparison to the other situation that they're dealing with. So it's not that it's not reasonably achievable to remove the soil, but it would be a better use of the resources to concentrate on the higher hazard material. So I've had that suggestion also.

MR. IKENBERRY: I can see where there might be some cases. That seems to be pretty stringent, those two cases, and there might be some more, some other cases where it could be done.

If you're going to think about allowing other types of material in the soil, I would think you'd need a different term for it because soil means soil to me, I would guess, and so if there's other types of material like slag that would be considered, I'm not sure that's a good idea either, but I would think of a different term at least.

MR. WIDMAYER: I don't think I would need to come up with other terms. I would have to make it

clear that there's other things.

MR. IKENBERRY: Just in the definition of what it meant?

MR. WIDMAYER: Yeah, that you can use mixing to include this other stuff, you know, and to tell us how you're going to do it.

MR. IKENBERRY: Okay. You know what? I might just pass this on to Eric. I want to think about this just a little bit more because I had --

MR. WIDMAYER: No passing. No passing.

(Laughter.)

MR. IKENBERRY: I can't come back?

MR. WIDMAYER: No.

MEMBER CLARKE: Tracy, we can come back.

MR. DAROIS: Can you go back to the prior slide?

MR. WIDMAYER: No, I've had my fun.

MR. DAROIS: When you say information to be submitted, what I thought I read in the guidance document so far here is that you're looking for this to be submitted in the LTP or the DP, and in two of the decommissionings I've been involved with, power plants, I don't think the DP or the LTP provided the or laid out the process by which we would evaluate various conditions. It was the process and procedure.

The site had not been fully characterized yet, and maybe there's no choice here, but I just want to leave that with you, that some of these things are defined as you go through the process rather than at the LTP or DP stage. So for your consideration at least.

As far as you mentioned the "R" word, "rubblization," that had a particular set of circumstances around it where we're taking it. At that point the utility was taking surface contamination, averaging it in with the contaminant volume, and then using that as a basis for using the concrete as backfill.

There are other variants of that, and one of them is happening at Yankee Rowe. They are using concrete as backfill on the site. We're dealing with some state issues on how much radioactivity can be in there, but if you model this thing right, it may not matter whether it's mixed in with soil and whether the concrete pieces are this big or half that size.

So I think whether or not you allow, you know, other materials to be mixed in with the soil, I don't know that it should be a hard and fast rule. I think there are other inputs as to whether or not that's okay or not. So just take a look at what's

happening at Rowe, I suppose.

And as far as the soil cap is concerned, just a little caution here. When you commit to using a soil cap and you take credit for it in the dose model, there are other pitfalls that come into play. Like we need to now evaluate the intruder scenario, long-term erosion of the soil cap and a whole number -- probably a few other variables.

So it certainly puts more of a burden on the dose modeling side of it, and you might want to mention that in the guidance document as just a little note of caution.

MR. WIDMAYER: Yeah, thanks.

MR. DAROIS: That's it.

MEMBER CLARKE: Virgil.

MR. AUTRY: I haven't put very much thought into intentionally mixing soils. I think that as an ex-regulator it would have been a very hard pill to swallow. In light of some of the interest groups, if I had to go to a public hearing that says we're going to intentionally mix soils to cut a concentration of radionuclides to make it acceptable, I'm not sure where this came from. Why is it coming?

I don't agree either with trucking truckloads of soil across the nation, moving from one

location to another. So I really don't have much thought other than that. It will be a very hard regulatory thing to try to do under state. I'm not sure how NRC would handle that, but it would be very difficult without some good reasoning and some sound science on it. Very difficult.

MR. WIDMAYER: And I think that we recognize that, and we are sensitive to that, and that's why we originally -- and we haven't moved off this position as of yet -- that it's only under limited circumstances that we'd consider this.

MEMBER CLARKE: Derek, I may be wrong, but am I correct in recalling that there are two cases now where this is being evaluated?

MR. WIDMAYER: Yeah. Just an update. The one case that I reported last time was Whittaker, and that's still in process. They were using the option of blending and then meeting waste acceptance criteria.

Now, what's interesting about that is it has run into a situation that Virgil was just alluding to, which is the receiving facility is having some difficulty with their state in allowing blended material to be accepted by the disposal facility.

And the other case was a situation with a

licensee in Pennsylvania. It looked to me like they were very interested in using mixing in part of their plan. They ran into the public acceptability issue in just their decision making, whether or not to even approach public around the site and say, "Okay. You remember the decommissioning plan that we submitted? Well, we're making a change to it that includes leaving some of this stuff here when we were going to take it somewhere else."

I never heard back from them. They were under some time constraints as far as submittal of the revision to the DP. So I think that they chose the safer route as far as their timing and public acceptance.

In the meantime, there's been another case that's come to us that we haven't even started reviewing yet.

MR. NAUMAN: Back to the slag issue, not dealing with slag; anything manmade. Every time you dig a hole on most sites, you're going to come up with items that are not soil-like, and whether you have to put rocks through crushers or sizing to reinstall it in the ground is where a lot of issues come up, and then you make the logic jump. Well, if it's okay to put a two foot rock back in the ground, why isn't it

okay to put a piece of two foot concrete in the ground if they're both potentially surface contaminated objects, but both of them very, very low level?

And that's where the bait comes from, I'm sure, but rocks and anything large that you dig up in excavation is probably something that you need to consider because it's a lot of work to bring in heavy equipment and crush it, size it, blend it homogeneously. It's a lot of extra effort and a lot of extra cost that's probably not resulting in any benefit or reduction of risk.

Running out of money as an eliminating condition, I think that's a claim that every decommissioning site will -- that's a bandwagon they all want to jump on, and they all can make a valid argument that, you know, they have limited funds, and it's supplied by the rate payers or in some cases not by the rate payers anymore.

And once you go down that slippery slope, there's no coming back because everybody is going to say, "Why are you treating me different than these other people who didn't have enough money set aside?"

MR. WIDMAYER: That was precisely the argument that was made at the workshop, was that, hey, everybody has limited funds. You know, we have a

certain amount that we're going to dedicate to decommissioning, and why wouldn't we use that, you know, the most expeditious way that we could?

And so they thought that it was sort of a -- they could see the opening already.

MR. NAUMAN: Right. Those are the two things that jumped out at me, is the rubblization argument with the rocks, and then the funding as an excuse.

MR. ABELQUIST: Well, I certainly have mixed feelings on this whole issue.

(Laughter.)

MR. ABELQUIST: It's late in the afternoon. Actually, when I first heard this concept being discussed, it was at the workshop, and I couldn't understand how it made sense, honestly. First of all, I think it would apply to a very small number of licensees, and I think the first of several things that started going through my mind was, first of all, if you're not going to dilute it -- and we've all heard dilution is the solution, but not in this case -- if it's okay by mixing it and not adding any clean material to it, why wouldn't it be okay the way it is? It comes down to a distribution analysis.

Mixing it certainly makes it easier to

quantify what the average contaminant level is. We don't mix soil all the time, and we still can determine the average. We just have to sample more.

So I guess that's one of the tradeoffs. If you mix it, you don't need to take as many samples.

The second thing that went through my mind is that it's 25 millirem plus ALARA, and one of the attributes of having material that's not homogeneous is that the hot spots can be plucked from what's left, and we usually call that ALARA in some very practical sense.

You know, we removed the hot spots. We don't blend them in. They're in many cases easily identifiable, especially slag. The sites I've been to, it's mostly soil, and when you find the slag, that's the hot spots, and I can't imagine that being okay to grind those up and mix them in when you could just as quickly start gathering them and separating them from the site.

Then the health and safety aspects. If you're going to go through the whole effort of start pulling out soil to mix it up, you're going to expose workers to all that material that they may not need to be exposed to at all.

So as I went through this and thought

about it, it just seems to, one, benefit a few, and I don't even think when I looked at it further that it's really that much of a benefit.

There was a site in Ohio that used a soil washer to remove some of the uranium contamination, and what this is like is a soil washer that's really not washing anything. It's just sort of homogenizing the soil, and it's going back.

It just seems like an awful lot of effort for a minimal benefit, if any. And I agree with what was said earlier. I can't imagine this standing up in a public meeting when you start peeling the onion back. It just seems untenable, in my opinion.

MR. WIDMAYER: I think one thing that I react to, Eric, and this goes a little bit back to the question that Virgil had, was I think that the intent when we first started working on this was that it would only benefit a few, and I think we were particularly thinking of facilities where, you know, we were limited in the way that we could take these traditional methods and get the job done because they were very low on funds, and whether or not this would help us achieve, you know, a safer condition with whatever money was left over.

The licensees were the ones that -- and so

you'll have to -- maybe you'll end up with a number of conversations with people as to what the real benefit is, but they seem to be, you know, in favor of this.

And I recognize the public meeting aspect of it, and we address that in the Commission paper, and there's not a lot that we can say in the guidance with respect to that, you know, other than for just pointing out maybe the obvious to the licensees.

CHAIRMAN RYAN: It seems like you've got a range of views to work with, Derek.

When I was thinking about the discussion, particularly the later points, it struck me that there are a couple of examples where mixing is allowed. Hardware, for example, irradiated hardware, the hot and cold ends of control rod blades in summer, you know, and then there's the times ten rule. You can have what, in essence, is a greater than Class C chunk of a piece of hardware and the low end is low. You're allowed to average over some reasonable volume, when sealed sources are disposed in fancier stainless steel capsules and, you know, there's an averaging that's allowed in that way, overall larger mass or volume.

I guess when I consider the broad spectrum of a teaspoon full of waste and a mountain of soil, that doesn't make a lot of sense to me, but when I

consider things that are, for example, just below Class A waste, and maybe just above in some portion of waste from a decommissioning, it seems very reasonable to me that that should be allowed to be blended if it accomplishes what is now Class A waste because the risk is about the same.

If it's a 1.01 Class A versus a .9 Class A, you know, it could easily be Class A. So I can see a set of circumstances where you could define it a little bit more precisely than just open ended, kind of using the examples of where mixing or averaging are allowed in current practices as at least a guidance on the thought process.

Now, I don't know if times ten or times 100 or what's the right range, and particularly for the materials you've asked about are soil, soil-like, slag, et cetera, and that would come from the folks at this panel, but I think there is a pony in there somewhere that's worth thinking about.

You know, the other thought I had was that we're sort of stuck on the paradigm of, to use an older word, of volume, curies per cubic meter, because that's the way we dispose it. But some of these other issues of the uniform/non-uniform distribution, you know, can be assessed in curies per pound, per gram,

per kilogram, whatever you want, and you could think a little bit more about, you know, what's the real risk in terms of the weight basis. It gets away from do I break up the rocks or not.

Also, I share the concern that just, you know, rubblizing stuff for the sake of rubblizing it into some uniform size doesn't seem to be all that comfortable to me because it seems like an ALARA question, a potential for inhalation exposure, let alone occupational injury of operating, you know, large pieces of heavy equipment, large quantities of bulk material. You know, somebody cuts a finger off in a rock crusher. That's as much, if not more, important than a fraction of a millirem of exposure.

So I just wonder what would be the return on some of those more aggressive, larger scale kinds of mixing, but you know, if somebody is stuck with 20 pounds of something that's, you know, ten times hotter than the other 100,000 pounds of stuff, I could see where a mixing process there would make some sense perhaps.

But when it gets to the extreme where it's not helpful or doesn't pass the laugh test, you know, at a public meeting -- we're going to take a million cubic yards here and a million cubic yards there, and

we're going to have a train. You know, it might just be silly at that point -- but I guess I would suggest that if you thought about from the examples of mixing that's allowed now in waste management practices as at least a guide or a thought process, that might be something to think about.

Those practical decisions are made all of the time. Trojan reactor vessel, steam generators, you know, one by one have gone down the road with an averaging process, and it's not the soil stuff you're asking about, but maybe if we could take those at least boundaries of mixing and averaging as a guide, we could think about what makes sense for soil.

MR. AUTRY: But you're not mixing two steam generators to make one.

CHAIRMAN RYAN: Well, but you do average the radioactive material over the grout content of the fill grout, you know, and there's a question --

MR. AUTRY: Well, you take credit for it.

CHAIRMAN RYAN: You take credit for it, but you, in essence, calculate a dilution factor in that grout to get an average condition, which is okay.

MR. AUTRY: But that grout is for other purposes though. It's not for --

CHAIRMAN RYAN: It is for other purposes,

and all the better. So all I'm saying, you know, it's not a direct analogy, and I accept that friendly amendment that it really isn't exactly the same, but you know, I just wonder. We have that kind of guidance where we've done that sort of averaging, you know, in different circumstances. At least it's something to think about. We're not, you know, in a vacuum then. At least we have some examples that are somewhat similar.

MR. NAUMAN: Well, let me expand on that.

CHAIRMAN RYAN: Sure.

MR. NAUMAN: There's two examples. You've got Shoreham and you've got Maine Yankee. The concrete is still at Shoreham. You know, it's released; it's terminated. It's still at Shoreham.

Maine Yankee --

CHAIRMAN RYAN: They didn't have a whole lot of megawatt dose per ton.

MR. NAUMAN: I understand.

(Laughter.)

MR. NAUMAN: I understand, but you could go down the same trail at Yankee Rowe or other places and decontaminate, leave the concrete on site and walk away, license terminated with the building staying there, and the concrete is still there, and it's still

slightly contaminated.

At Maine, you tear it down. It has to leave the State of Maine, and that's something else I meant to mention earlier, is the other stakeholders here are the local community and the state, and the rules that they'll put in place.

I thought we had a decent argument on Maine to go forward at one time, but then the other barriers, the stakeholders certainly didn't buy in, like Virgil said. You know, when there's cartoons in the paper of tricks-or-treating kids getting a piece of rubble, that was the local "which gasket" cartoon, you know. It doesn't fly in the public forum, and it's probably not ever going to.

CHAIRMAN RYAN: And for those wholesale large volume situations, I can understand that, but you know, for something that's a little -- and I'm talking about something that's a narrow subset of this broad spectrum, where you know folks are dealing with maybe smaller quantities of relatively like material where averaging gives them a clear path, perhaps even a less expensive or more direct path to disposal, that's worth thinking about.

MR. NAUMAN: Yeah, I agree.

MR. DAROIS: If I may? If I may, let me

just clarify a little bit on the Rowe situation, too. I didn't take the time to say this earlier, but in the case of Yankee Rowe, that containment was remediated. All of the surfaces were scabbled.

One of our deliberations with the state people was trying to meet a one millirem standard. I mean, there's still some residual radioactivity, albeit tiny amounts, and we were contemplating a one millirem release standard when it was in its final resting space on the site as backfill.

That doesn't look like it's going to go. We need to probably meet a free release criteria for the rubble, but nonetheless, if we're dealing with truly trace quantities of the material, I think the rules might change a little bit, too, I mean, for large volumes.

That's why I say it's a whole lot different than the Maine Yankee case, but it's still dealing with potentially trace quantities of material that you want to use as backfill.

CHAIRMAN RYAN: And, Eric, maybe that's the next cut, is to think about this as a -- and I'll just pull numbers out of the air -- a 1,000 cubic foot problem, a 100,000 cubic foot problem, and a million cubic foot problem. Because if you're dealing with

smaller or much larger quantities of things to be mixed, I think that, you know, it's a different case.

MR. DAROIS: And we weren't mixing it with the soil per se.

CHAIRMAN RYAN: Right.

MR. DAROIS: But we were placing it in the soil. So if you backed up and looked at the site, it sort of mixed.

CHAIRMAN RYAN: I understand.

MR. DAROIS: It was capped, you know. I mean, but it's not shovel-for-shovel mixed.

CHAIRMAN RYAN: And I guess that would be the comment, I think, Derek, to you, is that maybe it's a different problem at three different levels of volume, small, medium, and huge.

MR. DAROIS: May be, yeah.

MR. NAUMAN: And the other thing is the permitting process to dispose of construction, even if it's nonradiological now, you have to permit disposal of construction debris,a nd if you don't have the buy-in from the state and the local folks, you're not going to get a permit to dispose of clean concrete on site, let alone anything that was associated with the nuclear.

MR. DAROIS: Right. That's where we're

at, as a matter of fact.

MR. NAUMAN: Yeah, and that's the ultimate trump card that they hold, and they say that's fine. You still have to get it off site, and you're in violation of our local ordinance.

CHAIRMAN RYAN: One last point. I think, Tom, we've talked a little bit about it in a couple of different spots today, and that is that all that we're talking about in terms of disposal is with regard to just the radiological constituent, and there's a host of other concerns, whether it's chemical or subtitled B or C or whatever else it might be that really are a mix of local and state and maybe federal control based on where you are.

So I think the caveat probably runs through everything. This is after you've met everybody else's requirements, here you go on the radiological part. So there is a broader picture if it's a practical problem.

MEMBER WEINER: You mentioned, Derek, that when you make the decision to allow intentional mixing, it's risk informed, and I was wondering when you have a risk informed decision like that, do you consider occupational rad risk as well as public rad risk, and do you consider non-rad risk?

I mean the risks of moving heavy equipment, as has been pointed out, are considerable, and they sort of swamp other risks. Do you consider those?

MR. WIDMAYER: Yeah, I believe that we would, and I think that we would include that in the guidance, too, as part of the discussion, you know, that we will want presented and it will help us make our decision, yeah.

MEMBER WEINER: Because it seems to me that if you simply were stuck with the scientific argument, you could make an argument, especially since you have exceptions, that making a risk informed decision really is all you need, and you don't need any other guidelines.

But I'm sure that would not stand up in a public forum. You've got to have some guidelines, and I guess it rests with you all to make that -- to balance that decision because I think Mike has put it very well. In some instances it's pretty clear that you could do intentional mixing with on-site clean stuff, with contaminated stuff, and in some cases it just would never, never fly.

That's the only comment I had.

MEMBER HINZE: Derek, I see the focus upon

the footprint, and I interpreted that as this being a surface contamination problem. Have you thought about this in terms of the three dimensional aspect of it?

MR. WIDMAYER: Yes, and in fact, that's a little bit of the challenge. It's not supposed to be indicative of just surface. I mean, we're talking about subsurface contamination. You know, what you get in a decommissioning plan, of course, is, you know, something that they've mapped it out on two dimensions. Okay?

So you have basically the affected area, if you will.

MEMBER HINZE: Right.

MR. WIDMAYER: And that's what I'm referring to.

MEMBER HINZE: But are you giving guidance for the third dimensional aspect of it?

MR. WIDMAYER: yeah, and that has to do with how they do the mixing. I mean, the bottom line when you get to the end is that if it's homogeneously mixed, then whatever you have on the surface is going to be what you have all the way through to the depth.

MEMBER HINZE: So what do you use, a super plow?

MR. WIDMAYER: Well, that's the challenge,

some sort of super --

MEMBER HINZE: You're mixing activities there. I can visualize a super plow that if you had this mapped out in three dimensions, you might find that you wouldn't have to handle it at all, except for a plowing facility associated with it.

MR. WIDMAYER: Yeah, like I said, I've looked a little bit into the machinery. There are machines that what you would do is dig it up and run it through this machine, and it supposedly make it homogeneous, and then you either put it back or put it into your disposal cell.

MEMBER HINZE: Still a shell game.

MR. WIDMAYER: Yeah.

MEMBER CLARKE: But all of the techniques you're looking at do require excavation; is that right?

MR. WIDMAYER: Not necessarily, but experience where somebody has just used the tilling. Typically, you know, it's not really assured that it's a homogeneous mixture if you just do the tilling operation, and we have examples where, you know, we could show that or mention them, that it wasn't successful in that particular case.

MEMBER CLARKE: I'm sorry, Bill. Were you

finished?

MEMBER HINZE: I'm finished.

VICE CHAIRMAN CROFF: I'm going to take away from what you said by way of introducing some of the issues and the discussion around the table that the two foremost issues are whether to try to establish a priori limits on the number of applications that might come forth or just open the doors and say we'll evaluate anything on a case-by-case basis.

And if you do have a priori limits, how to articulate them, what cases to narrow it to and how to state them.

But a question of numbers. If you were to open the doors, do you really expect that great a demand, if you will, the number of cases that would, I guess, wave a red flag is the only way I can say it. I mean would you just expect a few of these?

I'll take away from your discussion that, you know, you only expected a few to start with, and then at the workshop, you know, all sorts of licensees said, well, you know, I'd like that, too, but will these cases really come forth? Would there be that many out there such that, you know, there is an issue here that's going to have to be faced?

MR. WIDMAYER: I don't know. I mean, one person's few is another person's many. I've actually been surprised at the interest so far. I thought that it was a good idea as far as proposing something that was out of the box and that was a unique option, and that basically the public acceptability aspect of it would pretty much turn anyone off.

But I've been kind of surprised at the interest so far. So.

VICE CHAIRMAN CROFF: I attend the workshop and the session you chaired there, and I came away with a fairly clear impression that many of the licensees had let's call it self-imposed limits; that maybe they'd like to use it, but they weren't about to go too far, like you know bringing soil in from off site. They knew the public would not like that, and so they weren't going there because if they attract too much attention, they just can't do what they want to do.

So there were a lot of self- -- I got a sense that they were self-controlling themselves or, well, they said they would. Let's put it that way. We don't have any evidence of this.

I don't know. You know, where I'm coming from is whether there's a real enough issue to be

worth a lot of this trouble, and I gather there's no statistics or no firm knowledge. Is that where it is?

MR. WIDMAYER: Yeah. The one case that I mentioned before, the licensee would be confronted with taking the decision that they had made already and showing where all of the waste was going to go and all of those, you know. It's going to go real far away, and changing that to, okay, some of these radionuclides that were going to go to Utah are going to stay right here.

And they had already had a large contingent of people that lived around that were, you know, pretty active as far as being involved in the facility and the plans they were going to do.

So, you know, that was changing the course, and they decided they -- you know, I don't know if this would be easier, quote, unquote, to do if you start all the way at the beginning. Okay. This is part of the proposed approach that we're going to take, you know. We're going to do all of these various things, and some of it is going to include mixing and some of those radionuclides --

VICE CHAIRMAN CROFF: My mindset here is reversing courses in any form is just a loser.

MR. WIDMAYER: Yeah. So in that respect

I've been surprised because, you know, we've had, let's say, four licensees that were already in the process of decommissioning who were at least willing to consider changing the course.

Now, I don't know about somebody who is just starting and saying, "Okay. This will be a great way for us to efficiently spend our money, you know. We'll use this mixing approach." So I don't know.

VICE CHAIRMAN CROFF: Okay. Well, that's another variable we'll have to think about. Thanks.

MEMBER CLARKE: Anyone else? Any other questions?

Go ahead, Rick.

MR. ABELQUIST: I thought of one more thing. If this is opened up, Derek, and licensees start building upon this, I could see a slippery slope leading into final surveys.

MARRSIM, as many of you know, has a classification scheme and Class 1 would be driven by the potential for hot spots, and for many licensees, that's a real burden when they have to demonstrate that their scanning capability for hot spots is acceptable to meet the hot spot limit, if you will. Sometimes they end uf taking many, many more samples than the statistical test requires simply driven by

the need to demonstrate their scan capability to see these hot spots.

Well, if all of a sudden word gets out that, hey, NRC is accepting soil mixing instead of designing your survey based on MARRSIM, mix up the soil across your site, and then come back and propose just statistical based sampling because no longer would there be a need to do any scanning for hot spots because, by definition, you've removed the hot spots. You've mixed them in.

And so not that that is necessarily unacceptable. What it does though is put a huge burden on looking at how well the soil was mixed. And so before, you had that issue covered by making sure the scan capability could see hot spots. Once you go to mix it, now the question is you no longer have to look for hot spots, but you do have to assure us that it's mixed sufficiently well that we're comfortable that you're not going to need to look for hot spots.

So that's just another wrinkle on the whole implementability of this.

MR. WIDMAYER: Yeah, and I kind of really only touched on it briefly, but I think that would be an area of difficulty in the review, is the demonstration by the licensee that it's mixed

appropriately and whether or not that's even something they could achieve. Maybe we would just stick to the MARRSIM approach even after the mixing.

MR. DAROIS: But, Eric, if this is a subsurface situation, MARRSIM doesn't address that. We're not scanning for subsurface activity.

MR. ABELQUIST: I'm just saying if this process is available, can you stop it from being just surface. I'm just saying if all you have is surface and it's hot spots --

MR. DAROIS: If it's just surface, right.

MR. ABELQUIST: -- mix it all up and why am I scanning anymore?

MR. DAROIS: But I thought the intent was for subsurface.

MEMBER CLARKE: Okay, Derek. Thank you very much.

We're due for a break. Let's take it and let's be back by I'll say 20 till.

(Whereupon, the foregoing matter went off the record at 3:26 p.m. and went back on the record at 3:43 p.m.)

MEMBER CLARKE: Okay, folks. Can we get started? We're coming down the home stretch. We have one more presentation and then the roundtable

discussions. Our next presentation is Rafael Rodriguez.

MR. PACEKO: Before we start, I just want to kind of put this in perspective a bit. What we've heard up until now is guidance revisions that we're preparing, and that was under the first half of what I referred to as the Integrated Decommissioning Improvement Plan earlier today. What we're going to hear now is not part of the guidance part of the Integrated Decommissioning Improvement Plan, but it's part of say the other big chunk in the IDIP, which is the program evaluation part of the Integrated Decommissioning Improvement Plan. And a big part of this also is lessons learned. Commissioner Merrifield has discussed it numerous times when he's made presentations. His concern is that there's a number of reactions that are undergoing decommissioning today, and then there might be a lull. And then later on there'll be another slug of reactors coming through the pipeline, and we don't want to lose what we've learned currently. So a big part of our IDIP is the topic of lessons learned. And today, Rafael is going to talk about the status of where we are on that particular aspect.

MEMBER CLARKE: Very good. Thank you,

Drew.

MR. RODRIGUEZ: Hi, good afternoon. My name is Rafael Rodriguez. First of all, I would like to start out for your attendance today. I'll give you, like Drew mentioned, a status of our efforts on the decommissioning lessons learned.

Basically, the agenda for my presentation, I'm going to give you a little background information of what is the genesis, if you will, of the lessons learned, the scope of the process that we're going to follow to collect and disseminate these lessons learned. I'm also going to cover the current status of our efforts, where we are right now in terms of collecting this valuable information. And finally, I'm going to explain our future plans for short-term and long-term vision of the lessons learned.

First of all, I would like to discuss some background information. Basically, the first way of lessons learned go back to 2002 when we had our Regulatory Information Summary, and a group of questions and answers that were incorporated in Appendix O of NUREG-1757. And also, we had the annual briefing to the Commission, the annual status of the Decommissioning Program back in October of last year, and there was an SRM dated October, 2004 basically

directing the staff to work on lessons learned and get back to the Commission this year and report our status on those efforts. That's the genesis of the process or the project that we are doing right now.

The scope of the process, basically I will use three Is, which is basically, number one, identifying this information, these lessons learned. Number two, immortalizing and incorporating. Now identifying these lessons learned, we're going to have like three groups or sources of information for these lessons learned. And this is one that came from the decommissioning work, which is basically licensees and the staff that have the practical experience on these lessons learned, industry groups like the Fuel Cycle Facility Forum, EPRI, and other groups. And finally, the agreement states that will also give us good feedback on the lessons learned from their perspective.

On the immortalizing efforts we're going to incorporate this information on NUREG-1757, and also our decommissioning web page that we're going to have this resource to make the information available to the public and all the members of the decommissioning community.

And finally, on the incorporating part,

basically, as I said, we're going to share this information through NUREG-1757 and the decommissioning web page with the DCD Staff and management, the current decommissioning licensees, those facilities are conducting decommissioning activities right now. Future decommissioning sites, and by this I mean like our next way for decommissioning facilities will start decommission activities ten years in the future, or maybe more. And finally, these new facilities that will be built in the future, so basically like Mr. Orlando said in the decommissioning workshop, how we make sure that these lessons learned are basically the standard, the SOP, the Standard Operating Procedures of the future facilities. So basically, this will be the audience for these lessons learned.

On the current status of our efforts, basically at this point we're collecting lessons learned from two sources of information. Number one, the DCD Staff, licensees, and again, this goes back to a recommendation that a licensee made during the workshop, that the staff should be in contact with the licensees and try to collect lessons learned from them. And also, the transcript from the workshop. We believe that there's valuable information there that we can use, and could be potential lessons learned,

but that's another good source of information.

To, let's say, help in these efforts we have kind of like a working group within our directorate that basically will help in screening the information and categorize these potential lessons learned, so basically we're going to have these pieces of information subdivided in different groups.

So basically, where are we going? What's our vision for this? As I mentioned before, we're going to incorporate information in NUREG-1757 and the decommissioning web page so this information could be available to the public and all the members of the decommissioning community. Also, we're going to have to report to the Commission this fall on the status of these efforts, what have we accomplished, and what we are going to do in the future. And another thing which I think is quite interesting is the fact that since this is something that will be forever, so people now and in future generations should have access to this information, we would like to consider options for a more integrated mechanism to load, store, and share lessons learned with the decommissioning community, so all this amount of information is consolidated in one place, and basically anybody that is interested in reviewing and

learning from these decommissioning experiences can have access to this information and use it for their benefits.

And part of our future plans, as I mentioned in the beginning of my presentation, we're going to use —– we would like to discuss a collaboration with industry groups and Agreement States, because we believe they have valuable information, and they can give us good feedback in terms of lessons learned, since they are also being affected by our regulatory process. And also, would like to consider other lessons learned from other organizations that have decommission experience like EPRI, Main Yankee, and I believe they have a document that is publicly available, where they are consolidating all the lessons learned from their decommissioning project, and other entities like ORISE, and I think they have what's called a Decontamination and Decommissioning Science Consortium, and we believe that's a valuable source of information to basically learn what lessons they have learned, and how that can be incorporated into our regulatory process.

Basically, that concludes my presentation, and with that I'm open to questions that the audience

may have.

MEMBER CLARKE: Okay. Questions for Rafael. Let's start with the committee.

MEMBER HINZE: Rafael, in terms of the lessons learned, do you plan to put this on the website, is this going to be hard copy, or is this just going to be presented at the Annual Decommissioning Briefing? Can you explain a little bit further what you mean by the third bullet of future plans?

MR. RODRIGUEZ: Okay. Future plans - you mean the options for more integrated mechanisms?

MEMBER HINZE: Right. Right.

MR. RODRIGUEZ: Okay.

MEMBER HINZE: Are you going to put this on a website?

MR. RODRIGUEZ: Yes. That's the challenge. Right now, I think part of the web page, right now we have like three lessons learned, and they are going to be available to the public. But if we look like a long-term basis, we're talking about hundreds, maybe thousands, and this is something that will be forever, so we'd like to have like a more integrated mechanism, and we're considering different options.

For example, we could have a database, because one of the recommendations that we got from the workshop was we would like to have all this information in a very user-friendly way so we can just go there, get the information that we want, and period. We don't want to struggle with that, so one option could be a database system having several capabilities like Google or Webcrawler. That's one option.

Another option could be, for example, a NUREG-type document or something that is kind of like an encyclopedia. And basically, the information will be indexed there, and somebody can go there and retrieve the information. So the whole challenge here is to gather all that information, put it in one place, either in hard copy or an electronic system, or something that is user-friendly for the decommissioning community.

MEMBER HINZE: So these lessons learned will be written primarily by the NRC staff, but there will also be, like those documents coming out of the Maine Yankee, so will there be a filtering by the NRC on these lessons learned?

MR. RODRIGUEZ: Well, basically, the filtering - like I said, the working group, basically

we are using the staff and the licensees, where the staff is supposed to be coordinating with the licensees, get the information. And when we see this information - okay, is this information of significant benefit to many licensees. It could be positive stories or negative stories, but it's something that has to be beneficial to either reactor licensees or material licensees.

MEMBER HINZE: So it will be filtered to some extent by the Nuclear Regulatory Commission.

MR. RODRIGUEZ: Oh, yes.

MEMBER HINZE: Well, it sounds like a great idea and very useful.

VICE CHAIRMAN CROFF: Will each lesson, let me call it, be put in a standard kind of format with standard data fields?

MR. RODRIGUEZ: Yes. What we're thinking right now, we're going to try to develop like a standard format, and that will be the format for every piece of information that aligns, for example, the summary and benefits, how this piece of information —– a concise summary and how this piece of information is beneficial to multiple licensees. And basically, probably we'll make reference to other pieces of information that will expand on that subject. There's

a SECY paper on what the approach that was followed - the Kiskey Valley Water Pollution Control Authority, and then that's one of the lessons learned that will be available for the public in our new decommissioning web page. And basically, with that format, there will be a concise summary, what is the benefits of that lessons learned, and where the user can go and get more details about that lessons learned. We're going to use the same format for all the lessons learned.

VICE CHAIRMAN CROFF: Okay. Thanks.

CHAIRMAN RYAN: I guess I have a suggestion more than a question. We've talked today about different parts of the guidance document that's coming out; for example, engineered barriers on site disposal, realistic dose scenarios, on down through all the talks we've heard today, and I assume that tracks some with the Table of Contents of the guidance document that's forthcoming.

Please organize the lessons learned with the same Table of Contents, so that if I want to know about lessons learned on dose scenarios, it's organized in the same way as the guidance document. That would be a very helpful way to do it, so that you're actually mirroring the guidance document. And tell folks it's the same Table of Contents; if you

want lessons learned, click on this button and this topic, so if they're struggling with one issue or another and they want to explore the information you've got on that topic, they can very easily get to it with the same organization as the guidance itself. Thanks.

MEMBER WEINER: What is a lesson learned, and what really isn't a lesson learned? I mean, how do you distinguish?

MR. RODRIGUEZ: Okay.

CHAIRMAN RYAN: That's a good one.

MR. RODRIGUEZ: I knew that was coming. Okay. As I mentioned before, we have this sort of working group that has the necessary expertise in the material decommissioning side, and the reactor decommissioning side. Basically, to start with your definition, that's kind of relevant, but the definition of a lesson learned, it's a positive or negative experience that is worth sharing with multiple licensees.

For example, a licensee did something that worked for them and saved them hundreds of thousands of dollars, so this something that should be available in the public web page, and basically it's a way of communicating to the decommissioning community hey, I

did this. It worked for me. Maybe you should try it, and maybe it will work for you, as well. On the other hand, it could be a negative story, like I did this. I didn't work for me, so be aware of this, and don't do it, that way we will avoid recurrence.

MEMBER WEINER: I'd suggest that your very first statement was a very good one. It's one that is worth sharing with other licensees and practitioners and NRC, and I'd suggest you put that statement at the top of anything you put on the web. These are lessons learned because. That's it.

MR. RODRIGUEZ: It has to be of significant benefit to many licensees.

MEMBER WEINER: Yes. And I think that's a very good statement to make when people say what is this? It's great. Thank you.

MR. JOHNSON: If I could just add one thing, Robert. When the new website comes up the end of this month, the example page will be up there, and it begins with that definition.

MEMBER WEINER: Oh, thank you.

MR. JOHNSON: So we already have it there. At least that's what we were attempting to do, because it's a good question.

CHAIRMAN RYAN: The other question is, how

do you plan for, or are you planning for ongoing involvement of practitioners like the five folks that are sitting at this table? I think when you think about lessons learned, there's a lot of hard fought lessons from folks that are —– certainly the Agreement States that you've mentioned and licensees, but then there's a whole bunch of folks that are not licensees, but helped them in one way or another, and work across many licensees, so the forums and the workshops, and the way you can get those lessons learned, I think thinking about how to continue to gather this information over time from other folks other than licensees or regulatory authorities, whether it's NRC staff or Agreement States staff is something to think about, too.

MR. RODRIGUEZ: So if I understood your question correctly, you're saying like these other people, groups, companies will be able to be involved in this process.

CHAIRMAN RYAN: Exactly.

MR. RODRIGUEZ: Okay. Let's say a long-term vision of what we want for this lessons learned project, we were thinking kind of like an interactive portal, so there will be like a submittal form, if you will, where people will be able to go to the web page

and then provide input on the lessons learned.

Another thing, and this is something that we'll need to give a lot of thinking about, is that one of the recommendations that - and maybe you, the ACNW, can give me some feedback or suggestions on this - one of the suggestions that a licensee made during the workshop is, you know, NRC, this is a very resource-intensive project, so you should not take everything on your shoulders. So basically, all that we have mentioned is under the assumption that we'll take the lead for that, but maybe the ACNW can give me some guidance or suggestions in that regard. But if we take the lead, that's one possibility creating this interactive portal so people, any member of the public or the decommissioning community can go there, provide input and then that information will be screened and reviewed basically the same way the information is being reviewed right now.

CHAIRMAN RYAN: Yes. And again, I think that's a little bit of a build it and they will come kind of view. I would caution, though, that sometimes the folks who are practitioners are so strapped for extra time to do these kinds of activities that you've go to be guarding against the fact that you won't get much feedback because, frankly, they're too busy doing

their real work. So somewhere along the line, if they're going to participate, you've got to create a benefit.

Now having said that, I don't know what the exact right answer is at the moment on what that would be. Money is always good.

MR. RODRIGUEZ: Yes.

CHAIRMAN RYAN: But certainly getting access to everybody's lessons learned or being able to participate in workshops that are helpful or those kinds of things, I challenge the staff to think about how do you create the incentive for the practitioners to participate, because without really a mutual benefit, it won't happen so well, I don't think, so there's a challenge on both sides. Is there a benefit to participating? I do have a good lesson learned - I should contribute it. But by the same token, what's the return on investment of that time for me, as a practitioner? I'd be thinking those thoughts if I was in that setting.

MR. RODRIGUEZ: I think it's a balance, as well. Because, for example, a lot of people said in the workshop we need to put everything in a very user-friendly environment, so if we want to use something like let's say a Google-type database system, so

basically you put your information and voila, get your results in a matter of seconds. That's one option, but also you have to think that's a database. That will be loaded with hundreds of information. It will require maintenance, that involves a lot of money.

On the other hand, you have these let's say NUREG-type document, you put the information there, and it's not as user-friendly. You have to struggle a little bit. We have the information consolidated there in one place. You see some box there, as well, so I think it's kind of a balance. And again, we're considering several options. We haven't made a final decision on which way we'll go.

MEMBER CLARKE: Okay. Let's turn to the panel. Tracy.

MR. IKENBERRY: I don't have anything.

MEMBER CLARKE: Oh, I'm sorry. Did I miss you?

MR. DAROIS: I think this is certainly a lofty goal. I think it can be an enormous amount of work. And, Mike, you said something earlier that I guess reinforces it in my mind. You're looking for the Index or the Table of Contents to look like what we're putting out here in 1757. I don't think you can, because unless we're limiting the scope to just

the issues in 1757, you're not going to be able to. For instance, methods of containment destruction - what's the best way? What's lessons learned, what's not lessons learned?

CHAIRMAN RYAN: And you're right. Maybe there's a whole other table, but I'm saying let's try and organize it around some data or flag that is familiar to practitioners ——

MR. DAROIS: I don't disagree with the premise, but there's a lot of lessons learned in decommissioning that aren't addressed in 1757.

CHAIRMAN RYAN: It's a good stab or a bad stab.

MR. DAROIS: Exactly, things like that. The other thing that concerns me a little bit is, there's a little bit of chest beating that goes on sometimes. I mean, we've all been to conferences perhaps, or workshops or whatever, and someone gets up and says boy, I did a great job on this. This is the best way to do it, and you peel the onion on it and you find out boy, that was a failure depending on who you talk to. I mean, this is a fact, and I've heard it, I'm sure we all have, that we can spin information one way or another depending on what our goals might be. And I've got to believe some of that is going to

—— it's going to be very difficult to filter or understand, or interpret, and to capture it correctly is going to be an enormous task. And I don't have any suggestions other than be careful, because some of the information could be jaded in some way, good or bad.

MR. RODRIGUEZ: Yes.

MR. DAROIS: You may get a preponderance of good things rather than bad things, so that's all.

MR. RODRIGUEZ: Exactly. And like I said in the beginning, they could be positive or negative stories. I think it's kind of subjective, because like you said, you can think in your mind oh, I did this, and it worked very well. And some other person can look at the information and say ahh, I don't think so.

MR. DAROIS: There's so many variables of how you look at something.

MR. RODRIGUEZ: Exactly.

MR. DAROIS: I don't mean to be too negative, and there's a lot of reasons why it's successful at one facility and not at another facility. And if you don't capture those reasons, the message gets a little bit lost.

MR. RODRIGUEZ: Yes. I think that's the key challenge, that the information has to be

beneficial to many licensees.

MR. DAROIS: Yes. It's going to be hard to do, but it's a lofty goal.

MEMBER CLARKE: Thanks, Eric. Virgil.

MR. AUTRY: Have you received any lessons learned so far? If so, could you kind of give us a summary or some kind of idea of some of the lessons learned you've gotten back, sort of the major themes of them?

MR. RODRIGUEZ: Well, for example, when I was working on the transcript, some of the —– we still need to screen information, but I could say that some of the topics or subjects that were repeated very often were like finality, certain issues that should be brought up front before submitting the formal decommissioning plan, license termination plan, those types of things. I wouldn't like to say okay, we have received this, because again, the information has to be screened and I don't want to put my neck on the line saying okay, we found this information, these lessons learned, and maybe later once the information has been screened, it's like this is not beneficial to many licensees.

MR. AUTRY: So you're going to kind of edit some of these things.

MR. RODRIGUEZ: Yes. It has to be -- the information has to be screened. We read the information, we screen it, and then we say okay, this issue - is it beneficial to many licensees, yes or not, and how, and then we'll decide yes, this can be considered a lesson learned or not.

MEMBER CLARKE: Tom.

MR. NAUMAN: After being involved with various aspects of Connecticut Yankee, Maine Yankee, I have to parrot what Eric said. There's a real liability there in the view of the person putting the information forward, and whether or not the person reviewing it and screening it can understand what really took place, and the background that affects it. It needs to be done, and there's some broad brush issues, but I'm sure you can ask Pectal what they think about the DOT Concept at CY, and I know from personal experience, what I can tell you about some of the lectures, you and the DOT Concept at Maine Yankee. It's just -- there's some lessons learned that are commercial in nature, that are proprietary, too. And we, as vendors and contractors, there's a lot of proprietary information that the licensee may want to put out in the public forum as their own idea or whatever, and it gets real cloudy and confusing. I

don't know how you're going to sort out those issues. I'm sure you can come up with broad brush ideas, the cold and dark process, how to lay up the plant, how to lay out a license termination plan that are effective, and everybody is going to want to know 10 or 15 years from now. But you're going to have to really be sensitive in screening the information so that it's not -- you don't get four different views of people writing in on the same topic - no, I did that; no, they did that. And it's going to happen, and it's going to be a real challenge for you to be able to sort it all out, so maybe a cross-industry working group for us all to battle it out, I guess, and come to consensus somehow. I don't know. It's going to be difficult. That's my only comment.

MR. RODRIGUEZ: Understood.

MR. ABELQUIST: I'll just add a little bit more to the D&D Science Consortium that you cited, Rafael. In 2002, a number of us that are affiliated with the Department of Energy formed the D&D Science Consortium, and the primary goal we had in mind in sharing information was to identify sources of information that licensee, D&D contractor that was interested in MARRSIM, survey instruments, best way to skabull could know who to go to.

We specifically addressed the idea of lessons learned and decided not to go there. We, instead, decided to provide a lot of information on the status of different projects, we provide the decommissioning guidance that EPA, NRC, DOE, States provide, and so our website, you won't find any lessons learned, and it's by design. We specifically wanted to put information out there, and so when someone calls us and they want to know what's your experience with wide area smears, it's more of okay, we know this person has dealt with this, or who's done studies on the different effects of strippable paint. There's a group that does that out at Idaho National Laboratory. So we've been there, and it's echoing what Eric and Tom have said. Unless you can really sanitize what you're going to be putting out there, our experience has been, people want to know who they can talk to rather than read a lessons learned. They want to know who to go to, because they want to spend 30 minutes, an hour talking to someone and getting it. There's a whole lot more detail than just here's a lesson learned.

MR. RODRIGUEZ: I think that's a good suggestion, and for example, in this interactive portal that I mentioned earlier, I know that I saw

some information from a DOE database, and the format that they have when they show the lessons learned, they have accounting information - well, the person, I guess, authored the lesson learned. I think that's another thing that we could consider in this format. For example, okay - this is the lesson learned, this is the person that authored the lesson learned, and assuming that the person gives the consent to be contacted, that information can be made available. And you can go there and say oh, I read this information on the NRC database. It looks like you authored this lesson learned. Can you expand on this issue?

MR. JOHNSON: I'd like to make one additional comment, if I may. Robert Johnson. Two things. The first one is, the web page example that we'll have up very soon is just the beginning approach, just an illustration. What we've included in there, some of you are probably aware, in NUREG-1757, there is a lessons learned appendix from our reviews at that particular time. Maybe it's 2001, that time period. We call them lessons learned from doing our reviews and preparing LTPs and Dps. And so we've put that link up into this database, so that's an example. There are lessons learned that we

identified from our reviews. That's one kind, so we're linking back to available documents where people can go. The one other example, the Kiskey Valley one that we put in there is site-specific, and it's a lesson learned that we identified, or that we're putting up there as an illustration, and say back to the realistic scenario approach. If you're interested in how we're implementing realistic scenarios for including off-site disposal scenarios, off-site use scenarios, then go to this particular commission paper that explains what the analysis was that was done and the Commission's approval.

So again, it's a short example. If people are interested in how to use realistic scenarios, they can read this very brief summary why it's important, why it could be useful to them, and then they can go to a source like you're saying, it's not a person, but they can go to a Commission paper and read what the staff and the Commission has said about this particular example. So that's currently what we were doing, but I think what Rafael was saying, and this is what we intended in having this status briefing is well, where do we go from here? I mean, there's a lot of ideas and a lot of possibilities that we heard at the workshop and we're hearing today, but all of them

have cost implications, and all of them, like you said, could be very ambitious and very difficult to do. So I think collecting all these comments and suggestions will help us plan what's appropriate for us to do next.

MEMBER CLARKE: Rafael, just one comment from me and an observation. I guess my comment is that - maybe I'm too optimistic - but I think there's merit to what you're doing. And clearly, there are going to be challenges, but I encourage you to do it and try to, as best as you can, document the lessons learned and disseminate them. And I guess what you've heard from us is, there are really three pieces to this. One is, how do you best get the information? The second is the quality control piece, which is not insignificant, and I think needs to be given a lot of thought. And I don't want to suggest peer review, but something in there to tackle that.

MR. RODRIGUEZ: Okay.

MEMBER CLARKE: And the third is how to best disseminate it.

MR. RODRIGUEZ: I think that's going to be one of the —– from all these three Is that I mentioned at the beginning, like the immortalizing part, I think that's going to be one of the real challenges, because

again like Eric said, it's a balance. Money is the driving factor here - and okay, you want something user-friendly, maybe something similar to Google - that's fine, but it will cost you a lot of money, where that money will come from. Are you willing to sacrifice some user-friendliness, but you will be able to save some money? So there are a lot of questions, and again like Robert said earlier, this is our long-term vision. Right now we're starting this whole project, but we want to get this —– we want to see okay, where are we going with this project.

MEMBER CLARKE: And I guess I would encourage you to give an equal amount of thought to the first two pieces; how do you best get the information, and how do you quality control it. Ruth.

MEMBER WEINER: I'd just like to second what Jim said about quality control, and just make another comment. If you do put a contact name on each lesson learned, make sure that the contact person, that that individual has given you permission to put his name. That's really important. And people may want to find out more about a particular situation by telephone and not by email. It's always —– you can always discuss things a little bit more freely.

MEMBER HINZE: But it shouldn't become a

marketing item.

MEMBER WEINER: That's a very important thing, and that's the quality control.

MEMBER HINZE: That's one phase of it. You're right.

MEMBER CLARKE: Are there any other questions for Rafael?

CHAIRMAN RYAN: Yes. There's a dimension to this that I think is a little bit different, to me, anyway, and Robert sort of hit on it; is, there are Commission papers or SECY documents, or NUREG documents, whatever they might be, and you can organize those in a way so they're a little more transparent or user-friendly, or better organized, and those are available as resources on the web, that's often helpful as opposed to a contact. I sometimes would rather go back and read a foundation document. It gives me insight as to how I might be judged. If I came in with a similar calculation, I might not be too far off base. So things like that are really at the root of what's helpful to a practitioner.

I think some of the other questions of lessons learned learned from actual cases tend to be not so much technology issues, as they are how did you do on profit margin kind of questions, and did you

make a lot of money, did you lose a lot of money, did you come out about even? So people are thinking about cost management when they want to talk to a similar facility and hear about that, so there's kind of a cost performance dimension to this, and then there's a basic information part. And obviously, I think what you're hearing is, if we can stick to the basic information availability aspect, and not drift into what are, in essence, profitability or cost management kinds of issues, that would be at least a place to start. Did that catch what people having been saying, summarize it all right?

MEMBER CLARKE: Thanks, Mike. Anyone else? Any other questions for Rafael? Thank you. All right. This brings us to the final session, the roundtable. And what I'd like to do is follow a practice that the ACNW has followed in past working group meetings. And I think you've all been alerted that we were going to do this to you. I hope you have. But in any event, what I'd like to do is go around the table, and I'll start by going around the table and ask, beginning with the panel, ask each of you to share with us, and I know you've heard a lot of information in a short time, and you may want to think about it a little more, and provide some comments at

a later date, and that would be great, as well. But for today, if we could ask you to sum up what you've heard in terms of what you think the major points are, and comments, suggestions, recommendations that you would have. And, Eric, I know you have some time constraints, so let's start with you, if that's okay.

MR. ABELQUIST: Well, I certainly think this was a valuable day spent looking at a lot of guidance. It was informative for me to find out where the staff is on a number of important issues.

I think when I was preparing for this day, on of the things I wanted to convey, and I think I was able to a little bit, but I'm going to take this opportunity to expand on it a little bit, is when we went to a dose-based rulemaking back in the late 90s, we had been using two principal forms of guidelines - one was the Branch Technical Position, early 80s, 1981, I think, for Thorium and Uranium. And we had used Regulatory Guide 1.86. And the reason I mention those two guidance documents is that licensees had a pretty clear path forward on how they were going to decommission their sites. It was certainly not dose-based, and there's a whole lot of negatives that go with that fact, that it was not dose-based. But the nice thing was, there were sites that were not overly

complex that could get through the process.

When I look at the state of affairs today in the decommissioning industry, I see that there's still a number of sites that can easily get by with the screening, the default DCGLs, and they're fine. There's also a number of complex sites, the old SDMP, certainly the reactor sites that need special considerations. And I think that was the focus of a lot of the topics that came up with the licensee termination rule analysis.

What I think is lost in the mix, maybe just a little bit, and maybe it's just my own perspective, but it's the sites that are not complex. It's debatable, of course, but the sites that under the old guidelines, Reg Guide 1.86, Branch Technical Position, they would have a clear path forward on decommissioning and demonstrating compliance. Principally, I'm referring to the sites that have Uranium, Thorium, and Radium, and they do not have groundwater contamination. They have incidental contamination.

The path forward for those sites has gotten a whole lot more rigorous because we went to a dose-based rulemaking. And I think some review of what can be done for those sites is warranted,

especially under the context of risk-informed. I think that if you look at the screening level DCGLs, they are very low. They're on the order of background variation, not even background levels, but the standard deviation associated with background. And when you're in that context, you could be clean as a whistle, but you're having to go through a whole lot more considerations than you would if the release criteria were four picocuries per gram instead of on the order of background variability. So I think that was the one thing that really, sort of, I wanted to convey as I was thinking about this whole review of where we're at with the decommissioning guidance.

The only other issue that I wanted to mention pertains to the DCGLs, and byproduct, which is the area factor concept. And this is getting a little involved in dose modeling, but essentially, whenever a licensee needs to do a final status survey, they need to have a hot spot limit, which is the area factor multiplied times the DCGL.

The problem is, if a licensee wishes to use the default screening level DCGLs, they're sort of stuck in terms of no area factors being available. And so I always thought that was something that the staff could look at, and perhaps provide default area

factors to compliment the default DCGLs, so if a licensee truly qualifies for the screening approach, they're handicapped to some degree by not having default area factors. It always seemed to me to go part and parcel with the whole idea that the screening approach is feasible. It's implementable for a subset of licensees. Let's streamline the process to make them get through the process as efficiently as possible, so that's something that I would really encourage the staff to take another look at, to see if area factors for the screening DCGLs could be provided, as well. So overall, I think the day went great. I certainly learned a lot, and appreciated the staff presentations.

MEMBER CLARKE: Thanks, Eric. Tom.

MR. NAUMAN: I'd like to second some of the comments from Eric regarding appreciation for this effort. I think this is wonderful. It's a great process to get the right involvement and get the right input prior to issuance of regulatory guidelines. This is great, and I think 10 years ago, it really would have set the stage for the jobs that are just coming to completion now. And we've all grown in the last 10 years dramatically in this field, and this is great to capture it and go forward for the future.

Instead of dwelling on details, I'd like to look at it from a more macroscopic point of view. In the next two years, or the next 20 months I'd say, all the major decommissioning projects are going to be coming to an end. The majority of them that are on the books right now, this information that we gained is crucial for the next generation. But it's going to be off in the future a while, barring no significant emotional event in the nuclear industry, at least from a utility perspective. I realize that a lot of the material sites and other facilities, especially DOE, are going to go through rapid closure, and that's where the market is going to be. But putting the Reg Guidelines in place and capturing what we've done over the last 10 years is crucial for the next phase, and I appreciate everybody's effort on that.

Talking to Virgil, and Eric, and others on the mixing topic, for instance, public perception here - it's a critical time for the industry as a whole, public perception on nuclear reliability is critical. And items that we've learned, such as the public's resistance to mixing are things that we have to factor into these guidelines, and I appreciate the chance to have the inputs. And I think going forward in the future that it's critical that we all participate.

Whether or not there's a means to support it through EPRI or through other methods, this is a great forum for us to all get some input, so I appreciate that.

I think I'll save detailed comments and give you something in writing, Jim, as things go forward. And again, I'd like to thank you for the opportunity.

MEMBER CLARKE: Okay. Thanks, Tom.

MR. AUTRY: Well, I appreciate the invitation to come and share what experiences we have, which are quite extensive sometimes. And I kind of wish we'd had a document like this 10 or 15 years ago, I wouldn't have had to have done so much research and establish criteria and things to help decommission our facilities, and give guidance to our licensees.

I think Reg Guide 1.86 has outlived its usefulness. I think we've advanced our technology sufficiently that this document that's proposed, the NUREG document on license termination will be a great benefit and kind of establish a better guidance for that.

Speaking to the Agreement States, the Agreement States need this type of guidance. They're very limited in the staff they have. They're faced also with supervising or regulating decommissionings.

They don't have the staff, the experience to deal with these things, so I think it's going to be very important for the Agreement States to have a document like this to rely on. We relied very heavily on the staff at NRC for a lot of the help they've given us, and we really appreciate that. Now that you're putting this in a document that's available, I think it's going to serve a great purpose there too.

Also, NRC or someone should provide more opportunities for workshop and training, RESRAD, RESRAD Build to develop the decommissioning standards and DCGLs would be very helpful, as well, and how to do those at a state level. I know a lot of people at NRC and some of the vendors are very familiar with that, but I think the states need to understand that better, too.

Like Thomas, mixing soil is a sore point with me. I really think that probably, not trying to criticize Derek because I know he's worked very hard on that, but I think to be successful with this NUREG and get a lot of the criticism involved, I think you need to reconsider that as making that a case-by-case possibility instead of adopting that in the Reg Guide itself, the NUREG document right now. That's my opinion of it. Thanks.

MEMBER CLARKE: Thank you. Eric.

MR. DAROIS: Well, once again, let me reiterate all the other comments. Thank you very much for the opportunity to provide this feedback and input.

I have a few, probably specific items that I've been jotting down here, as opposed to larger issues here. I think what really came out today in my mind was the importance of taking the lessons learned, and I use the term rather loosely, but in feedback whatever we can into at least new plant designs and operating criteria for new power plants. I think that's -- and I don't have any strong suggestions as to how we do that, but I think that needs to be put close to the top of the list.

Along that line, and I guess probably related to that is criteria on capturing historical events that go beyond the requirements of 50-75(G). I think that's something we've certainly learned in a couple of the sites I've been involved in, that we talk about the soil relocation issues, and there's a whole host of other things that may not fall into that regulatory bin that becomes important historical data in classifying the site and performing final surveys.

I think the on-site disposal issues are

important, as well, and I think we hammered that out, but I just wanted to put an exclamation point against that issue. And certainly, the dose scenarios and all that we talked about, more realistic scenarios, I think we're heading in the right direction, but there's hopefully more to come in how we implement those issues.

One thing we didn't mention at all are the calculational tools available. Virgil mentioned training for RESRAD and RESRAD Build, but RESRAD is a fairly old code, and it's written in an old platform with some lipstick on it on the front end. We ran into some significant issues with RESRAD in developing DCGLs for some of the transuranic radionuclides. I mean, execution times, computer CPU time. I don't even -- they were on the order of nine days of computer time to calculate the number, to finish the run. We've got more complicated computer games that we can play on really small machines these days.

I really think that technology needs to be updated, and we need to put some effort into that. It's a complicated code to run. You need to go through a week of training and spend a couple of grand and understand how to run it, and I don't think it needs to be that way.

Groundwater considerations - I mean, we certainly, I think, all probably agree that that's huge. It's huge from the beginning to the end, cradle to grave on this issue. And lastly, I'll just make a point that kind of another thing we haven't really talked about, but I think it's important to keep on our radar screen, is the clearance rule issue.

Reg Guide 1.86 may be dead but plants are still using environmental LLDs and Reg Guide 1.86 for the free release concept. It's probably okay, but it doesn't help the generic cause of getting this down to a risk-based release system. And it feeds into decommissioning. I mean, we've got plants that are in decommissioning doing free release against those criteria today. Again, it's probably okay, but it's inconsistent with the rest of the world we're trying to create. That's all I've got.

MR. IKENBERRY: Well, I, too, would like to thank the staff for their presentations. It's obvious that there's been a lot of thought gone into these, an they're all very well versed on their areas of expertise. I think, in particular, the risk-informed approach that has been forwarded here is noteworthy. I think that's a very good idea.

I was struck by, as we went through the

presentations, how I saw the interrelationships between the various presentations. We talked about the subdividing of the sites was related to the on-site disposal, and related to the mixing of soil, and to the engineered barriers, and to the realistic scenarios, and I hope that as you go through and develop these areas, you're not being compartmentalized and you're all working together, because it seems like there's a lot of interrelationship that you could draw on one another's expertise that could benefit everyone.

I would also encourage you, wherever you can, to make it as simple as possible, and present it in a simplified manner, because it's much easier to use, and much more likely to be used, and I would encourage you to do that, as well.

I guess one last specific point. I think the soil mixing is a very interesting issue, and I think it has potential. Certainly, there will have to be some limitations put on it, but I think it's worth considering. I think there's some potential there that could be of benefit to all the parties. Thank you.

MEMBER CLARKE: Thanks, Tracy. Dr. Ryan, do you have anything else?

CHAIRMAN RYAN: Well, I want to thank certainly the NRC staff for a very well prepared and informative day. We've been well informed by all the presentations, and the dialogue, as well. And I want to thank the panel participants for giving of their time, and talent, and expertise here today. Without you five folks participating and offering your comments and insight, we wouldn't have had nearly as productive a day as we've had now.

The ACNW has worked on a couple of different collaborative modes with the decommissioning staff. We were actually observers at their last public working group, and they thought that was great because it helped them not to give the same presentations to us that they gave across the street, so that was helpful. And it was beneficial to us to actually hear the input they received live. It's much better than reading a transcript, so we were observers, and that was very helpful for us, so we appreciate that.

I think, Jim, to answer your charge, when I think about today, I think about a couple of things. One is, I guess I tend to lean with Tracy that in the right framework and with the right limits, mixing does have a role. I wouldn't rule it out of hand. In the

same way that we mix hot and cold ends of LPRMs, other kinds of mixing, I think there is a role. I think wholesale mixing in a little teaspoon of hot stuff for the mountain of clean stuff, maybe that's outside of the envelope, clearly, so I would tend to at least keep it in and think it through carefully before just dismissing it out of hand. And I think that's an important one to capture.

In general, I think that -- well, let me just stop there and hear what other folks have to say. Thanks.

MEMBER CLARKE: Okay. Allen.

VICE CHAIRMAN CROFF: I'm not entirely sure how to wrap-around this whole thing. In one day, I've heard a lot of given that the NRC is updating basically some things that they have, and extending to some extent, we've heard a lot of specifics today that I think need to be taken into account. And I'm not even going to pretend to try to list them, but then maybe some higher level - I don't know whether it even encroaches on policy space kind of issues - as to maybe the mixing is one part of this, the issue about engineered barriers and various philosophical kinds of approach to caps, long-term versus short-term and more replaceable, and this kind of thing came up.

I don't know where to go from there. I've got notes, and I've got some ideas on maybe things that ultimately need to be said, but it's going to be a whale of a job to try to get this in order.

CHAIRMAN RYAN: Let me try to help you again, Allen, and just come back. I think that one central theme, as all the details swim in everybody's heads, is it needs to be risk-informed, and we need to stick with that theme of having a risk-informed approach. To quote Heywood Shealy, who is Virgil Autry's predecessor in South Carolina, said "Mike, it's got to make sense." So I think when we think about approaches to some of these issues, it's got to be a risk-informed sensible approach. And if we kind of maintain that theme, I think that's something that will help guide us through all the details. Thanks.

MEMBER CLARKE: Let me just pick up a little bit on what Allen is saying. I've given this a lot of thought, as well, and he and I have worked together on other initiatives that have gotten into this. And I think we find ourselves in the situation where we're dealing with very long compliance periods, regulatory or otherwise. Even if we just define compliance as the time during which the material could pose a hazard, for some materials in some settings

that could be very long, greatly exceeding our experience with just about anything, so we have that challenge.

Now we would like to work with reasonable time horizons. We probably feel pretty good about 30 years, better about 20 years, maybe okay about 50 years, but when we get into 100 years, and 1,000 years, we're driving beyond our headlights. And so the need to look at trade-offs between robustness and flexibility, while we would all agree that a barrier that could last for the time it needs to last is preferred, if it can't last for that long, then what do you do?

If you have to ensure protection, and if ensuring protection means relying on intervention and maintenance, then I personally think there's merit to going back to square one and looking at how do we design these facilities to better monitor them, and to better maintain them? And so, under the heading of maybe a different philosophical approach, I would throw that out, as well, to again, I think, compliment the points that Allen is making.

MEMBER CLARKE: Ruth.

MEMBER WEINER: I'm not among the cosmic thinkers that I've just heard. This is very down-to-

earth. First of all, I want to congratulate the staff for working with practitioners, and for even taking on the question of revising this regulation in the light of things that actually have happened all too often. You know, a regulation goes along, and goes along, and goes along, and they don't look at how it really works on the ground, so congratulations for even undertaking this effort. I think that's great. And I hope that there continues to be a dialogue with the people who are actually involved in decommissioning and the staff on these regulations. And when you see something in a reg or a reg guide that doesn't work, that is outdated, that ought to have another look, I hope that you will speak up and say so. I think that's very important.

I'd like to echo something that Eric Abelquist said. The Department of Energy really has had a lot of experience in this area, and they have sites that have been closed, that have been capped, that have been cleaned up. And I think it is very worth taking advantage of their experiences, and their monitoring history. And they do keep —– there are good records of that, so I would encourage doing that.

And finally, I heard what you said about RESRAD, Eric, and being involved in upgrading a

computer code myself, these codes get out-of-date very fast, platforms improve, and updating, revising is an expensive proposition. And if it's going to be done, somebody has to put up the money to do it, but it's very much worth doing. People do not in this day and age want to sit for 48, 72 hours and let the computer crank out a single number. That's not good, so other thoughts I'll get to.

MEMBER CLARKE: Thank you, Ruth. Bill.

MEMBER HINZE: Well, I think that I realize more than ever that massive nature of the task that the NRC has taken on. There is such a wide range of decommissioning sites and the parameters that are involved in them, the environment and so forth. And I'm just questioning in my own mind just how useful this document can be in terms of the guidance it provides. I think this is a real challenge to the NRC to include all of this. And I'm afraid that if one treats it in a manner such that you will have the ultimate inflexibility that you will not provide the guidance, the control on the uncertainties that is needed and is warranted.

I think we've heard a lot of specific items that need to be talked about perhaps by the Committee, and by the NRC staff. I think that Robert

and Drew pointed out to us early in the game that there was a difference in the level of maturity of the various status of the program. I think that was evident to us today. I think there are some things that I know from my own interest in the sub-surface and the groundwater contamination, that I would like to hear a little bit more about where the staff is going with regard to the identifying of sites for high potential sub-surface contamination and the groundwater issues. I think we need to hear —– I think it would be useful for us to hear about them, because I think we may be able to provide some input to them.

There were a number of flags that came up as I listened to the presentations. One of those, for example, was the state restriction, just as a high concern to me about how that is going to be used, and how the NRC is going to have its impact upon the use of these restrictions. I'm sure that, Jim, you'll find a number of items as you go through the transcript and the notes that will provide you with a lot of information to write a letter for everyone to chew on.

MEMBER CLARKE: Thanks, Bill. Let me open it up, comments, questions from the staff, from the

audience?

MR. HAMDAN: Just one flag that remains, and that is, Eric, too - Mr. Darois has mentioned groundwater as a huge problem, cradle to grave, and frankly, that to some extent surprised me having listened all day, and all we hear about groundwater is monitor. So I want to second Bill Hinze's point that if groundwater is huge problem, and now that Eric mentioned it, it must be, and it must be even if you didn't mention it, then it seems to me the guidelines needs to include something about groundwater standards, something about characterization of groundwater contamination, some groundwater remediation guidance. I don't see how we can have a guidance like this without addressing the groundwater contamination issues.

MEMBER HINZE: Well, can I follow-up, Mr. Chairman? An example, is the intentional mixing of soils. When I attended the workshop, I guess I was overwhelmed with the licensees' response to this, and was caught up in the fever of the day. And as I listened to the practitioners and I think about this a little bit more I say, man, there is a can of worms if you've ever seen it. But one of the things that we hear on this is just the surficial aspects of this.

You can mix the soil around, and you still have the water infiltration, and going into the groundwater, and contaminating the groundwater whether you mix it up, or you put it all in one hot spot. I'm sure from the surficial standpoint, this is important, but it's also important from the standpoint of infiltration and going into the groundwater, just an example of how we need to have a closer look at the groundwater aspect of it. And I fear that we're -- excuse me.

CHAIRMAN RYAN: No. That's good, Bill. I want to push your checker one more square down the board here, maybe. When you think about risk-informing it, what drives the risk? It is the total activity that drives the risk, it is not the concentration. The concentration is a metric used to make a regulatory or management decision. It is not the direct quantity that drives the risk. The disposed quantity of total activity is what goes in RESRAD ultimately as the potential from which a fraction is leached. So if I'm taking a small concentration of high quantity, and low concentration, the relative activity and then the ultimate total activity is the risk and the change in risk, if you will. So I think if we kind of translate some of

these practical technical options into how they are -- what the risk profile is by doing A, B, or C with them, that's what I mean by risk-informing. That's a good example.

So from the standpoint of risk, the intentional mixing question is not one of concentration, but one of activity. Do you significantly change the total activity by intentionally mixing stuff?

MEMBER HINZE: And as I talked about it, I realized I should have been saying that perhaps this is a no-never-mind, because of risk from this to the pollution, the contamination of the groundwater is not a risk, and so maybe this -- why bother with the mixing, with the intentional mixing?

MR. DAROIS: Can I follow-up?

MEMBER CLARKE: Please.

MR. DAROIS: The issue of infiltration into the groundwater and it's tied to mixing, is probably only applicable to soluble radionuclides, so with that point said, I think everything we've said about mixing before is probably true for the insoluble nuclides.

The other thing I wanted to mention was that my comment about groundwater being huge is

probably more speaking to the financial side of this. It becomes a large issue, a huge issue financially if you're facing it for the first time in the decommissioning space. So getting our arms around it early I think ends up potentially costing less, on average, to licensees that have that potential, so I didn't mean to imply that we have a huge groundwater problem. I think it just becomes a large issue. It's an emotional issue with the public, and it's a difficult issue to solve.

CHAIRMAN RYAN: And the dose consequence problem is a financial and ——

MR. DAROIS: Yes. I think so far what we've shown in the utilities that have had groundwater contamination, I believe is not a big dose contribution problem, it's not a big public health and safety issue, it's a public perception issue, and it drives the states and drives the utilities into spending a lot of money to resolve the issue. And you have to spend a lot of money if you do have it, to resolve the issue. It's just expensive.

MEMBER HINZE: I spoke about using non-invasive techniques, but no one knows better than I do that they are costly. This can drive you to the wall very rapidly, so this has to be done very judiciously.

And here is where research can help us to define the limits of how those can be used, so that we don't have to overuse them. You go to a point where you reach an asymptote of the information you're going to acquire from them, but you go on spending money. And we can't drive the situation to that.

MR. DAROIS: I agree.

MEMBER HINZE: I fully agree. I really think that from my experience, one of the most significant things that could be done is adequate plugging of holes, and not only plugging on a surface plug, but also plugging so you don't contaminate from aquifer to aquifer, so this really means plugging of the entire hole.

MEMBER CLARKE: Okay. Drew. Robert.

MR. PACEKO: I just wanted to thank the ACNW for our meeting today. I think it was a very good meeting. I think we had a good exchange of ideas, a lot of comments were put on the table, a lot of suggestions, a lot of ideas were put on the spot. I'll say that oftentimes, too, though, today we would pose questions to the ACNW that sort of were just left hanging and vice versa. And I would encourage ACNW to consider those, and we'll consider them, as well, and maybe we'll come up with some potential solutions for

those.

Like I said when I started, our plans are to publish the draft guidance document the end of September, and we will factor in the comments we received from the ACNW, both on the spot today, as well as any future comments between now and then, as best we can. Then the document does go out and be published as a draft for comment for approximately a year. So there will be time yet, even in the future, to further the document. Wait a minute, excuse me. It's going to be finalized in a year. It's only going to go out for comment for about three months, excuse me. But it's going to be finalized in a year. Thank you.

MR. JOHNSON: I'd just like to add one thing. A number of us have worked closely with Jim and Rich, and Mike to try to create kind of not a different approach, but an earlier approach to getting input on our guidance, both at the workshop and in this session. So I guess I would say the state working group experience, these things are sort of new and they're sort of risky. They're time consuming, and if you come here and you don't have all your ideas firm and you're putting just your current early thinking out there, and that's uncomfortable

sometimes, and so people see that as the downside. But actually, when you step back after hearing this whole session today and at the workshop - and to me, it was really, really well worth it. I appreciate your ideas and getting them early, and that's the benefit, I think. It turned out just the way we were hoping, just like the workshop was useful to us, too, but to hear more specifically from practitioners and members more technically than we maybe heard at the workshop, but that all contributes. And so that's good about the early interaction, so we sort of stretched ourselves to experiment with this, and I feel really good about the benefit that we got today and it was worth the effort, I believe. So thank you for not only coming to the workshop earlier in April, but also contributing your time here. Thank you.

MEMBER CLARKE: Thanks, Robert. I, too, want to acknowledge Rich Major's contribution to this. He worked very hard on pulling all this together. Thanks, Rich. He had some help. We worked hard. Anyone else?

MR. FLACK: Do we have time? I didn't want to lengthen the meeting any, but I was listening to some of ——

MEMBER CLARKE: Just tell us who you are.

MR. FLACK: Oh, John Flack, ACNW Staff. And, of course, my perspective is risk, and some of the things came to mind, picking up on what Bill said earlier; that if the risk doesn't change, why even mix? I think that was the kind of comment that it was leading to.

In order to see the whole thing, to see what is the change in risk say before and after, and if it isn't changing, why even mix might be the solution, if you can say that given the footprint, if I did mix, I would have this risk. If I didn't mix, I would have this risk. So in some ways, the question is whether it's worth even mixing at all, but then it goes back to the question of how do you risk-inform, and what do you need so that you don't end up on a slippery slope, for example.

And it's one thing to risk-inform, but it's also to have the infrastructure that allows you to risk-inform; that is, do we have the right tools, are we making the right decision? What are we going to do with the results, and then how to use the results. So having to think that all the way through before actually going there and saying it's okay to mix, might be the thing to do. I don't know whether that's all in place at the moment, but it would be

maybe worthwhile looking at that and saying okay, take it all the way through, what decisions would I make? What tools do I need to be sure that I'm making the right decision, and how am I going to decide when to do something, when not to do something so you don't end up on a slippery slope? That was really the point that I was trying to make.

MEMBER CLARKE: Any other comments, questions? Boby.

MR. EID: This is Boby Eid, Division of Waste Management. I really enjoyed this workshop today. I tried to be quiet as much as I can, but just one thing I want to bring to your attention; that in the risk there are two factors coming from the risk. One factor is the direct exposure that is coming from the direct exposure because of concentration, so if the concentration is very high, so the direct exposure will be very high. And the other potential is because of the transport through the water cycle, because of ingestion of drinking water, because of ingestion of plants irrigated from contaminated water. So, therefore, if there is a dilution of that concentration because of the hot spots that Eric also discussed, so that's the reason we have the hot spots area factor that we conduct in order to assist

specifically for the direct exposure, actually it's intended. So, therefore, if the concentration can be reduced through mixing, this would help because it may reduce the exposure, just to bring it to your attention, the way the dose analysis is conducted.

Another area, RESRAD is believed to be very simple code, and many people have made jokes of that, that it's too simple. And actually, we're studying now, trying to compare different kind of codes that we can use for complex sites, specifically sites with contaminated groundwater.

And actually, for your information, RESRAD is the simplest code that you can use. And we have also established workshops in the regions, and we welcome actually to expand these workshops to include also the licensees, but this has to be coordinated.

Working with RESRAD code is not really -- it does not take too much time if you know how to use it. For example, if you use the time step factor, if you use it 100 steps to use, of course it's going to take you weeks. And this one issue actually we discovered when we used RESRAD, so there are certain tricks when using RESRAD that if you are not aware of those, maybe it will take you one week. So that's another factor, just to bring it to your attention, is

working with RESRAD code.

So the other issue that maybe I need to elaborate is risk-informed. I would like to repeat that risk-informed I think is good to combine what we are doing with the risk-informed approaches. Definitely, Mike, he's just on target with this, and we need always to think about that, how we do risk-informing, why we are doing all of those processes. An example of actually the story that we can tell - in one case, the licensee conducted deterministic approach and used certain values, and other values that were not really conservative; whereas, when the staff directed the licensee to do probabilistic risk analysis using risk-informed approach, this is a good story we can tell so the licensee passed, and we are now in the process of releasing the site. Those are other examples where about risk-informed approach is quite important and vital to be used alone when we develop these guidelines. Thank you.

MEMBER CLARKE: Also, Boby, while we have you, the subject of data reporting came up earlier, and at the workshop you gave a nice presentation on Marlab, and you might want to say a few words about that.

MR. EID: Well, Marlab is another guidance

that was developed by eight federal agencies, and we spent lots of time discussing it, went through this AB review, and also expertise like you here, and the area. I believe it has also benefits, and we are going to —– there will be a paper presented, I'll be presenting on use of Marlab at the end of this meeting, specific topic in Denver, Colorado in August. Also, there is other paper I'll be presenting at the EPRI conference on low-level waste the end of this month about how Marlab can be used, and benefit the licensees for nuclear power plants. And I think there are lots of good ideas.

There are, unfortunately, some inconsistencies in harmony currently between the current old guidance that we developed since 1974 and the early 70s, and they are currently being used. And what we are saying, that we do not need to adopt Marlab currently for the licensee, but look at the merits of using Marlab, and we find lots of benefits from using it. And that's the message I would be giving actually at the EPRI conference. Thank you.

CHAIRMAN RYAN: Jim, if I may, Tom Nixon is in the audience from Research, and welcome. It's always good to have you here, but I wanted to mention two things from our last meeting here a couple of

months ago. And one was the research facility on Ground One that's underway just out of town. I was taken by, first of all, the complexity of the modeling system that's in place, the fact that there's a lot of interesting research projects that are addressing some of these groundwater questions that may actually address Latif's point, and some of Bill's follow-up. And other point was the presentation we had on modeling, that sometimes the simpler models are actually the better ones for decision making. And I refer to our previous meeting and record for participants here to see that I'm leading to a question.

The question is, is there a way, Drew and Robert, to capture some of these very clearly related kinds of tools and techniques kinds of issues, at least for linkage on the website? Interesting research that's going on in the RES Program that's related to tools, or techniques, or modeling, whatever it might be. Just a thought to maybe capture the done D&D parts, that certainly would be of help to folks addressing problems, or research reports that are topical on the Marlab report or other things that are related. It just would be interesting to explore how to capture those good bits of work.

And the other good news, Tom, there's about a thousand research projects we identified for you today, so get your budget prep work underway.

MEMBER CLARKE: Thanks, Mike. Eric.

MR. ABELQUIST: Listening to Bob, I remembered another point I would like to make, and that is, research did study probably two or three years ago - maybe it was published two or three years ago - but it is NUREG 1720. And what it addressed specifically was the resuspension factor which directly impacts the DCGL for alpha contamination.

The default DCGLs are on the order of 10, 20, 30 DPM, and the upshot of this research was that the resuspension factor that was being used in the default screening model was a factor of 15 times to conservative. And so that was published, there was a loud shout yeah, let's use this. I'm not sure if the green light has been given to use it, but I would think this is an NRC NUREG. It increases DCGLs for licensees that want to run defaults by a factor of 15, it makes it much more survey-worthy. You can't really do a survey for 10, 15, 20 DPM, not easily, not with any reasonable count time. And so I guess I have a question first; is that NUREG being implemented now, or is it still just waiting approval to be used?

MR. EID: Well, thanks for asking this question. I'm the senior author of this NUREG with other staff, too. From the first time we saw dose screening values we realized because of the simplicity of the model, so I think we could do better, actually, because of the approach that D&D code tried to establish the suspension factor so we've been stuck with that because we used the 95th percentile. And also, we try to use extreme conditions; therefore, having the default resuspension factor resulted in these kind of unrealistic, highly conservative screening, that is although they are screen values, but still really bother us as a staff when we looked carefully at this. And also, many licensees, they were unable to use it. Actually, in some cases we did not have screen values, and this is only for the building of the license scenario. So we did do that and we actually spent lots of time, and we want to see in WRA, also to review the approach and methodology. We have drafted a NUREG, it was published in that NUREG, and the recommendation was for the screening values, they can be —– the suspension factor can be less restricted by a factor of 15, which I believe is significant.

During the review that we received, some

people, they made a comment - they said okay, we have now screening values; however, the code is so simplistic and so conservative, how about using code like RESRAD Build and using template files? What we did, we went through the process of trying to develop template files. Hopefully, those template files, we can compare them with the D&D code, and that's where we were. And we did not finish that process because maybe there will be also reaction saying, well, the model that you are using is too simplistic. Then try to revise the whole DCGLs, and this will open to us another area to try to start from zero point to establish new DCGLs. That's the reason we are not in a situation now to say yes or no; although, I do believe in terms of risk insights and risk approach, definitely the resuspension factor can be easily -- should be acceptable for using that risk factor, which is this risk affected by a factor of 15.

Now in case if you want to do that, again, maybe you need to revise the whole process for establishing new DCGLs, and that's the reason. So I can't answer that question if the question - the direction now to go and establish new DCGLs using that specific code, which many people they believe is still highly restrictive, I think that's the path we will

take.

If the other way around, we'll try to look at more realistic codes that we can use, and use template files. Also that's another approach. That's where we are now. But thanks for raising that issue.

MEMBER CLARKE: Okay. Any other questions? I, too, want to thank everyone, the Division of Waste Management and Environmental Protection for their fine presentations, the panel for giving up there time coming here and helping us with this effort. Thank you very much. And at this point, I'll turn the meeting back to our Chairman.

CHAIRMAN RYAN: Thank you, Jim. And again, I want to thank you and Rich for organizing a fabulous day and a wonderful working group meeting. I think we got a lot of great input from our participants, expert participants and the staff. And I agree with Robert, it's a great benefit and will help us all move the ball forward.

If I can take just 30 seconds and talk about the process forward; and again, I'm kind of in a draft version of this in my mind, but we've certainly got a very rich transcript to digest. That's number one. Number two, I think that the staff is in progress of actually writing the document on

which they have us insight presentations today, and received feedback, so as we document this meeting, we might be in the mode of writing a letter to the Commission saying this is a work in progress. We might specifically ask that we're not asking for a specific response from the staff, but this is a status report kind of letter to say the next step will be for us to look at the draft, and revisit with the staff when it comes out. And then kind of get into the more formal detailed comments in the ore traditional letter. And I just offer that for the staff to think about and maybe digest. I think that satisfies your needs as we move forward, so forth.

What we don't want to do is ask them to respond to a letter which the Commission would ask them to do and interrupt their preparations that we `ve heard quite a lot about today, so we want it to flow smoothly in their time horizon, as well as our own, so we can give that some thought. But I think the real secret is we want to mine the transcript and get it all down in an organized way before it leaks out, or leaks away from us all. If we let it drift weeks or months, we'll lose some of the richness of the transcript, so we'll at least make that step and then figure out how to make it a useful process from

here on in.

MR. PACEKO: We'll share our mining with your mining when we're done.

CHAIRMAN RYAN: Exactly. And we'll do that with our notes, and then kind of try to work in an ad hoc way. But again, I want to thank all the participants, internal and external. It's been a great day, and if there's no objection, we'll move to ajourn.

MEMBER HINZE: Second.

CHAIRMAN RYAN: Second. Okay. Done.

(Whereupon, the proceedings in the above-entitled matter went off the record at 5:14:58 p.m.)