Official Transcript of Proceedings ACNWT-0197

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Nuclear Waste
176th Meeting

Docket Number: (not applicable)

PROCESS USING ADAMS
TEMPLATE: ACRS/ACNW-005

SUNSI REVIEW COMPLETE

Location: Rockville, Maryland

Date: Thursday, February 15, 2007

Work Order No.: NRC-1440 Pages 1-192

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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON NUCLEAR WASTE

February 15, 2007

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE (ACNW)

176th MEETING

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THURSDAY,

FEBRUARY 15, 2007

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland, at 11:00 a.m., Michael T. Ryan, Chairman, presiding.

COMMITTEE 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:

DEREK WIDMAYER, Designated Federal Official

ACNW STAFF PRESENT: (cont'd)

FRANK GILLESPIE

MICHAEL LEE

CHRISTOPHER BROWN

ANTONIO DIAS

NEIL COLEMAN

LATIF HAMDAN

ALSO PRESENT:

CHARLES MILLER

GEORGE PANGBURN

LARRY CAMPER

SCOTT MOORE

DENNIS RATHBUN

RATEB ABU-EID

ANDREW PERSINKO

CHRIS McKENNEY

MIKE BELL (via telephone)

GIORGIO GNUGNOLI

NANCY OSGOOD

BILL BROCK

BRETT CARLSON (via telephone)

ROB LEWIS

CARL WITHIE

GORDON BJORKMAN

I-N-D-E-X

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

(11:08 a.m.)

CHAIRMAN RYAN: Okay, folks, if we could come to order, please.

This is the third day of the 176th meeting of the Advisory Committee on Nuclear Waste. During today's meeting the Committee will consider the following: Savannah River National Laboratory Workshop -- I'm sorry, that's -- is that still -- no, that's not on. That has been postponed due to travel problems.

We'll receive now our semiannual briefing by the Office of Federal and State Materials and Environmental Management Programs. We'll receive a briefing on international conferences on decommissioning and low-level waste topics. A portion of that briefing may be closed pursuant to 5 U.S. Code Title 5, Section 552b, subsection (c), item 4, to discuss information obtained from IAEA to be treated as confidential. And we'll talk about the possible use of moderator exclusion for transportation packages.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Derek Widmayer is the Designated

Federal Official for today's session.

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, please make your wishes known to one of the Committee staff. It's requested that the speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so they can be readily heard.

It's also requested that if you have cell phones or pagers that you kindly turn them off.

If I could just take a point of privilege for the Chair, I want to recognize that we had 25 guests visit us and participants in a two-day working group meeting on igneous activity yesterday and the day before. And, of course, we had the most fabulous weather Washington is probably going to have this winter.

(Laughter.)

And I want to recognize the members of the ACNW staff who really took care of all of these folks, got them in and out. We had to reorganize our two-day schedule. We had to help folks with travel arrangements. We had to help folks with overnight

hotel arrangements due to cancellations. And I think everybody had a bed to sleep in and a hot meal, and a way to get home today if not necessary. And they really did a fabulous job of helping everybody out in a seamless way.

And, as always, you know, our room is under the great control of Theron Brown, and, you know, it worked perfectly no matter what the weather was. So I just wanted to put on the record that we really appreciate everybody's efforts, and the working group was a great success, largely in part to their ability to help folks battle the weather issues.

So thanks very much to all the staff for all your hard work.

Without further ado, I'm going to turn it over to Dr. Charles Miller, the Office Director who is going to lead us through this morning's briefing. And thank you for being with us.

DR. MILLER: Thank you, Mr. Chairman. It's a pleasure to be here today. What I'd like to do is to offer some overview comments as kind of get-acquainted comments, to give you what the structure of our office does and what our office accomplishes, and what we have before us with regard to challenges.

And I wanted to start by basically walking

through our organizational structure. I brought my division directors with me here today. You'll hear from each of them concerning the activities in their division and opportunities for the future.

I guess before I start one of the things that I wanted to make sure of is that I wanted to make sure that the Committee is aware that, as a new office, I mean, we have merged from portions of what was NMSS and the Office of State and Tribal Programs. And I think it was our feeling, for those of us that came from NMSS especially, that we had established a good working relationship in the Committee, and it's our goal to continue that good working relationship, so that we can share views and we can get issues resolved.

That said, let me jump into our organizational chart. Sitting to my right is George Pangburn, who is my deputy. George will speak in a moment. I was lucky to get George; he came down from Region I. So he brings to our office a fair amount of regional experience in the materials and waste area.

Our office is organized -- I guess, first, Mr. Chairman, in spitting out the office name, it's quite a mouthful. A lot of people are asking, "How did you come up with a name that was long?" Well, I

think the easiest way to say that is the final name of the office was a collaboration amongst the Commissioners.

(Laughter.)

And we came up with a name that was suitable to the Commission.

The office is divided into four divisions. We have three what I would call technical programmatic divisions and a division that does the program budgeting and planning. I wanted to focus your attention today on the three divisions that do the technical work for the office for the most part.

The first division is led by Janet Schleuter. She leads the Division of Materials Safety and State Agreements. There are three branches within that division. The branches focus on source security and safety. They focus on state agreements and industrial safety, and they focus on medical safety.

A lot of interface with these groups in the regions. The one thing that makes the materials program unique is that the licensing and inspection work for the materials program is primarily done in our regional offices. And we do the programmatic support and oversight for those offices.

The second division is the Division of

Intergovernmental Liaison and Rulemaking, which is led by Dennis Rathbun. And there are three branches there -- the Intergovernmental Liaison Branch, the Rulemaking branch -- two rulemaking branches, A and B. And this division primarily focuses on our external interactions with other federal agencies, with states also as it relates to state liaison functions, and with Indian tribes. We have a jurisdiction.

We have a lot of interaction beginning with some of the Indian tribes, which is primarily focused -- the tribal views are primarily focused on activities that surround the geographical areas where the tribes reside.

And then, our third technical division is the Division of Waste Management and Environmental Protection. And this is the division I think that you're probably most familiar with, and the activities of this division pretty much came to this office intact, with the exception of one area. And I'll just touch on that, and you'll hear more from Larry in a little bit.

We focus on decommissioning here. We focus on environmental reviews. We focus on low-level waste. We focus on our activities with the Department of Energy as they relate to WIR. We focus on in situ

leaching, and we'll get into more of this a little bit more.

The fuel -- some of the activities that come have come over from what was in the Division of Fuel Cycle, Bob Pearson's division at NMSS, and that was put in my office also. So I don't want to steal Larry's thunder, so I'll let him get into some of that.

Before I turn over the mike to George, I did want to touch on a couple things, and some of our global challenges as an office as we set up a new office. When you set up a new office, one of the first things that you have to do is get your processes in place, so I'm trying to take this first year to get a stable organization that has business processes in place, so that we can continue on with our activities and have a platform from which we can grow and improve.

Secondly, in bringing the various groups together, although we all work for one agency, offices develop their own cultures over time. So one of our challenges is in merging NMSS and the Office of State and Tribal Programs we're blending a couple cultures together.

And the people that are working in this

office that come from those various factions are now intermixing day to day on their activities, and blending those cultures together is one of the things -- one of the themes that I think that you'll hear throughout the presentation as a challenge in getting us to have a smooth operating machine.

Thirdly, I have some geographical challenges, and that is that my office is spread between One White Flint and Two White Flint. And while you might not think that's very far, to overcome some of the cultural challenges it is important for the staff to get together.

There are just some side points. They don't necessarily reflect on the activities that you'll have before you, but they're some of the things that if I had been spending my time on in the first five months of setting up this organization --

CHAIRMAN RYAN: If I may, Dr. Miller, I'd like to recognize another challenge that this office and its predecessor has handled very, very well, and that is the fact that most of your licensed activities are in states.

DR. MILLER: Yes.

CHAIRMAN RYAN: You know, you're not like the reactor folks that have 104 and, you know, a

smaller number of sites. And having worked myself in a state that was an agreement state, and having, you know, lots of visits from the regional office, you know, joint inspections and other activities -- and, again, the Committee's work on commenting on the MPEP program and other things, I don't want you to short-change the fact that that's a very robust program and has a real challenge to keep, you know, well-oiled and I think it's 36 -- is that the right number right now?

DR. MILLER: Thirty-four.

CHAIRMAN RYAN: Thirty-four, with a couple in the mill maybe?

DR. MILLER: We've got three states that are in the various stages of the process to become agreement states.

CHAIRMAN RYAN: And I don't think I'm short-changing by saying tens of thousands of licensees -- or licenses, I should say. Some hold many licenses but --

DR. MILLER: Thank you.

CHAIRMAN RYAN: -- that's quite a challenge. And, you know, you are managing it from a regional basis, and it's well done. We really appreciate that. I just don't want -- I want the record to reflect it's a national --

DR. MILLER: Thank you.

CHAIRMAN RYAN: -- program.

DR. MILLER: Thank you, Mr. Chairman. Yes, I mean, with over 20,000 licensees nationwide that range from one- and two-person companies to large corporations, it becomes quite a diverse challenge for both headquarters and the regions, and the agreement states who are our partners in this.

And 80 percent -- just for the record, about 80 percent of the licensees in the work are in the agreement states, and it's -- that percentage is growing as more states become agreement states. And the Chairman is very much interested in increasing agreement state activity to the maximum extent, getting more agreement states, getting more work.

He feels very strongly that the work is done close to home, that people know the licensees the best, and he's a champion for that. So we get full support from him and his office on that front, as well as the rest of the Commission.

Without further ado, I'd like to introduce George and let him make a few remarks.

MR. PANGBURN: Thanks, Charlie.

Good morning. Again, I'm George Pangburn. Appreciate the opportunity to be here today. A little

bit about me. Charlie did mention that I came here from Region I. I was there for about 10 years, and during that time ran the materials program in that region.

Prior to that, I did spend three years in another regional office, in Region IV, dealing with uranium recovery issues. And in another lifetime before that -- I'm showing my age here I guess -- worked on the Part 61 rulemaking as well as a relicensing of the Barnwell facility in the early 1980s. So my experience is relevant to many of the activities that the Committee has interest in.

The office itself and the programs that we're responsible for is about 260 FTE, and about $14 million in contract support. And those figures include the regions, and that's part of what I'd like to get to is talk a little bit about this relationship we have with the regions under FSME.

While it may not be unique, it's certainly a very strong relationship, in the sense that the regions regulate about 4,400 materials licensees in those areas where NRC has jurisdiction. As Dr. Ryan pointed out, you know, we do have 34 states where the states have the lead, but in the other states and in those portions of states where we have exclusive

federal jurisdiction NRC has that responsibility, and that's under the regional program by and large.

The regions also play a key role in inspection and oversight of decommissioning activities. Whether it's at power reactors or materials facilities, they're the folks who are in the field and conducting the inspections in process and then final status surveys of those activities.

They also inspect independent spent fuel storage installations and work closely, again, with the program office and with Bill Brock's organization in that regard.

We do budget for them. As I mentioned a moment ago, that FTE figure includes the regions. We budget for both the materials and the waste portions of their programs. We work closely with the regions on a daily basis, literally, in the sense that we talk to regional coordinators every morning about events. We also work very closely with them in event response. When there are complicated events or where actions need to be taken in real-time basis, it's done through coordination between the region and this office -- again, on the materials side of the house.

We worked closely with them in working groups on programmatic activities, rulemaking, and

development of various regulatory products, as well as you alluded to a moment ago, Dr. Ryan, about the MPEP program and that's another place where we worked closely -- and staff -- to look at oversight of the agreement states and the various regions.

Our responsibility also includes sort of oversight of the regions. Through the MPEP program we do go out and look at their performance over a several-year basis.

Today what we hope to do is to talk to you a little bit about those programs in some detail. We're going to have each of the division directors here, as Charlie mentioned, in a moment -- come up and talk to you about some of their key programs and activities, their current interactions with the Committee, where there are such interactions, and some future interactions or challenges as is appropriate.

Larry Camper will come up first to talk about Division of Waste Management and Environmental Protection, followed by Scott Moore, for materials safety and state agreements. And then Dennis Rathbun will speak on the Division of Intergovernmental Liaison and Rulemaking.

So having said that, I'll turn it over to Larry Camper.

CHAIRMAN RYAN: Great.

DR. MILLER: As Larry is coming up, Chairman, you know, you acknowledged the MPEP program. Janet Schleuter, the Division Director, is sorry she couldn't be here today, but she is en route to Florida for the exit for the Florida MPEP.

CHAIRMAN RYAN: Okay. Well, first things first.

DR. MILLER: Mission first, yes. Thank you.

CHAIRMAN RYAN: You know, we wrote a letter not too terribly long ago on the MPEP program, and I think one of the impressive elements of it is the fact that the agreement states staff people are involved in it as participants and as team members on your review, so they, you know, see other states and they learn what the NRC is doing, and it really helped set a common stage for expectations, which I think is very effective.

And the second point I think is that it really is, in our view, and from the work we did taking a look at it a little bit ago, it's a leading indicator kind of program. And in terms of being risk-informed, it, you know, tries to highlight those things that need attention first and get ahead of a

problem, and identify corrective measures before things really are off track, so --

DR. MILLER: Right.

CHAIRMAN RYAN: -- that's pretty effective, given the amount of, you know, staff that you have to put across 36 programs. That's pretty impressive.

DR. MILLER: Thank you.

MR. CAMPER: Good morning.

CHAIRMAN RYAN: Good morning.

MR. CAMPER: Good to see you.

Mr. Chairman, members of the Committee, and the ACNW staff, it is indeed a pleasure from my perspective to be with you again. I'd like to start off my remarks by pointing out that I believe that my division's interactions with the Committee and with the staff of the ACNW has just been excellent over the past year, and we look forward to another good year, frankly, working closely with you on a number of challenging issues. So when I say it's a pleasure, I genuinely mean it.

Next slide.

You're quite familiar with the division. As Charlie pointed out in his remarks, one of the things that changed when the new office was created,

though, was that the uranium recovery function came to my division. Within that, then, we became a fully expanded, comprehensive decommissioning program.

I think you might recall that over the past few years we have been taking a number of steps in the decommissioning area to make the program one program that covers all aspects of decommissioning within the agency. And now the program consists of research and test reactors, power reactors, complex material sites, and now those sites undergoing decommissioning in uranium recovery as well.

With regards to uranium recovery, this is an area where we forecast a great deal of work in the near term. As I speak, we have indications of something on the order of 9 to 12 new applications for uranium recovery. Most of those would be in situ leach. Some would be conventional mining -- three. So nine for in situ leach recovery, three for conventional. There may be more.

We're going out to a meeting with the National Mining Association in Denver in the spring time, and we'll be having a lot of sidebars and one on ones with various players in industry. A year ago at the NMA there were 89 companies that expressed -- or 89 entities that expressed an interest. NMA believes

there is something on the order of 12 to 15 that really have the resources and what have you to pursue this. So we certainly expect a tremendous workload in uranium recovery in the foreseeable future.

The next point I would make, then, that's so closely aligned with that initiative is prioritizing environmental reviews. The simple fact of the matter is is that we are underresourced in the environmental review area. We sought additional resources in the '08 budget request for environmental reviews. We did not get those resources.

And so if you'll look at recent activities for environmental analyses for sites such as USEC or LES, and the intense timeline that was associated with those sites -- 18 months -- will others come along like that? Plus known complicated environmental impact statements that we are working on, such as Shieldalloy or Sequoia Fuels, coupled with the potential for as many as 12 uranium recovery licensing actions.

You can see there's a pinch when it comes to environmental resources, because as we speak each of those uranium recovery licensing actions would need an environmental impact statement to support the licensing action.

And we are exploring with the Office of General Counsel some other ways that we might do some creative things with regards to environmental impact statements, such as for example the possibility of conducting a generic environmental impact statement. But we don't know until we get a final answer from OGC if that's doable or not.

So prioritizing environmental reviews with limited resources, procuring more resources for this area, is an area that Charlie and I often talk about, and try to figure out what we can do to make that a little more palatable.

Implementing the low-level waste strategic assessment -- you're quite familiar with that. We discussed it with you. You gave us a lot of valuable input. We are completing the assessment. We plan to get the assessment up to the Commission in a SECY this summer. In that strategic assessment we will identify activities by high, medium, and low.

I think there is on the order of 10 activities that we are classifying as high, and we'll need to move during the latter part of this year, certainly into FY08 and FY09, to implement those activities, assuming the Commission agrees with the staff's ranking of those activities and gives us the

go-ahead to do so.

Enhancing waste incidental to reprocessing consultation and the associated monitoring for waste incidental to reprocessing -- this is an area that has gotten a lot of public fanfare, as you know, a lot of congressional interest. Last summer we received a letter from the Office of General Counsel at the Department of Energy that was quite critical of the process that we've been using.

In reviewing the determination prepared by the Department of Energy, it focused upon Section A of the NDAA of 2005, the National Defense Authorization Act, which charged the Secretary of Energy with conducting determinations in consultation with the NRC.

And DOE has taken some exception to the process that we've used. I think principally and basically they feel in many cases they are being treated like a licensee and being held to some of the same standards that they would expect a licensee would be held to by us. And so what we've been trying very hard to do is work with DOE to better understand their concerns.

We have had and are holding a number of closed agency-to-agency, government-to-government

meetings, if you will, to better understand their concerns. We had a public meeting last November with DOE in which we set forth the fact that we would be holding these discussions.

What we are trying to do now is to figure out a better way to make the process work more smoothly, more effectively, so that both parties are comfortable with the process. And then, as we work our way through that, we would intend to go back to the public in short order, sometime this year, and explain the outcome of those discussions and make sure that the public understands the process that we'll be using.

We recently held a briefing for the Commissioners' assistants to make sure the Commission is being kept informed along the way as we try to enhance the process and make it even more effective.

The monitoring is a responsibility that we have under the Act. We are charged with assessing the compliance to ensure that the performance objectives of Part 61 are being met. We've developed the monitoring plans. We are now coordinating those monitoring plans with the state of South Carolina and the state of Idaho, along with DOE in near-term, and then we would expect to commence our monitoring

activities first at the Idaho National Lab site, probably in the springtime when the weather is better, and then subsequently at the Savannah River Site.

Next slide.

This slide depicts a number of interactions that we've had with the Committee over the last year or so. Just to touch on a couple of them briefly, we have worked with you to take a look at ways to risk-inform the low-level waste management area and emerging low-level waste issues.

You know, you put together a very good white paper, in fact, that was useful to us as we went through the low-level waste strategic assessment trying to figure out what are the things we should focus upon. Of course, we worked together in a workshop that was in the spring of last year that was very effective in helping us deal with that.

You've also heard a presentation by Dennis Damon on materials, risk-informed activities. You've spent a lot of time and energy with us looking at ways to better risk-inform issues in the waste area. The prevention of legacy sites rulemaking is another area that you provided some consultation to us on, which we greatly appreciated.

As part of that workshop back in May we

also talked about performance barriers for near-surface disposal. You were very instrumental in our overall decommissioning guidance overview. You came to our public meeting in April when we were looking at ways to update the guidance for decommissioning at large, and you played an important part there.

Of course, waste incidental to reprocessing, you played an active role in providing some consultation on the standard review plan that we are currently working to finalize at this point.

Next slide, please.

Now, in our program, we face a lot of challenges. And, frankly, to distill them down to three or four biggies, you know, is not easy. But three or four do come to mind that I think you can readily identify with.

One is the ongoing challenge to align federal and state agencies -- finality, if you will. Whether it be a power reactor in decommissioning or it be a complex site, what we find is there are many different views and many different standards that are brought to bear by different federal and state agencies.

And a lot of times when we think we've got alignment with the federal agencies, we'll find

ourselves somewhat out of sync or at least having different views about in-state with a particular state, not the least of which of course at the moment in time is -- Shieldalloy is a good example of that. There are others, but that's just one that comes to mind.

Restricted use sites -- we have a provision in the license termination rule, in 20.1403, that allows for restricted release. The fact of the matter is is historically no site has ever gone the restricted release pathway. Some have started, but none have taken it from soup to nuts.

A number of different reasons for that, but the primary reason is is that there is a requirement in that part of the regulations that there be a third party oversight provided. And states or municipal jurisdictions can step up and assume that role. None have wanted to do so, because of liability concerns.

We went to the Commission recently, in the last year or so, with a policy change, which the Commission endorsed, that created a new pathway for long-term controls, institutional controls being provided by the NRC via a license in perpetuity over the period of performance for the rule.

We now have an applicant that is pursuing that particular course of action; that being Shieldalloy. We have three other sites that are expressing an interest in restricted release. Those are different pathways under restricted release. One of those, for example -- the AAR site up in Michigan -- would be pursuing a deed restriction. Its extent of contamination is not nearly as much as it is at the Shieldalloy site, and there has been a rather dramatic remediation effort up there.

But nonetheless, restricted use sites are challenging, they are time-consuming, and they, of course, naturally invoke a great deal of local interest, as you might imagine, from state and local governments.

Anticipating low-level waste issues -- you know, if you would have asked me 10 years ago, would we have had some of the discussion that we've had, and some of the things that you have looked at when you did your white paper, I would have never envisioned that much interest in the low-level waste program. I just would not have envisioned it.

But if one looks at the GAO reports that have been done thus far, the National Academy of Science examination, your own efforts in looking at

the program and what can be done to make it more risk-informed and to address some of the concerns that industry has about it, there has been a lot. It's a small program, as we've talked about before, limited resources, and we're in a maintenance mode, as charged by the Commission. But yet there is an awful lot on the plate.

That's the principal reason that we did the low-level waste strategic assessment -- to try to figure out, what are the things that we really need to spend our time and energy on, given limited resources.

So what's out there next? I don't know. I know there is a possibility of another GAO report looking at the compact process. Now that leadership of Congress has changed, will that continue to have traction? We don't know. Will there be other things?

So I suspect in due course we'll be back here with you talking from time to time again about issues emerging in the low-level waste area.

Next slide.

So in my last slide, I wanted to just focus a little bit on some of the interactions that we see coming down the pike. First is the legacy sites rulemaking. We've been with you on the legacy sites rulemaking. You've given us advice. We appreciate

that. As I said earlier, we are now developing the technical basis for the rulemaking. We're constructing the language of the rulemaking.

You might recall just briefly that that rule really has two purposes. It really is -- it's designed principally for complex material sites that undergo events in the course of operations that weren't anticipated, resulting in subsurface contamination, groundwater issues, and the like. And the idea is when those things happen, what kinds of operational changes can be made? What kinds of reporting requirements are in order? And what needs to be done to make changes in financial assurance?

What we want to do is come back with you as we proceed with that rulemaking and share with you how that rulemaking is going and what the contents of that rulemaking are going to be.

Assessment of dose modeling, approaches in methodologies, this is a self-initiated effort by the division to take a look at the dose modeling techniques that we use. Since 1999, the decommissioning program has undertaken a number of evaluations of its processes. We've made a lot of changes, and, frankly, those changes have borne a lot of good fruit, as witnessed by the number of sites

that we've been able to get off the decommissioning list in the last few years.

It took an investment to do that, and it took a lot of self-examination, and it took a lot of changes. And I commend the staff for stepping up to the plate and making those changes.

But the one area that we haven't looked at is the dose methodologies that we use. Are we state of the art? Are we doing it the right way? Are we doing it as well as we can? And Dr. Abu-Eid, who is our senior-level scientist, is leading the charge this year in taking a look at the methodologies that we use, and at some point he wants to come and talk with you about what he's finding and get some views from you.

Depleted uranium disposal analysis -- this is one that we were charged with the Commission by doing in the order -- in the matter of Louisiana Energy Services in which the Commission directed the staff to -- outside of the adjudication to consider whether the quantities of depleted uranium at issue in the waste stream from uranium enrichment facilities warrant amending Section 6155(a)(6) or Section 6155(a), Waste Classification Table.

The state has identified that as one of

the high priority line items in our strategic assessment, and it certainly is an area where we will want to seek some counsel from the Committee as we prepare that. I know that there's a lot of interest in that. Dr. Weiner, of course, has expressed some interest in that in one of the meetings earlier, and it is a very important issue. So we'll be coming to talk with you about that.

Revision of guidance for in situ leach recovery. I really should say revision of guidance for uranium at large. We recently had a workshop. Sixty attendees came -- this was on February 8th. A lot of interest was expressed in updating some of the older guidance that's out there, things dealing with health physics issues, modeling, flow and transport, monitoring of performance of flow and transport. Some of those things it would be of value to talk with you about.

And then, last but not least is coordinating the annual review of rulemaking and guidance on low-level waste storage. You know that we are charged, with the Commission, every year of going up with the SECY, explaining what is needed in terms of updating guidance for low-level waste. This past year we did indicate to the Commission that we would

be updating guidance, especially guidance for long-term storage of Class B and Class C waste, given the pending closure of Barnwell.

Staff is in the process of doing that updating now. But that's something that cycles every year, and we'll come back and talk with you along the way about what seems to be in order for that particular year.

So I think in closure, then, again, it is a pleasure. It has been an excellent working relationship. And as Charlie pointed out in his remarks, we want to continue that. And I think as you can see we've got some interesting things we'll be coming and talking with you about.

Those are my remarks. Any questions or comments?

CHAIRMAN RYAN: A couple, if I may.

MR. CAMPER: Sure.

CHAIRMAN RYAN: And I guess we'll just take them one at a time for each talk as we go through. Is that okay?

DR. MILLER: I think that would probably be more efficient.

CHAIRMAN RYAN: Okay. Great. Just a general comment, first, Larry. I think we all agree,

the Committee, that we've had a lot of success in working with your office and in every office in the now new division. But one of the elements of that that I think is very important to highlight and that we should keep is that it has been very proactive.

We have, on decommissioning, for example, participated from your first public meetings, just as participants and observers. And all the Committee members came and, you know, participated and observed and learned a lot. And because of that, we are contemporaneous with your information-gathering and learning processes, in a way that is effective, and I think at least from our viewpoint not really intrusive into, you know, your goals and objectives. We've got alignment --

MR. CAMPER: Good.

CHAIRMAN RYAN: -- which I think is very, very helpful for us, because we are a lot more up the power curve if you will than we might otherwise be if we get finished work products to then review. And I summarized all that when we had a couple working groups that Jim Clarke ran with the same participants a couple of times -- three I think -- and they got to see the draft guidance. They got to offer comment.

You got that comment. They get to look at

the final, and the comment that I've shared with all the Commissioners is that participants said our comments were addressed. And I think that's a win, you know, when you can get stakeholders who are at the table and say, you know, we had a lot of significant comments, and they've been addressed in the guidance, and they were satisfied with how they were addressed.

So that's a real opportunity and maybe a model that we ought to use for all of our interactions across all of our activities. And I view that -- and we also advised the Commission of that in our last briefing in December. So three cheers for that approach.

So that's history. Now on to the tough stuff which is ahead, right? The hardware. I'm happy to see on your challenges page, on page 4, the things you've listed, because most of those in one form or fashion are in our action plan that we're working on now, so I'm glad to see those.

We have bumped up the uranium mining question to our tier 1 based on Commission interest and the obvious industry's need. We're very interested in Shieldalloy as a -- you know, a restricted site decommissioning, so we'd like to, you know, hear a little bit about that.

I think the alignment with federal and state agencies is an ongoing challenge. And if you see anything where we can be helpful in that regard, we'd love to participate as well. So I see an awful lot of alignment with, you know, the issues that you're dealing with and with our interest.

So I don't think you'll see our action plan diverging too much. It might be in the specific details of who briefs about what, but --

MR. CAMPER: Right.

CHAIRMAN RYAN: -- we see an awful lot of alignment there, so I think that's a real positive thing.

The DU disposal analysis I'm sure -- and we don't need to go into detail there, but, you know, it would be helpful to learn a little bit more about when you say "disposal analysis" what's the circle of disposal analysis realm that we're thinking about there. That would be just one I'd like to get your mind on a little bit more as we go forward.

But, again, I think overall with this there's an awful lot of alignment, because as you pointed out we have participated together -- your staff and our work -- on the low-level waste white paper, and, you know, your strategic assessment and

our meetings were basically aligned to be at the same time, so we all get the same information. That works very, very effectively, I think for everybody. So that's great.

Any other questions or comments from other members? Let's start with Bill, please.

MEMBER HINZE: I have a brief question. Larry, there is quite a bit of interest on the streets in the Texas low-level waste site, and I'm wondering, where is that on your radar screen, and are there any issues emerging from that that are of interest to the Commission?

MR. CAMPER: Where does it stand, first? We do monitor it quite a bit. We talk with Texas from time to time. We actually had people down there a year ago, year ago in May. It continues, of course. Texas did grant the additional time that WCS was seeking to provide answers to the extensive RAIs, Requests for Additional Information that the state had.

There were some changes that took place within WCS that I personally viewed as positive. The organization -- WCS -- decided to get Bill Dornsyfe much more actively involved in the application process. I think, you know, Bill brings a wealth of

experience, having been a state regulator himself, and I think he, therefore, is well-positioned to understand the kinds of things that a regulator needs to be comfortable in proceeding to make decisions. So I viewed that as a positive step.

At this point, the state is continuing its interactions with WCS. I am not in a position to know what the outcome will be, of course, because it's an ongoing review. At some point some of those questions with regards to a need for the seeking of an exemption with regards to our regulations as far as land ownership is in play will come to bear at some point in the future for us.

But for the moment, it's proceeding. I sense that the state and the applicant are having more productive discussions. If you look at some of the RAIs that were generated, and certainly in the first round or so, some of those things seem to be fairly obvious from our vantage point. They were certainly reasonable questions on behalf of the regulator, and one wondered why there wasn't more in-depth information. You know, performance of groundwater aquifers, for example, is something you would expect.

So I think it's proceeding. I think it's getting better, but I don't know what the outcome will

be. We'll continue to monitor it, and at some point we'll have some discussions with the state with regard to some of the land ownership provisions that might require an exemption.

But you're right, there's a lot of interest out there. I mean, I think there is certainly a sentiment that we'd like to see other options available. Some of the changes in industry of late have caused some concerns about making sure there is more options in competition, and so forth, so we'll continue to monitor.

With regards to coming to the Committee, I'd have to wait and see what technical issues we -- if the state were to turn to us and request technical assistance on some challenging issue, that's a possibility. I just don't know what it is as we speak.

MEMBER HINZE: Thanks very much.

MR. CAMPER: Sure.

CHAIRMAN RYAN: Dr. Weiner?

MEMBER WEINER: Thanks very much for --

MR. CAMPER: You're quite welcome.

MEMBER WEINER: -- a very good presentation, and I applaud your taking on dose modeling. I have to say that that's a really great

thing.

I wanted to make some comments regarding your comments about the EIS on in situ leach mining. Generic EIS is very tough in that context, because this is really a site-specific activity. And I was wondering if you had thought of going the environmental assessment route, and then if there is -- if it doesn't result in an NOI, then, for one side or another, then you go on.

MR. CAMPER: I mentioned it today, and I'm glad I did now that you're asking me questions, because I was wondering if I might stimulate a comment or two out of the Committee, because frankly we're in the thinking stage about this. I mean, the challenge that we face from an operational standpoint is we have a lot of them, they require an environmental impact statement.

We have sought counsel from the Office of General Counsel as to whether or not we might pursue a generic environmental impact statement. We're waiting for an answer.

If we're going to do that, then we would want to do that quickly, progressively, and on very short timeframe. That's a challenge. But even if we do a GEIS, even if we do -- and that's not certain yet

-- but if we do, it does not eliminate the need, of course, for a site-specific environmental analysis. We'll still have to do those, because the sites are quite different, obviously, which is really what you're alluding to.

Now, the nice thing about doing a GEIS is -- there are two things. Number one, it would be more cost effective for our agency in the long run as compared to doing certainly EISs as we have historically and classically done them. As you know, that's about a 1.5 to 2 FTE per year for two years to do a classical EIS. Very expensive.

So we can perhaps do it more efficiently and cost effectively, and there are a number of things, certainly technical issues, that are generic, but that does not eliminate the need for site-specific. And our planning is considering that as well.

But the critical thing I think in addition to doing sound analysis is that if, in fact -- I mean, think about the number that we're talking about. The agency wants to be positioned not to be the roadblock to the front end of the nuclear renaissance, if that in fact becomes a reality. So we're looking at this from a number of different perspectives, and it's a

big challenge for us.

MEMBER WEINER: What, beyond the fact of the state of New Mexico in its wisdom, decided to call the DU product from LES a waste? What is the -- what are the problems with DU disposal? Because DU is really a very useful substance.

MR. CAMPER: No question. I think the problem, aside from the term "waste" -- I mean, the fundamental problem is is that the volume of this waste, this type of waste, and the concentrations of this type of waste have not been evaluated. Years ago the Commission, and as recently as even in this proceeding, has determined that this is in fact low-level waste.

There is language in Part 61 that says, "If you don't put it into a table through analysis of classification, by default it's Class A waste." So what the Commission has asked us to do, because of some of the concerns that were raised in that proceeding, is to take a look at it aside from the adjudicatory process and do an analysis.

So what you're really looking at is the fact that this volume -- certainly, this volume was not evaluated historically. And, in fact, the concentrations were not. I mean, if you go back and

look at the draft environmental impact statement that was put out years ago -- I'm not sure if I know the exact year, maybe Bobby does --

CHAIRMAN RYAN: 1979.

MR. CAMPER: There you go. But it talked about concentration values on the order of 50 nanocuries per centimeter cubed. Okay? So of this waste has -- is much higher than that in concentrations, not uniformly but maybe a factor of five to 7 higher, and the volumes were never evaluated.

So what we really want to do -- and, again, I'm glad you're asking this question, because I want to pick up on Dr. Ryan's comment. What we really want -- what we need to do in the first instance is to conduct unbiased, sound technical evaluation. We do not want to think about outcomes or options on the front end. Let's do the analysis, good science, and it will be what it will be.

Now, depending upon the outcome, then we'll look at questions of waste classification, other ways of doing site-specific analyses under 61.58, whatever. I don't -- you know, there are options we can consider, but on the front end it has to be a valid technical analysis. Absence of malice, and it

would be a good opportunity to get some dialogue and input from the Committee.

CHAIRMAN RYAN: If I can just add to your question, Ruth. One area I would urge you to start out with right away is the drift that has occurred between the types of DU that have been disposed over time.

MR. CAMPER: Yes.

CHAIRMAN RYAN: You know, very early on there was calcium fluoride with a tiny bit of stuff in it -- DU. And then, you know, it kind of went on to where now a lot of DU metal is being disposed as intact metal. So there's been a lot of drift in wasteform, not just in waste concentration.

But the form part of it I think is something to capture. That's an important difference that has occurred. And there has been everything in between.

The other part of it is is that the fuel fabrication facilities, which is not really DU, but they basically, you know, do such a great job at recovering material they have precious little that they ever even throw away, so -- of the uranium content. So a lot has changed in that arena over 30 years, so that's part of your, you know, initial

information-gathering. It could be an interesting exercise.

MEMBER WEINER: I have one more brief question.

CHAIRMAN RYAN: Okay. Because we've got about six minutes to do --

MEMBER WEINER: Is greater than Class C waste under your jurisdiction?

MR. CAMPER: Yes, it is.

MEMBER WEINER: Thanks.

CHAIRMAN RYAN: Allen, anything else?

VICE CHAIRMAN CROFF: Yes. I'd like to ask a question on the waste determination standard review plan. You noted we had offered comments on it, and revision is in process. I understand we'll see the next version sometime in the summer. And we've got a commitment for staff to come in and tell us about the comment resolution.

Looking beyond that, do you see any technical issues arising on the waste determination business, either the consultation part or the monitoring part, which is something a little bit new?

MR. CAMPER: Possibly on both. Possibly -- you know, one of the things we're doing in these discussions with DOE is to address the seven generic

issues. Point of compliance, for example, is one.

As we continue to work our way through resolution of those technical issues with the DOE staff, there is the possibility that we would seek some counsel on resolution of certain of those technical issues.

With regards to monitoring, I think to a large degree, you know, the challenge in monitoring is, you know, on the front end you develop this monitoring plan, but then what do you find over time? What do you find over time? And it's very complicated. As you know, it's not something where you can go out there every day and look, you know, casually or take a survey meter out like you can in the health physics review. It's much more complicated than that.

So there certainly may be issues that will emerge over time as we carry out our monitoring responsibilities that we'll feel that there is value in consultation with the Committee.

VICE CHAIRMAN CROFF: Talking about the monitoring brings to mind the working group meeting on linking modeling and monitoring, which may be the way to go there. Okay. Thanks.

CHAIRMAN RYAN: Dr. Clarke?

MEMBER CLARKE: Thanks, Mike.

I certainly want to underscore everything Mike said about the relationship. I think it has been excellent --

MR. CAMPER: Thank you.

MEMBER CLARKE: -- and I personally want to tell you it has been a real pleasure working with you and your staff, and I look forward to continued interactions.

MR. CAMPER: I appreciate that very much. Thank you.

MEMBER CLARKE: The early involvement has been most helpful, and you mentioned legacy sites, and that we'll be interacting again with you, and we look forward to that. I did want to express an interest in the site you mentioned that may -- I guess in the context of your graded approach to institutional controls would be a low-risk site that may be going for a deed notice. And I think we'd be interested in following that as well as that develops. That would give us the range of complex sites from a long-term control license to something like a --

MR. CAMPER: A graded approach is exactly the key. that's the right way to describe it.

MEMBER CLARKE: But thanks, Larry.

Appreciate it.

MR. CAMPER: You're welcome. Thank you.

CHAIRMAN RYAN: One last question that I might ask -- I forgot to ask it before -- is, Bobby, you're going to be leading the dose modeling and dosimetry review. And I applaud your effort; that's going to be a big job and you're well suited to do it. You've done great work in a lot of other areas.

One area of interest to me is the dose conversion factor itself. If you look at a dose conversion factor -- I don't care if you pick ICRP or FGRs or whatever you might want -- you can find many examples where they can be ultra-conservative, and you can find a few cases where they are non-conservative.

So I would say that's a fruitful area to examine, and we shouldn't just worry about transport of radioactive material and the environment, but also look at once it's taken into the body what's the basis for the GI tract uptake fraction or the dosimetry model itself.

You know, very often internal dose folks think if they get the dose to within an order of magnitude of what they measure from bioassay it's a win. Actually, two orders of magnitude is okay.

So that's kind of a specific point. But

the general question is, I think -- and I'm just offering this as a thought, not as something that is -- you know, I can say I've ultimately concluded today, but it would be interesting to try and take the parts and pieces of that process of dose calculation modeling and calculation, and try and rank them a bit on where the best effort can be spent to reduce uncertainty and to better risk inform what's important there.

Is that a fair comment? Am I on track with what you're thinking?

DR. ABU-EID: Yes, that's fair, definitely. I think one of the issues is to use different dose conversion factors for ICRP. As you know, we use ICRP 26 currently in most of the dose analyses. We will look into other dose factors, such as ICRP 68-72, and even newer ones. Actually, in the models that we developed we did introduce different dose factors possibility and compared the results, so that's an area we'll be working on in the dose analysis.

In addition, for the uncertainty --

CHAIRMAN RYAN: Can I make a point there? I'd push it even further. Iodine-129 is my favorite example. It is most dependent on the dietary intake

of iodine.

DR. ABU-EID: Okay.

CHAIRMAN RYAN: The dose from I-129. The reference factor I think it -- and I may not quote all of these right, but if ICRP 26 -- or maybe it's 68, I forget which one is based on, let's say, 200 micrograms of iodine per day in the diet.

Well, if you have 400 milligrams of iodine in the diet per day, you have no dose. So you're overestimating the dose if you use that factor. If it's 150, which is some -- one report says is the U.S. average, you're underestimating the dose. So you have to actually bore in below the actual factor and say, "What's the metabolic model? What are the dietary intake drivers?" All those kinds of things to really see where the details are, and I would urge you to, particularly on some of the critical ones like Carbon-14, I-129, Neptunium-237 --

DR. ABU-EID: Plutonium-210.

CHAIRMAN RYAN: -- Plutonium-210 and -- that's a popular one right at the moment. But there's a lot of those where I think if you can better risk-inform the dose conversion factor and tell folks, if you know these three things you can actually adjust the factor more appropriately for your specific

circumstances, that would be a fabulous step forward in risk-informing those calculations. Just a thought.

DR. ABU-EID: Okay. Thank you.

CHAIRMAN RYAN: Thank you.

DR. MILLER: Thanks, Larry.

CHAIRMAN RYAN: Next?

DR. MILLER: Yes. Scott Moore is going to come up and talk about materials safety. As he's coming up, Dr. Ryan, you had mentioned interest in Shieldalloy. One of the things I think we have to be careful of here is Shieldalloy is now in hearing space, so we've entered an area of ex parte with the Commission.

So we can't talk -- we can't talk to the Commission about any of the technical merits of it, and I guess it's going to, you know -- I'm not exactly sure of what legal restraints are on the Committee. But if you're advising the Commission on that, we may get into some separation on that, and we probably need to be able to work together to make sure how we --

CHAIRMAN RYAN: Absolutely.

DR. MILLER: -- how we --

CHAIRMAN RYAN: I think --

DR. MILLER: -- carry that out.

CHAIRMAN RYAN: Absolutely. Our first

step, however, would be I think to be more in the general briefing arena, so we can receive those materials that are in the docket like, you know, written plans or just an overview of the sight and other things that would be more straightforward of educating the Committee, clearly as step 1.

And I think if we step at that first step, and then stood back and then got into the more detailed discussion you just described, that would be a great start. So if that suits you, we can go there. And, again, we're not looking to, you know, be in the mode of hearing things that are currently under --

DR. MILLER: Well, I think, you know, where we have to be careful is, you know -- and I don't want to speak for you -- but your role in advising the Commission. And I think we have to see which side of the fence the Committee sits on.

And if it's to advise the Commission, and the Commission has a judicial role perhaps, depending upon how the Hearing Board comes out, we can't discuss the technical merits of the case at this point with the Commission, and I guess we have to see if we can do that with you given --

CHAIRMAN RYAN: Absolutely.

DR. MILLER: -- your role in --

CHAIRMAN RYAN: We'll work through all of that with you.

DR. MILLER: -- or when in the process we can do that.

CHAIRMAN RYAN: Sure. No, we'll work through that with you. That's fine.

DR. MILLER: Yes. Scott?

MR. MOORE: Mr. Chairman, I'm here to brief the Committee on the Division of Materials Safety and State Agreements. As Dr. Miller and Dr. Ryan have already mentioned, we oversee a national program that covers regions and agreement states and thousands of licensees.

The division itself oversees medical, academic, and commercial uses of radioactive materials, and we're responsible for implementing policies on radiation protection and security within those licensees. We provide support and guidance on licensing, inspection, and enforcement activities that are conducted primarily by the regions and the agreement states themselves.

We also assess the regional performance of the regions through MPEP and evaluate agreement state adequacy and compatibility, also through MPEP. We thought the best way to do this would be to describe

what the functions are of each of the branches organizationally, and so I'll walk through that.

But to give you some background, when the division was formed, it was an amalgamation of the former Office of State Programs, and Office of State and Tribal Programs, and Dr. Miller's former division -- the Division of Industrial and Medical Nuclear Safety, portions of both of those offices and portions of the division.

The last time the Committee heard from me was on the NARM rule, and that was when I was in a function under rulemaking. The rulemaking function is now under the Division of Intergovernmental Liaison and Rulemaking. You'll hear next from Dennis Rathbun, who is the Division Director for that division. So that's in a different division now.

One of our branches is the Source Safety and Security Branch. That branch has programmatic and technical responsibility for support of the sealed source and device program, where they review devices and the engineering of those sources and devices. And they also have responsibility for safety and control of sources.

So we do things like we hold weekly meetings with the agreement states and the regions on

how to implement the institution controls and how those are used within states. That branch also implements the general license program and manages the materials licensing database management systems, like our sealed source and device registry, the general license tracking system, and also our licensing tracking system, which keeps track of materials, licensees.

Finally, the branch coordinates with our Office of Nuclear Security Incident Response and also the NMSS portion that split off from FSME on security issues, including security orders that have been issued, you know, over the last year, year and a half, to our licensees. So the source safety and security branch has responsibility for security requirements within our division.

The State Agreements and Industrial Safety Branch has responsibility for programmatic and technical areas within the industrial arena and also oversight of the agreement state program.

Dr. Ryan mentioned the MPEP program. That falls within this branch. It interfaces with agreement states, most of the agreement state coordination and the regional state agreements officers that are in the regions. That coordination

is done from within this branch. For instance, we have monthly conference calls with the states, and that's managed out of this branch.

So oversight of the agreement state program is done from within the state agreements and industrial safety branch.

That branch also has a program to do exempt distribution licensing. It's the only licensing that we do out of headquarters. All of the other licensing is done from within the regions. But since exempt distribution, which is at very, very low levels of radioactive material is a nationwide program, that's done here out of the headquarters office.

Finally, we have a branch on medical safety and events assessment. That has programmatic and technical responsibility for medical uses of byproduct material. It also does regional coordination and event analysis and assessment for all types of materials events, including those within this office and those within NMSS for fuel cycle transportation-type events.

It's responsible for incident response coordination and emergency preparedness and coordination with the Ops Center, and maintains a

database called the nuclear materials events database in the contract that we have with the national lab to operate that database.

Finally, it plans and coordinates activities with another advisory committee -- the Advisory Committee on the Medical Use of Isotopes, the ACMUI. And we have significant interaction with that advisory committee. And just like Larry Camper's division, he has a fairly large amount of interaction with ACNW. Our division has a fairly high amount of interaction with the ACMUI because of the medical uses that are within the medical program.

So we actually -- that's a staff-level advisory committee, and we support that. Just like you have your own staff, our staff supports the ACMUI, and so we spend a lot of time in that support role.

Can I have the next slide, please?

We don't have any current interactions going along now with the ACNW out of our division. If we do have future materials activities that fall within the purview of the Committee, we would certainly bring those to the Committee.

Could I have the next slide?

In prepping for this briefing, we are looking at what area might be of interest to the

Committee. And one area that we thought of that may be of interest is what we're doing in material disposition or source recovery. There is two programs that are related -- the Orphan Radioactive Material Disposition Program, and the DOE Offsite Source Recovery Program.

The Orphan Radioactive Material Disposition Program is a cooperative agreement program that we have with the Conference of Radiation Control Program Directors. It provides information to assist states and NRC in source disposition, and is primarily listing waste brokers, individuals who want sources, and individuals who want to get rid of the sources, that's run by CRCPD.

It's focused on the smaller sources, and is mostly an information exchange, but also has a component in it that can disposition some of the smaller sources. And so NRC arranges to get money, a fairly small amount, about 100K per year, to CRCPD via a cooperative agreement through another federal agency.

And Orphan sources themselves are sources for which a responsible party can't be identified or are uncontrolled sources that require removal to be put into a situation that would protect the public

health and safety, or they may be controlled sources, but they're in a condition such that the security can't be assured in such a situation.

So that's a fairly successful program for us, and at one -- it may be one that you may be interested in hearing about.

The other program that we have is one with DOE. It does not cost NRC any money, but it's DOE's program to address greater than Class C waste sources, and also allow licensees to register with DOE for source recovery. We have an MOU with DOE that covers this program, and allows DOE to recover significant security concern sources.

Both programs have a nationwide impact. They pick up sources across the nation, and we thought they may be of interest to the Committee. If the Committee is interested in hearing about it, we can brief the Committee. If you have other more pertinent issues, then certainly, you know, you could hear about those. But these are areas within our division that would fall under the purview of the Committee.

That concludes my briefing, f you have questions.

CHAIRMAN RYAN: Scott, let me thank you again for your briefing on NARM. I know that was a

hurry-up rulemaking to meet requirements of newly-imposed requirements, and it seems like you've had a couple, three of those in your recent career with security issues that came along, and NORM and NARM, and you've kept us fully informed in a really helpful way to us.

So we really appreciate you taking time out of what has to be a very busy schedule under those crunch times to keep us plugged in, so we really appreciate that.

MR. MOORE: Thank you.

CHAIRMAN RYAN: As you may or may not know, the Commission has actually suggested to us that they might be interested in expanding our activities into more materials areas, so we're thinking about that.

MR. MOORE: Yes.

CHAIRMAN RYAN: And I think rather than, you know, going into too much detail with -- because we're kind of working on our action plan even as we speak, we'll probably be in contact with you all on those topics as they come along, so there may be some additional things that will come into our purview as in the SRM that we received from the Commission. So we'll be working on those.

One take-away message that I'll take from you is that we really probably should be careful not to overlap or step on the relationship that you have with the CUMI, because clearly that's an area where you have -- and the Commission has independent, you know, advice on those areas. So that was really helpful, to get a better insight there.

MR. MOORE: Definitely.

CHAIRMAN RYAN: So we'll be mindful of that area that is -- and I'll just assume it's -- and I probably agree with it, it's got pretty well -- pretty well covered now, so that's one we'll be mindful of as we do our planning.

Any other comments? Let's start with Dr. Clarke.

MEMBER CLARKE: No.

CHAIRMAN RYAN: Allen?

VICE CHAIRMAN CROFF: No.

CHAIRMAN RYAN: Allen, no. Ruth?

MEMBER WEINER: No.

CHAIRMAN RYAN: Okay. Well, thank you again. We appreciate it.

And last but not least.

DR. MILLER: Dennis Rathbun.

CHAIRMAN RYAN: Dennis.

MR. RATHBUN: Hi. Hello, Dr. Ryan. I'm Dennis Rathbun, Director of the Division of Intergovernmental Liaison and Rulemaking. I'll be very brief. Why don't we just go to the first slide.

There are several rulemakings which I think you're aware of which we're responsible for now in the -- yes, the rulemaking activities. The 656 in -- these are outgrowths out of the Energy Policy Act of August 2005, which governs the secure transfer of nuclear materials. 652 is work in progress, which covers fingerprinting and criminal history check, background check.

And then, as you know, the NARM rulemaking, which Scott I guess has briefed you on earlier, we are working on that now. The rule was published in draft form last July 26th. We've gotten 39 comments and some from the agreement states and some from the medical community. And we're working to resolve those, and the expectation is to get that back to the Executive Director for Operations by the third week of March.

The other activity which is important to us has to do with allegations. That's a merged function from the old NMSS and state and travel programs, and now in the state and travel programs we

were responsible for allegations which were received via the state employees. And now we're responsible for both of those in my division.

We have petitions that we are responsible for. There is one which is work in progress now involving the two-person radiography rule, and we're getting to a resolution of that particular one.

Let's go to the next slide.

The national source tracking system final rule was published, and we -- the other activity that we do every three years is the national state liaison meeting. That meeting was held last August 1st and 2nd here in the building, and we're pleased to have had representatives from 34 states and the Department of Transportation represented in that meeting.

Chairman Klein, in one of his early discussions, met with the state and liaison -- the state liaison officers and talked up some of his ideas.

A third thing that we've been working on and made some important progress on is the pre-licensing guidance. As you may know, the General Accounting Office had some concerns and interests in that from the report -- the recommendation that they made a couple of years ago, and we've had a task group

working with the states and ourselves and come up with what we think is a reasonable way of screening applicants for materials licenses, basically to get sort of a preliminary information base as to whether or not we should proceed.

We have a six-month pilot program in -- you know, in progress now.

Let's go to the next slide, Sam.

Another thing that I'm responsible for is work with the Native Americans. The tribal stakeholder meetings, we've had two so far, one with the Prairie Island Indian Nation. We're concerned about the relicensing of Prairie Island and trying to find the best way that they can for being actively involved in that process.

The other one has to do with the Yukon Nation communities, and their issue -- their interest pertains to the possible Toshiba power reactor to supply power to Galena, Alaska. And then, we have another piece of work in progress, exemptions from the -- from licensing. This basically is a fix-up to some -- you know, bringing up to date the exemptions for licensing in the final rule.

The last slide is basically, you know, some of the activities that we have still ahead. One

of the outgrowths of the review and action on the Minnesota application to become an agreement state was a concern, which is true or could be true in a number of places, that activities undertaken by a state may have a -- may infringe upon a regulatory authority under the Atomic Energy Act, which is actually reserved to the NRC.

And that's an area of some interest to the General Counsel's office and also to the Commission. And so they asked us to prepare a paper on that, how we might deal with those kind of circumstances, and to apprise them of where they might -- where we think that they might have taken place. You know, we've prepared that paper and sent it up to the Commission. There was a joint -- basically, a joint paper with the Office of the General Counsel.

And with that, of course, we all have our problems in terms of the rulemaking schedule. There's always an issue and also budget, but, you know, that's not new and different.

So I'll open it up to any questions you might have.

DR. MILLER: Before questions, I guess as we flipped through the slides, you may have noticed there are some rulemaking activities that we have to

do in our office that support other offices. For example, the high-level waste program, security rulemaking. So over the course of time, especially as it relates to the high-level waste program, you'll be hearing as we go forward from that.

The technical basis is really done in NMSS, in Jack Strosnider's organization, but --

MR. RATHBUN: Sure.

DR. MILLER: -- my organization and Dennis' division has to take that information and promulgate a rule at some point in time. Rulemaking changes need to take place.

Same in the security area. We support NSER in that regard. So --

MR. RATHBUN: That's a big challenge, and that's a big challenge because basically it calls -- in order to prepare a rule you really have to have a satisfactory basis for the rule, a technical basis for the rule, and it has to be well thought out and well designed, and in order to allow us to proceed, with the expertise for doing the rule. The support work it generally mentions is in our shop.

CHAIRMAN RYAN: Okay. Dr. Clarke?

MEMBER CLARKE: None for me, thanks.

CHAIRMAN RYAN: Bill? Ruth? No?

MEMBER HINZE: Excuse me. I was just interested, are you having problems getting the information that you need to develop the geological repository operations?

DR. MILLER: No. You shouldn't take that from this presentation. I just wanted to alert you to the fact that I've been given the responsibility in my office to do rulemakings, not only for those rules that would originate in my office but for other non-reactor -- non-power reactor related rulemakings and --

MEMBER HINZE: I was more interested in the aspect of whether the DOE is far enough along with -- and you're getting sufficient information that permits --

MR. RATHBUN: Well, that's a much more global -- that's a much more global question.

DR. MILLER: That's a question you'll have to ask Jack.

(Laughter.)

MR. RATHBUN: Well, that's right, and I can hardly wait to hear his answer.

(Laughter.)

MEMBER HINZE: Good.

CHAIRMAN RYAN: Nothing like asking the

big question.

The office -- the division's name is Intergovernmental Liaison. Can you tell us a little bit about interactions with EPA and some of those overlap areas or --

MR. RATHBUN: Well, it's there in concept, and it's there, for instance, in areas -- specific areas like the in situ leaching rulemaking that the Commission is interested in and we're working on. And, consequently, there is a perfect example, kind of a poster child of where we can't -- you know, the Nuclear Regulatory Commission can't move forward without consultation and working with both the Environmental Protection Agency and also the other side, potentially the National Mining Association.

So that's an example of a particular -- probably a pretty good one --

DR. MILLER: The intergovernmental is not only federal but state also. This organization --

MR. RATHBUN: Sure.

DR. MILLER: -- does the state liaison function. The state liaison function in the states and out of our regions, which Dennis interfaces with, for example, goes in overlap to nuclear powerplants and state liaison in that area. So --

MR. RATHBUN: Emergency planning.

DR. MILLER: Emergency planning, yes. Emergency response.

CHAIRMAN RYAN: Just our of curiosity, are there any mixed waste issues you deal with from an interagency perspective?

MR. RATHBUN: I haven't personally.

CHAIRMAN RYAN: To put a little finer point on it, there has been a couple of efforts over the years to deal with mixed waste, and there's a current advanced notice of proposed rulemaking out. Is that on the horizon at all or --

MR. RATHBUN: Possibly.

DR. MILLER: That hasn't been put on Dennis' plate. Where that would come through would be through, you know, either Larry's division or -- and who would do any technical bases kind of work. Where it would come over to Dennis would be if we needed to take any regulatory action with regard to rulemaking in that area.

CHAIRMAN RYAN: Gotcha. The reason I'm asking is that one of the commissions that I'm briefing, Commissioner Jaczko asked us specifically about that interaction between very, very low activity waste and --

DR. MILLER: Right.

CHAIRMAN RYAN: -- subtitle C facilities, and so forth.

DR. MILLER: Larry, I didn't know if you wanted to make any more remarks in that regard or not.

MR. CAMPER: No. I think, Charlie, you -- just is -- as pointed out, I mean, this issue of mixed waste, there was a point in time when there was a head of steam at EPA, and it has quieted down frankly in the last few years.

CHAIRMAN RYAN: Okay.

MR. CAMPER: And will it reemerge, as Dennis is pointing out? It might.

CHAIRMAN RYAN: Well, as we begin to respond to the question from Commissioner Jaczko and the Commission's SRM, well, we may be trying to get your insights a little bit more fully about that. But thank you very much.

MR. RATHBUN: He would probably ask us, too.

CHAIRMAN RYAN: Yes.

(Laughter.)

DR. MILLER: Dr. Ryan?

CHAIRMAN RYAN: Yes.

DR. MILLER: In wrap-up, unless you have

any --

CHAIRMAN RYAN: Please. No, that's fine.

DR. MILLER: -- more questions, you know, appreciate the opportunity to kind of give you an overview today. As you can see, there are going to be a lot of interactions that we'll have with the Committee. I'm very interested in your action plan. I'd like to be able to work together with you and the Committee as you formulate your action plan and with our activities to leverage the resources that we have, so that we can get the maximum utilization and maximum benefit from both your perspective and from my perspective.

My resources are not growing, and I'm just looking for opportunities to leverage those in the best way, so that we can meet your needs and meet our needs and together we can continue to make progress and accomplish some goals in the near term and in the longer term.

CHAIRMAN RYAN: Well, we sure concur with the idea that if we work smartly we can all be winners, and we've got some real good examples to follow and working with your staff already. So --

DR. MILLER: We'd like to continue to build on this.

CHAIRMAN RYAN: -- we will do that. I'd be remiss if I didn't, to that point, recognize the fellow sitting to your left, Sam Jones. He is really very effective at working with us month to month and probably much more -- not probably, but much more frequently with the staff on helping us define our interests and to get the folks from the various parts of your -- you know, your organization to help us understand what activities are underway and what the information is.

DR. MILLER: Right.

CHAIRMAN RYAN: So Sam's an integral part of that success story.

DR. MILLER: Thank you.

CHAIRMAN RYAN: So I'd be remiss if I didn't recognize his ability.

DR. MILLER: Sam is an example --

CHAIRMAN RYAN: And our own staff as well.

DR. MILLER: Yes. Sam is an example of what I talk about in leveraging resources. Sam is a hybrid, what we call a hybrid. It doesn't mean that sometimes he runs on gasoline and sometimes he runs on a battery pack.

(Laughter.)

Because we didn't get additional

resources, neither Jack or I, Sam has been serving both offices --

CHAIRMAN RYAN: Sure.

DR. MILLER: -- as the liaison function with the Committee.

CHAIRMAN RYAN: Well, we appreciate that.

DR. MILLER: We appreciate it.

CHAIRMAN RYAN: It's a very effective way for us to communicate clearly and smoothly with your organization, so --

DR. MILLER: Thank you.

CHAIRMAN RYAN: All right. With that, we've eaten into everybody's lunch break a little bit. So without further ado, I will adjourn for our lunch break. And let's schedule to reconvene at 1:15, if that's okay.

Thank you all very much.

(Whereupon, at 12:28 p.m., the proceedings in the foregoing matter recessed for a lunch break.)

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

(1:17 p.m.)

CHAIRMAN RYAN: An item of business, I would ask members to do your timesheets before you leave today, so you can turn those in, please.

And our next item on the agenda is a briefing on international conferences on decommissioning and low-level waste subjects. And take it away. Here we go.

MEMBER CLARKE: Actually, we've got two presentations here. I'll get us started.

CHAIRMAN RYAN: Oh, I'm sorry, Jim. This is your deal. Go ahead. Jim, take it away.

MEMBER CLARKE: It's actually both of us.

CHAIRMAN RYAN: Well, both of you.

MEMBER CLARKE: I'll get us started with Drew, and then I'll turn to Allen and --

CHAIRMAN RYAN: Okay.

MEMBER CLARKE: -- the second one. So we're going to allot about 45 minutes for each of these.

Our first speaker is Drew Persinko, Branch Chief of the Special Project Branch of the Decommissioning Directorate in the Office of Federal and State Materials and Environmental Management

Programs.

Now, Drew attended and participated in the international conference on lessons learned from decommissioning of nuclear facilities and the safe termination of nuclear activities. This meeting was held in Athens in December, and he will brief us on the results.

Drew, thank you.

MR. PERSINKO: Good afternoon. I was said, I'm going to give a short brief on the lessons learned conference that was held in Athens in December. It's the international conference on lessons learned from the decommissioning of nuclear facilities and the safe termination of nuclear activities.

It was sponsored by the International Atomic Energy Agency. There were about 300 attendees at the conference and representing about 56 countries. So it was well attended.

I'll talk a little bit about the U.S. participation and the U.S. Government participation. From the U.S. Government, there were representatives participating from NRC and Department of Energy. From NRC it was Dr. Charles Miller and myself. From Department of Energy, Mr. Dae Chung, Andrew Szilagyi,

Sandra Waisley, Frazier Lockhart, who heads the Rocky Flats field office.

The U.S. presented seven papers at the conference, two from NRC, one by DOE, one from EPRI, and three from private industry. Additionally, the U.S. was represented on five panel sessions.

In addition to that, Dr. Miller chaired a session, and I was also a rapitore for a session, as well as I was on the program committee to help the IAEA arrange the conference.

The conference was set up in basically seven sessions, and there were -- each session consisted basically of two parts -- a presentation of approximately five papers, and then there was a break, and then there was a panel discussion with about five people on each panel discussing a topic of relevance to the session.

There were no breakout sessions. This was all sequential in one large room. The conference sessions, as I said, there were seven of them, global overview, regulation of decommissioning activities, there was planning of -- planning for decommissioning, implementation of the decommissioning activities, waste management activities, technology, a session on technology, and also a session devoted to

decommissioning small facilities.

The NRC papers -- as I said, the NRC presented two papers. One was written by Larry Camper, and it was presented by Charlie Miller. And the other paper was mine on -- it was mine. The first paper -- Larry's that Charlie presented -- was entitled "Lessons Learned: Past to Future."

And in the paper Dr. Miller -- the paper largely summarized NRC documents -- the current NRC documents that have lessons learned in them -- for example, that we have two RISs that we published with lessons learned, and recently we've updated our NUREG-1757 to address such issues as soil mixing and flexibility and realistic scenarios.

So the paper summarized those documents. The paper also briefly contrasted two different decommissionings that we did with reactors. And the overall -- and also another overall point of the paper was knowledge management; hence, the title "Past to Future." It was noted that most of the people in the room are not going to be the people who are doing the next generation as well, so it's important to capture knowledge management and pass it on to the next group of people who will be responsible for decommissioning. So that was kind of an overriding theme of the paper

that Larry Camper wrote.

In my paper I describe the graded approach that was in -- that's in our NUREG-1757, the six categories that are in there, and how the grading -- what's graded. You know, sometimes we require an EA, sometimes we require an EIS, and I talked about the six categories and how the grading -- as the complexity increases, how the grading also increases the requirements that have become more stringent. So I discussed those aspects.

I noted also that most license terminations are routine. Of those that are not, though, the ones that are complex, they can be difficult, and they can be expensive as well. So even though most are routine, those that are not can be difficult and expensive. So I made the point that small does not necessarily equate to easy or inexpensive.

Let's see. I issued a joint trip report. Charlie Miller and I put together a joint trip report. I think the Committee has access to that. In it I -- we talked about 11 high-level points. I'll note that there are no proceedings from the conference yet, so I do not have copies of the papers that were presented. They will be in the proceedings when they

come out, and they should be out in a few months.

And so largely what I'm presenting is based on my memory as well as the high-level report that was written by the president of the conference.

Okay. So with that, I just thought I would summarize some of the lessons learned that were discussed at the conference. I would like to note, though, that as I go through this a lot of it, you know, it was a lessons learned conference, but a lot of what happened at the conference, too, was the sharing of difficulties, not necessarily "this is what we learned," you know.

There was learning, but there was also let's tell you how hard this was, what we had to do, and what we faced. So it was the sharing of difficulties. And I think it's fair to say I don't think there were any truly surprises that jumped out at me and said, "Oh, that's a brand-new one that we hadn't heard of before." So I don't think there were any "ah ha" moments, as I call them.

So with that, I'll just talk a little bit about it. So what I'm saying is a lot of what you hear is probably things you've thought about or heard before as well.

And I didn't correlate these lessons by

session. I, rather, tried to do it by topic, because some of them actually cross-cut several sessions. I'd say first there was one with strategies -- decommissioning strategies. There was quite a bit of discussion about the benefits of doing immediate dismantling versus deferred dismantling. Is it acceptable to defer dismantling?

The consensus was yes, there is. There is a justification for deferring dismantling, and three reasons are having a lack of funding currently, anticipating that you may get some funding in the future, there may be a lack of waste management arrangements currently, and also for social and political reasons.

But it was also noted that deferred dismantling does not just mean we close the door and we walk away from the facility. You have to make sure that the facility is in a safe condition at the time you walk away, and you also have to plan for a knowledge management plan, because the knowledge that currently exists to a facility will likely be gone when you resume the decommissioning in the future.

Second point was, as knowledge management -- and I said this is I think a cross-cutting topic. It came across in several of the sessions. But it was

noted that the time scales for many decommissioning projects are long, and it's important to make sure you don't lose the knowledge from the existing staff regarding plant configuration or operating history, because as time goes on the existing staff will retire and gradually disappear, and it may be difficult to resurrect some of the knowledge that you could have obtained had you had a knowledge management plan in the beginning.

So there need to be mechanisms for saving and managing the knowledge, and I also mentioned if you were going to defer it that's another reason for having one.

With respect to the regulatory aspects, I think one of the main topics was that decommissioning is really a dynamic phase. Unlike operations, which tends to be more steady-state, decommissioning varies day to day, you're facing new things you hadn't seen before, so it's a dynamic situation, and, thus, it requires regulatory flexibility.

And there was a discussion about an internal authorization approach that the French use, which sounded to me like something similar to what we do in 10 CFR 50.59, whereby not every little thing is needed to be approved by the regulator, yet the

regulator does have oversight.

Also, there was talk about a graded approach needed to reflect the hazard level. And so that was brought up in the regulatory session as well as later when I spoke about the small facility session, so graded approach was another cross-cutting topic.

Funding -- inadequate funding to do decommissioning was a cross-cutting topic that came across in several sessions. It was noted that lack of funding is a main reason why decommissioning progress is not made for many facilities, and there was some facility, some countries, that begin planning very, very early, while they are still in operation, but they are way early in the process and the idea there is that that planning is largely so that they can get a handle on the funding come decommissioning time.

Ideally, the arrangements for decommissioning funding should be made before the facility becomes operational. And it was noted also that while funds usually exist for civil nuclear powerplants, this is not the case for other types of facilities. It was noted that responsibility for funding lies with the operators, but it was also noted that ultimately the responsibility lies with national

governments. So that was mentioned by a number of participants.

Another topic that was discussed was transitioning from operations to decommissioning. It was noted that, as you change from an operational state to a decontamination/dismantling state, this work scope is really changing, as well as the risks. The risks are generally less. And also, it was noted that you need a different skill set when you're doing decommissioning than when you're doing operations.

While it's important to maintain some of the operations staff to make sure you capture the knowledge, it was also noted that largely -- in decommissioning space, it's largely a project management activity, and so a different skill set is -- different mix of skill sets is necessary to carry out the decommissioning.

Also, there was a topic -- a cross-cutting topic of clearance of materials from decommissioning. It was noted that a vast majority of the material resulting from decommissioning is really low activity, below clearance levels. And the use of clearance has the potential for considerably lowing waste disposal costs, and it was noted that clearance levels should be harmonized between countries to avoid

misunderstandings and transboundary problems.

It was also noted that the IAEA in 2004 wrote a safety guide on the subject of clearance, and I think it is slowly being adopted by some countries.

There's a section on technology, and it was noted that worker safety and cost and duration are not mutually exclusive. In fact, it was noted that many of the aspects related to work safety and technology also lower costs and the duration of decommissioning as well.

It was noted that starting quickly with a simple technology, and then continually improving it with the involvement of the workforce, has a greater success than starting off trying to develop some highly engineered solution that has a long deployment schedule. And so usually simple technologies are found to be the best, and that was a point made by Mr. Lockhart from Rocky Flats, actually.

Some examples of the decommissioning technology were discussed, such as recycling concrete, cutting reactor vessel internals.

And the last topic was decommissioning small facilities. And as I said, kind of the overriding themes there are that small doesn't necessarily mean easy or inexpensive. Small

facilities are often what they call the orphans of nuclear installations, because they have technologies and fiscal housings that are very old and date back decades.

So, also, for smaller facilities, as I said, funding is often an issue, because, you know, the civil -- the larger facilities, although they are larger, they usually can find the funding, whereas the smaller facilities have a more difficult time funding the decommissioning.

So that's kind of the overall -- I think the big picture topics that cross-cut through the conference.

Grading was an interesting topic. I talked about that, and afterward there were a number -- a few folks came up to me and were inquiring about the NRC's grading scheme. And I even had a few people say that they might contact us in the future and try to understand it better, so there was interest on the grading.

So as I said, you know, I don't think there were really any surprises or any what I call "ah ha" moments that, wow, this is -- we found something really brand new. I think mostly it reinforced what we all have faced, and what we are basically talking

about with respect to lessons learned when we discuss the topic.

I think -- there were some new, interesting technologies I think that I found -- I was not aware of, and they talked about -- EPRI talked about internal reactor pressure vessel, internal cutting, and also the subject of recycling concrete. I thought that was very interesting.

So I don't think -- you know, I said I don't think it was -- found anything brand new, but I think it was beneficial hearing the sharing of experiences from others in an international setting. And you find out that while some things seem unique at the beginning, well, you know, they're basically the same problems that we're all facing when it comes down to decommissioning.

There were some planning problems. In one site I remember there was a site in an eastern European country, and they ram into problems because they had contractors as well as the owner, as well as the government, and it became a problem with -- they had translation problems between the groups, and the decommissioning project actually fell way, way behind. And it was because there was lack of coordination and a lack of planning in the beginning.

There was a discussion about decommissioning a facility in Cuba where they faced a lot of -- a hospital, I believe it was, where there was -- there were unforseen things that they had faced, and I think in the UK they had talked about their waste programs with trying to dispose of Magnox waste.

So with that, that's the -- that's pretty much the summary. And where I want to go from here is that when the proceedings do come out, I'm going to -- we're going to look through them and go look for more detail than the kind of things I've talked today about, and see what we can mine out of those to incorporate into the lessons learned effort that we're currently -- that we currently have underway with our other stakeholders like NEI and fuel cycle facility form. And you've heard about that; that's the one that Rafael Rodriguez is heading up internally here.

So we're going to try to pull some -- review those and see what we can mine out of the proceedings as they -- when they become available.

So that concludes the presentation. I'll note that there were -- in addition to the invited papers that were presented at the conference, there is also a list of -- a number of contributed papers that

were bound and put into a volume. So if anybody is interested in reading some contributed papers, there is -- they are compiled into a bound volume here by the IAEA.

So I think that concludes my presentation.

MEMBER CLARKE: Drew, thank you. I would encourage you to do that, to mine that information. We're interested in a number of things, as you know, and we're interested in pulling many of these things together in an integrated way.

I was wondering if the link had been made by any of the presenters from decommissioning to designing new facilities. Was there any discussion about how you factor lessons learned into best practices?

MR. PERSINKO: You know, I think it was mentioned, but I don't remember any of the specifics on, this is the lessons learned on how to do that. But it was mentioned, that we need to --

MEMBER CLARKE: About the legacy sites, those kinds of --

MR. PERSINKO: -- that we need to factor this into new designs. But I said I don't remember -- I don't know that specifics were even talked about. But it was mentioned, it was noted as well. That is

one aspect, as you know, that we here at NRC are doing within our rulemaking right now.

MEMBER CLARKE: Questions from the Committee? Bill?

MEMBER HINZE: Well, Drew, I'm kind of interested, particularly in your small facilities, and especially universities. Could you expand a bit on lessons learned about research reactors in universities and the problems and the lessons learned from them that we have here in the States as well as in other countries?

MR. PERSINKO: Yes, I recall that there were discussions about hospitals at the small facilities. Also, it included laboratories. There were also laboratories discussed in the small facilities. And although research and test reactors are included in that topic, I don't remember any particular points that applied just to them. I'm trying to think here.

MEMBER HINZE: Well, you gave a paper on --

MR. PERSINKO: Well, I gave a paper basically on the grading, and the grading was basically the six grades that -- the six categories that are in the NUREG-1757, and how if you meet

certain conditions you don't have to do an EIS, you do an EA instead, or -- but it didn't break it out into, say, okay, the RTRs fall into this category.

In fact, RTRs I guess would fall into a -- they would fall into what's a Group 3, I imagine, 3 or possibly 4, since they are -- they do have a decommissioning plan put together. But the RTRs are graded, as I see it, in a sense is that their decommissioning plans are usually less detailed than other facilities, and that's my understanding.

MEMBER HINZE: Well, didn't -- you know, my university has a reactor, and my -- and I'm always wondering what they're going to do when they decommission it, whether they have a plan, and I understand that, what was it, University of Missouri at Rolla recently decommissioned a reactor, and I'm wondering, are there any lessons learned from that? Are there any special problems associated with university reactors?

MR. PERSINKO: Off the top of my head, I'm not aware of any specific problems. I know -- no, I'm not aware of any specific problems. I know that there are I think -- well, there was two cases. I think once I was -- I understood there was a case of one reactor where they had real difficulty trying to

remove a concrete pedestal, and the concrete -- and they finally -- they started off small, and they brought in jackhammers trying to take out the concrete pedestal with jackhammers.

And after a week of beating on it with jackhammers, they decided that wasn't working, and so then they brought in a machine to bring it out -- to chop it up, to break it up, and it worked very well. But I don't know that that's specific to a research reactor. That's just --

MEMBER HINZE: Was there any lessons that you retrieved from this meeting on the basis of the regulations regarding decommissioning and how that impacted the whole decommissioning process from one country to the other? Other than translations.

(Laughter.)

MR. PERSINKO: That was an interesting one, yes. That was -- it was translations, but it was also, yes, just coordination, too.

Yes, I walked away I guess thinking that all in all I thought, you know, we in the States anyway have a fairly good set of regulations that sometimes we may take for granted that other countries may not have.

And with funding, for example, we have

financial assurance regulations that owners meet, and that's not the case in all the countries out there, and that's why I think there are problems with funding in other countries, more so I think than what we have here. So that's one aspect, I think.

I know I got a lot of interest in the grading. There is interest in the grading and how we grade from smaller facilities to larger facilities and less complex to complex. So although that's not our regulation, that's our guidance document, and I think a lot of people were interested in our guidance document, too, because we -- that was one of the purposes of my talk was to make other countries aware of this document.

And I think there were a number of countries that were not aware of it, and so I think we have a good system of grading, we have financial assurance regulations to try to prevent future legacy sites, and I think that's non-existent in all of the other countries.

MEMBER HINZE: A final question that may not be totally germane to the topic here, but what about the countries like Sweden, Switzerland, Germany, that are getting out of the nuclear power business, do they have a rush to decommissioning going on? What's

the status of that whole activity? And is that in any way impacting the decommissioning?

MR. PERSINKO: I know there are presentations by Germany, and there was a presentation by a fellow from Switzerland. But I don't know that -- I didn't detect anything out of the ordinary. You know, nothing that I remember from that.

MEMBER HINZE: Thank you very much.

MEMBER CLARKE: Thanks, Bill.

Ruth?

MEMBER WEINER: I hesitate to correct my esteemed colleague on the right here, but it's the University of Michigan reactor that was recently decommissioned. The one at Rolla is --

MEMBER HINZE: It's about time.

(Laughter.)

MEMBER WEINER: The one at Rolla is going strong, yes. I --

MEMBER HINZE: Okay.

MEMBER WEINER: -- and a very nice teaching reactor. It is --

MEMBER HINZE: I was just checking to see whether you were --

(Laughter.)

MEMBER WEINER: He always gets the last

word. This is on a transcript, Dr. Hinze.

I have a question for you. I believe Rocky Flats was the first DOE site, the first federal site in this country that was considerably contaminated and that has now been released to the public. It is completely released. Are there any lessons learned from Rocky Flats? Has there been any follow up of how that -- the acceptability of that site -- did anybody talk about that at the conference?

MR. PERSINKO: Not specifically. I mean, they talked about it in the sense that the speaker I mentioned, Frazier Lockhart, spoke in the technology section of the session. So he did speak about Rocky Flats, but from a technology point of view. And I remember him talking about starting simple and don't try to be too complicated right from the beginning.

They found out that they could get a lot more done if they started simple and worked their way up, and not to, like I said, start developing some grandiose, engineered-type solutions that may take a long time to deploy. And that was his -- I think the point of his paper, and he had some -- I remember some pictures in his conference that were very good. But that was his point, as I remember.

As far as the other lessons learned, you

know, the -- at the conference, no, there was nothing that I remember specifically to Rocky Flats. That was Frazier's --

MEMBER WEINER: That was -- yes.

MR. PERSINKO: -- Frazier's point. But I do know that we do have in our -- apart from the conference, in our lessons learned group -- working group we have that we do have a Department of Energy representative on our group, and it has recently been changed. In fact, it's kind of interesting, one of the people who was at this conference from DOE is the person who is now on our group. I met him at the conference in Athens rather than over here. So they are involved with us.

Now, I do know that they have some lessons learned. But when we look at them, not all of them, but some of them, you know, they are pretty specific to the DOE complex, but -- because of the kinds of material DOE deals with versus what we deal with. So --

MEMBER WEINER: Yes, that's an interesting comment, because you wonder -- these are large decommissioning efforts, and complex decommissioning efforts, and you wonder how generally applicable they are. Was there anything -- was there any discussion

about decommissioning an arid site as distinct from a site where you have -- a more humid site where you have a lot of rainfall?

MR. PERSINKO: Not that I recall. No, I don't remember that.

MEMBER WEINER: Have most of the international -- has most of the experience been with relatively arid sites, or does it just vary all over the map?

MR. PERSINKO: I don't know the answer specifically to that question. I'm guessing it would vary. There are people from Eastern Europe, I mean, all the way from Eastern Europe to Cuba to -- so they are all over the world. So I think it varies. I don't think it was specific to anyone.

MEMBER WEINER: And I just want to echo Dr. Hinze's comment about small sites and universities. There have been a number of university reactors decommissioned, and I have no idea what the problems associated with those area, because these are generally in the middle of a campus where there is a lot of traffic.

CHAIRMAN RYAN: I think, you know, many of them are self-contained, though, Ruth. There really aren't any environmental issues.

MR. PERSINKO: I was going to say, generally speaking, I don't think there has been that many problems with --

MEMBER WEINER: That's good to know.

MR. PERSINKO: -- reactors on campuses. I'm trying to recall. And now that you mention Michigan, I know, because we're responsible for Michigan, you know, our group has recently taken over the decommissioning of the research and test reactors. They were transferred to our group from NRR back in October, so we are now the project manager there. Michigan is on the cusp I think of being decommissioned or being terminated.

But I don't know of any specific problems. I'm thinking back what I know of the sites that are in our group. I think we have like 14 on our plate right now. And, you know, they seem to be going pretty smoothly, so --

MEMBER WEINER: Thank you.

MR. PERSINKO: By the way, I used to work at Rocky Flats.

MEMBER WEINER: Oh.

MEMBER HINZE: If I may, you know, one of the problems is that most universities that I'm familiar with are -- do not have contingency funds.

And I --

MEMBER WEINER: That's correct.

MEMBER HINZE: You know, and so where they provide the funding for these into the future I just wonder about.

MEMBER CLARKE: Ruth, if I can just --

MEMBER WEINER: Yes, that's --

MEMBER CLARKE: -- and then we need to --

MEMBER WEINER: No, I'm done.

MEMBER CLARKE: -- keep moving. But Rocky Flats, as you know, is now a wildlife preserve --

MEMBER WEINER: Yes.

MEMBER CLARKE: -- operated by Fish and Wildlife, and it's the equivalent of a -- it's not a license, but it's a durable control, I think you would agree, since it's a government-owned facility.

Mike, any --

CHAIRMAN RYAN: I'm sorry. I had to duck out for another matter, and I appreciate it. But no, I'm fine, thank you.

MEMBER CLARKE: Allen?

VICE CHAIRMAN CROFF: Was there much, if any, discussion of decommissioning reprocessing plants at the conference?

MR. PERSINKO: Such as what? Do you mean

fuel reprocessing plants, is that what you --

VICE CHAIRMAN CROFF: Yes, spent fuel reprocessing plants. Maybe something from France, Sellafield, anything going on there?

MR. PERSINKO: You know, the French -- but, you know, the French spoke, and I said I don't think there is -- you know, the lessons learned that came across, I think the France one that I remembered was the one about the internal authorization approach. So I don't think that's specific to a reprocessing plant. I think that's decommissioning in general in France with the French regulations.

VICE CHAIRMAN CROFF: Okay.

MR. PERSINKO: I don't remember anything specific to reprocessing there.

VICE CHAIRMAN CROFF: Okay. Thanks.

MEMBER CLARKE: Okay. Drew, thank you.

MR. PERSINKO: Thank you.

MEMBER CLARKE: Mike, I'll turn it back to you. I think Allen has the next one.

We have somebody on the bridge, don't we?

VICE CHAIRMAN CROFF: Yes. We probably need to take a moment. Theron, it's time to get Mike Bell again, if you could.

(Pause.)

VICE CHAIRMAN CROFF: Hello, Mike. This is Allen Croff. Can you hear me?

MR. BELL: Yes.

VICE CHAIRMAN CROFF: Okay. We're just ready to get started with the DS 390 part of this thing.

MR. BELL: Okay, great.

VICE CHAIRMAN CROFF: Okay. Our second speaker on this -- on IAEA activities is Chris McKenney, Acting Branch Chief for the Performance Assessment Branch in the Office of Federal and State Materials and Environmental Management Programs. Chris participated in a technical meeting at the IAEA on a waste classification guidance document. He's going to brief us on the guidance document and the NRC's review of that document.

We may need to close a portion of this meeting, if we discuss aspects of the guidance document and the technical meeting, which are considered to be confidential. We'll ask any members of the public to leave for that closed portion of the meeting, if it should arise.

And given the questions I suspect this Committee is going to want to ask, I suspect it probably will, but we'll face that a little later.

Chris, go ahead.

MR. McKENNEY: Okay. Thank you. Yes, our new designations are quite a mouthful.

Last July was -- the IAEA issued DS -- a revision to DS 390 in which they -- well, actually, they issued a draft 390, because there was no 390 before. It's the new designation for the previous way they have numbered the safety guidance previously.

But it's basically a revision of the current IAEA waste classification system, and I'll first go over that, and then the proposed -- what was in DS 390, and then a short discussion of the waste classification with NRC, sort of how they go to the two different types.

The current IAEA classification is in the Safety Guide 111-G-1.1, which is 1994. It predates a lot of documents and processes that IAEA has sort of changed their frameworks on how to do their numbering system and what -- the order on which information is in safety guides versus safety reports versus safety fundamentals.

And it also, most importantly, for waste classification it predates the Joint Convention between the nations on waste, so -- which established various classes that all the nations who are members

of the Joint Convention report on.

And also it predates, of course, which was mentioned at the previous meeting, the safety guide on clearance and exclusion and exemption that was issued in 2004.

The current IAEA waste classification had basically three broad categories, and the -- one which was exempt waste, one which was high-level waste, and then everything else, which was low-level waste, which is between those two boundaries. And inside the low-level waste boundaries there was some divisions by half-life that some country has used to designate some classifications of waste.

Other people dealt with -- that's where some people had the intermediate low-level waste for national things, but there was no specific actual category in the IAEA classification or a separate category for ILW. It was just a subcategory of low-level waste that some people used.

And so they decided that they wanted to break out some stuff, and they wanted to have a general system of classification that's based on the long-term safety considerations of the waste, not what does it have to do to be disposed of, what is it in 30 years, but, really, the long-term considerations of

waste disposal, and classifying based on those long-term safety considerations.

They wanted to assist development and implementation of waste strategies consistent with the Joint Convention. Facilitate communication and information exchange. You had, again, this very broad category of low-level waste. You had lots of people having subcategories on that, and everybody's subcategories differed slightly in large -- or even in completely what they meant by the different types of waste.

They wanted to identify boundaries and provide quantitative guidance, and they obviously wanted to update their previous safety guide to be consistent with the new hierarchy of guidance from the -- from IAEA.

The 390 waste classification scheme has now -- as the draft had, has six waste classifications, one which is exempt waste, which actually includes clearance and excluded waste, very short-lived waste, very low-level waste, low-level waste, intermediate-level waste, and high-level waste.

The draft DS 390 included both manmade and natural radioactivity in the scheme, or it was -- there is no differentiation. Most types of norm were

thrown in as part of the definition of low-level waste. Generally, the categories and descriptions of them as -- for having both a bit more risk-based that -- if it's -- that the type of facility you should go to is more -- based on its risk than really its origin, a la if it comes from a powerplant it goes to a low-level waste site. If it's from a silver mine it gets disposed as mill -- as silver metal tailings under some other chemical concern.

They included an interesting example of the drawing of what they visualized. The sort of -- how to break out these categories by -- with half-life and some other things. Actually, the -- all of the letter-numeric dots on there are for different types of sealed sources. They are going through an example where this picture is.

They had two graphs, but actually the first graph in the document was flawed in the first place, and was misprinted wrong. And this is actually the one that was closer to what they meant.

As you see, there is -- there could be a lot of discussions about how hard these lines are and how -- or how fuzzy and what it means to be near the border of each. And a lot of assumptions went into the various edges of the classification and the talks

about it, like, you know, the very short-lived waste is considered to be waste that could decay down to clearance levels, that has a half-life of about 100 days.

And the very low-level waste is activities that are slightly above the clearance values, and you usually associate it with like large amounts of material and stuff, which are -- there are -- France and a couple of other countries already have very low-level waste facilities that have been developed which involve less robust engineering than a normal low-level waste site, because they don't expect that much environmental risk from the material being disposed there. So, correspondingly, you can do less engineering or less requirements of wasteform.

And then, the low-level waste was considered to have mostly short-lived materials with very small amounts of long-lived materials. Basically, that the radiation hazard or risk of the site would reduce within the first 300 years, so that your long-term control to avoid intruder dose or intruder risks would only be really important over the first 300 years.

And then, if the material was -- the waste volume and length of time and risk levels were such

that you had to contain it for more than 300 years, the material basically would fall into either intermediate-level waste or high-level waste.

And that break is -- generally, part of it is somewhat a heat generation term or what -- intermediate-level waste is generally described as material not having to have any heat controls on the waste type.

Although the fuzziness between -- even in the draft 390 between what is intermediate-level waste and what is high-level waste was -- it was very vague on what would actually make the difference if you were talking about reprocessed -- if you were talking reprocessing waste. You know, which would it break down into -- intermediate- or high-level waste?

And so -- and then, of course, and this picture is also -- the one reason I wanted to use this one is it includes a drawing of the -- where does the NORM potentially fit into here of a thing? And that NORM can -- NORM could be really classified into, depending on its activity levels, many of these classes, although in the definitions they put it pretty much in low-level waste.

While in some countries you could have mill tailings that are consistent with risk levels and

activity levels of intermediate-level waste, such as in Canada or -- and we wouldn't see anything near those risk levels in our country, but Canadian mill tailings is -- does need probably stronger controls than ours, so -- our deeper disposal, which is what they're considering. but that's basically this scheme that they brought -- that they suggested.

And we have this visualization that we are trying on specific radioactivity and stuff, and basically our classes, you know, are -- the classification of NRC realms, and, of course, really when we're talking about the comments here we're not talking about NRC comments only.

There is also Department of Energy issues and comments, because like the wording on whether spent fuel is high-level waste or not is a -- you know, we're like if it's described as -- if it's decided to be waste, then it is part of high-level waste. And if it's not, then it's still a resource, and, therefore, it doesn't fall under the classification scheme, and that's one of an issue between Department of Energy and us of what we almost -- are used to talking about.

When we mention spent fuel, a lot of times with civilian reactors we're usually talking about

they've already been classified as waste, we view it as waste. There are parts of DOE that view spent fuel as still a resource, so for them it's not a waste yet, by default.

And our class -- because the United States doesn't have any clearance -- any generic clearance or very low-level standards in place. Both those categories are pretty much within our Class A. Class B and C are still within the low-level waste -- what would be in the low-level waste categories of the IAEA standards.

The GTCC could or could not, depending on the design of the facility, the facilities attributes may be -- may fall under the classification similar to the intermediate-level waste, but it may still fall under low-level waste, depending on the design of the facility and location, and some other characteristics, like how much GTCC are we talking about per facility.

Uranium mining and milling, of course, is -- we use low-level waste -- we use near-surface disposal facilities because of practicality concerns mostly, and other things. I mean, the -- while its environmental risks may be similar to Class A, it never -- its intrusion risks never change. They are pretty much the same intrusion risk -- or consequence.

If there was an intrusion on day one of a uranium mill tailing site, as much longer in time, it's -- versus Class A and other low-level waste, it tends to have intrusion risks much higher at the start, and then they decay as -- decay with time.

And then, of course, we have soils that fall into low Class A, and NORM and TENORM is within the realm in the United States of percentages of same sort of levels of risk, or radioactivity and risk.

But that's where the U.S. would fall under the characterization. The staff reviewed and provided comments on the document, but most of those specific comments are under confidentiality because of the way that IAEA comments are held by the country.

VICE CHAIRMAN CROFF: Okay. Let's start with some questions. Jim?

MEMBER CLARKE: Thanks, Chris. Can we go back to the slide before that one? Yes. I was interested in your -- you know, this may not be a fair question, and you may not have gotten into it. But you said there is a distinction between engineered controls, between the very low-level waste and the low-level waste.

MR. McKENNEY: Right.

MEMBER CLARKE: And this is near-surface

disposal. Is the distinction comparable to a Subtitle C versus a Subtitle D?

MR. McKENNEY: In concept, yes. In concept, yes. They're looking at -- well, even in low-level waste, we can compare it to what they're talking about in France of -- you know, they're talking about very short -- you know, not necessarily requiring the same level of governmental control afterwards, not, you know, if -- it would be sort of -- in a similar vein to us, it would be like instead of requiring, you know, 100 years of maintenance and/or monitoring and everything else for this thing, we'd be looking at 30 years, we'd be looking at possibly, you know, not as much engineer cover for intrusion, because intrusion isn't really even an issue, and some other things like that.

So, yes, it is sort of like a cross between a --

MEMBER CLARKE: Real design differences.

MR. McKENNEY: Right. Real design differences, and, you know, for France it's -- there's a distinctive difference, from a low-level waste site to basically big concrete monoliths, and then they've got this very low-level waste facility that is basically coming in with large volumes of stuff and

just being put in a landfill design, and not grouted over. So that's just a -- especially for France, that's a large distinction and difference.

MEMBER CLARKE: Thanks.

CHAIRMAN RYAN: Chris, those two graphs are -- I mean, the two figures are really interesting, and maybe we could switch to the NRC visualization. That is an interesting one, too. You know, you've lined them up pretty well.

It strikes me that there's a dimension, or maybe even two, that's missing.

MR. McKENNEY: Unfortunately, when you're talking low-level waste, it goes --

CHAIRMAN RYAN: And let's just talk about them. I know you know this, so this isn't a surprise. One is all of these figures, both are concentration-based.

MR. McKENNEY: Right.

CHAIRMAN RYAN: And that's only one metric of risk. Quantity is also a metric of risk, as you well know, so 200 Becherels per gram of -- gram is a whole lot different than 200 Becherels per gram of 600,000 tons. So quantity somehow has to be a dimension.

The next dimension is -- and we've run out

of dimensions in regular space, so I guess we're in trouble. You know, the third dimension is -- or fourth is the -- let me just summarize it and say the releasibility or the dispersability or the ease with which the radioactive atoms can move into the environment.

So it's wasteform, it's waste packaging, it's, you know, the French monoliths versus, you know, shove it off the back of a truck, all those differences. And how do we -- or how does the IAEA deal with all of that?

MR. McKENNEY: In the current one, a lot of -- all those issues are almost assumed in the way that they wrote their vague definitions of waste classification. Like the writers of the 390 had sort of a vision of what the performance of a -- performance range of a low-level waste site might be, although it's not articulated that well as to what is really meant to be there.

I mean, they mentioned that small amounts of long activity waste could be in there, but how much are you meaning exactly? Obviously, all those assumptions were something we wrestled with when we developed A, B, and C classifications anyways in Part 61.

CHAIRMAN RYAN: Sort of.

MR. McKENNEY: Well, there was -- yes, but, I mean, it was -- the classifications are based on a set of assumptions of volume.

CHAIRMAN RYAN: One set.

MR. McKENNEY: Yes, I know that.

CHAIRMAN RYAN: Yes.

MR. McKENNEY: And four different types of facilities.

CHAIRMAN RYAN: Fair enough.

MR. McKENNEY: And regional facilities and -- but -- and we obviously -- a facility that is designed to make their own classification system. But, yes, there is all of these dimensionalities that, really, it doesn't take in. It's the -- it's a vertical slice through it.

It makes an assumption almost on all of these other factors, these figures do generally, of what classification things would fall into, because then you come down to, you know, trying to display a coherent system in that sort of --

CHAIRMAN RYAN: Right.

MR. McKENNEY: -- regulatory realm is hard. And then, coming up with -- which some countries would probably be interested in, which is,

you know, hard numbers. Where does one classification end and one -- where does one -- another class ended? And you've got countries that range from, you know, very either tropical, arid, or temperate. And the performance levels of even similar designs is just incredibly different in each of those facilities.

So trying to say what is a hard number for the internationals on every one of these things is --

CHAIRMAN RYAN: But do they do a good job of laying out exactly what you've just said?

MR. McKENNEY: Not in draft 390, no.

CHAIRMAN RYAN: I mean, I -- and maybe that's an area for comment.

MR. McKENNEY: Yes.

CHAIRMAN RYAN: Because I think that's really -- I mean, there are, as we've pointed out in the recent letters, you know, the 61.58 allows the Commission, upon request through its own initiative, to develop alternate systems of classification. It doesn't say different concentration values. It says alternate systems of classification.

MR. McKENNEY: Well, basically, they wouldn't -- that site would have both a generic A, B, C, but then it would have 1, 2, 3, or 5, 6, 7, whatever classification system it wanted that was

site-specific design. It's similar to our -- what we do in decommissioning.

CHAIRMAN RYAN: Yes. And the point is is that risk-informing it has to take into account these other dimensions.

MR. McKENNEY: Right, right. No. Any analysis for 61.58 would have to take into account the site's performance versus for various radionuclides the types of wasteforms it would be accepting those radionuclides in, the volumes, and all those sort of --

CHAIRMAN RYAN: Yes, all of that, yes.

MR. McKENNEY: -- characteristics would be used to, then, develop back into a new -- into a site-specific classification system.

CHAIRMAN RYAN: And I guess I'm curious if you see this standard-setting activity going in that direction or not.

MR. McKENNEY: This is a real high-level document, so it's hard to get into too much of that detail. They are doing a lot of other safety guides on like managing NORM residues, another one on waste technologies of everything up and to how to develop wasteform and other things. This doesn't really go into waste acceptance criteria, which is the only --

CHAIRMAN RYAN: Yes, but that's too fine of a detail. I'm just -- does it even recognize these principles of other dimensions?

MR. McKENNEY: It does mention them.

CHAIRMAN RYAN: Sort of, but--

MR. McKENNEY: Sort of, but not --

CHAIRMAN RYAN: From the look on your face, I'm guessing you're not real satisfied that it's enough.

MR. McKENNEY: No, I wasn't really satisfied on it coming from base principles. It was -- it was a lot more from a personal standpoint. It came out and said, okay, here's a classification scheme, this -- here is something that's in very low activity. Here is something that's on low-level waste activity, and sort of just generally described the classes but didn't really go into how the would be developed or how a country could tweak them for its own situation. I just didn't feel that was really -- it didn't come from the root principles --

CHAIRMAN RYAN: Right.

MR. McKENNEY: -- in development in the document.

CHAIRMAN RYAN: Right.

MR. McKENNEY: That's --

CHAIRMAN RYAN: Well, that's a deficiency, I would guess. Have you commented on that without telling -- I don't want to get us off in --

MR. McKENNEY: I can't say that I have.

CHAIRMAN RYAN: Okay. All right.

Giorgio?

MR. GNUGNOLI: If I could just make one little slight elaboration. If you look at -- if you had to come up -- this is Giorgio Gnugnoli from FSME. If you had to come up with a short buzz word to explain the difference between the current version that's published versus the one that's being proposed, it said it went from perhaps a more origin-based categorization of waste to a more disposal strategy-based.

It is -- maybe the best way to think about it is this is a slow movement or evolution by the IAEA to go from, let's say, a more traditional performance approach to one that addresses perhaps the risk of the material once it's in place and whatever strategy is used. When they --

CHAIRMAN RYAN: Having covered these other dimensions of wasteform packaging, you know, engineered barriers and all of that, then they haven't accomplished that goal that you just discussed.

MR. GNUGNOLI: Well, that's true. But if you look -- if you step back and look at the IAEA's approach towards dealing with waste management, you can almost see that the publication process is very similar to what's going on in the categorization approach. So for things that would be greater than Class C, that would be inappropriate for near-surface disposal, they are now looking at intermediate or deep bore hole disposal as a strategy.

So if you look at what the IAEA is doing in laying out its publication guidance, it's sort of -- it's sort of reflected as a risk- or dose-based approach, but through the means of a disposal strategy rather than what's the dose to so and so, or what's the dose because --

CHAIRMAN RYAN: Who is using deep bore holes?

MR. GNUGNOLI: Hmm?

CHAIRMAN RYAN: Who is using deep bore holes?

MR. GNUGNOLI: Well, they're basically talking about intermediate bore hole disposal for some of the sources that are greater than Class C, kind of ILW. But then, if -- you know, if you're talking about something that might as well be treated as a --

in the same risk category as high-level waste or spent fuel, they will talk about the geologic disposal of ILW.

CHAIRMAN RYAN: And I think that's a risk, because if it's just based on concentration of a highly concentrated sealed source like -- you know, pick an isotope that you want to talk about, that may or may not be risk-informed.

MR. McKENNEY: No, that's -- I mean --

CHAIRMAN RYAN: And my guess is probably not.

MR. McKENNEY: Well, even if we go back to the one -- there was some discussion, like on this one, with examples for sealed sources where you have similar levels of radioactivity that actually fall into things of different classifications. And like the short-lived material and -- for A2 on the slide is fairly much similar activity levels as the B2, but --

CHAIRMAN RYAN: Let's be specific. It's only based on concentration.

MR. McKENNEY: I know. This one right now in -- it's somewhat based also on half-life of risk.

CHAIRMAN RYAN: Okay. But, you know, if you take 1,000 curies of something and you have it in some volume of -- you have something in soil, big

volume, that's one profile of risk.

MR. McKENNEY: Right.

CHAIRMAN RYAN: If you have it in a sealed source, in a welded stainless steel capsule, in a concrete barrier, in a 55-gallon drum, in an 80-gallon overpack, you know, you get to a much different view of that same activity or concentration.

MR. McKENNEY: I understand that mostly volume was not well articulated in the current method.

CHAIRMAN RYAN: So that would be a real weakness in my view of the system.

Bobby?

DR. ABU-EID: This is Bobby. Just, I would like to let you know, if we look at the DPP of developing DS 390, which is the document preparation profile for this standard, which was actually in June '04 -- it's about, you know, more than two and a half years -- I think they listed the objectives for developing the DS 390.

And if we try to analyze the objectives and know exactly what is the objective, so we know exactly what is the basis for the classification -- and they said the main objective is implementation of appropriate waste management strategy. That's really the focus, and that's the reason they have the

subcategories in the waste, in the low-level waste specifically, is for waste management strategies.

And they emphasize the priority of disposal and also for disposal -- is how to manage actually the waste, so that's really the focus for this waste classification.

CHAIRMAN RYAN: Yes, that's good information, Bobby. Thank you. But, again, I would add my own view is is that for those exact goals it should clearly have these other dimensions of wasteform packaging and disposal engineered features, as well as concentration.

DR. ABU-EID: Definitely, I agree with you, but I think with IAEA standards they do not go through lots of details as we go and we develop our regulations and standards. We have NUREGs to support the analysis. We have lots of analysis to do before we go there, and that's why if you look at the 10 CFR Part 61 table it was supported somehow -- you know, the basis for the classification and performance to meet certain performance objectives.

Here, in this case, they look at it in more generic way rather than specific way.

CHAIRMAN RYAN: No, I appreciate that, but I think they've left out a couple of key things in the

generic assessment.

DR. ABU-EID: Yes.

VICE CHAIRMAN CROFF: Ruth?

MEMBER WEINER: Could you go back to your other slide? Is there an international view on the question of transuranic waste? Because if you look at transuranic waste, there was a very specific definition in the United States for the waste isolation pilot plant. Most of it is low-level waste, and what isn't low-level waste is high-level waste actually. It's the same stuff. So I just -- I'm surprised to see it on your chart.

MR. McKENNEY: Well, remember, this is for the NRC or U.S. sort of characterization, and why we have TRU versus not necessarily everybody else. And as we would designate that just because we disposed of it similar to what would be defined now as IAEA intermediate-level waste or high-level waste or geologic, it doesn't -- it is not necessarily that.

MEMBER WEINER: That's true.

MR. McKENNEY: Because, as always, you can always over -- you can always overdispose of something, you know, beyond its risk level, such as Germany is going to do with all of its waste supposedly by policy. TRU is one of those ones where

I think it's -- we have a unique definition in the world right now of TRU versus other countries about --

MEMBER WEINER: Speaking of Germany, was there discussion -- what's been the experience in the salt repositories at Ossa and --

MR. McKENNEY: Well, we didn't get any discussions of exact experiences in any of these issues, really, or those. Just that Germany is currently doing -- is involved with IAEA in the waste classification schemes, even though the policy is that all radioactive waste will be disposed of in geologic dumps.

MEMBER WEINER: Okay. Thank you.

VICE CHAIRMAN CROFF: Bill?

MEMBER HINZE: A question out of ignorance. The specific radioactive activity -- is it a linear scale?

MR. McKENNEY: I'm not sure. I think it's just really --

MEMBER HINZE: I see. So it --

MR. McKENNEY: It's just a cartoon.

MEMBER HINZE: Well, my ignorance question is: what's the use of B?

MR. McKENNEY: The sue of B? Well, that's always a good question. I think it's -- B was -- and

B is always a question of what the category goes to between B and A.

DR. ABU-EID: I think it is --

MR. McKENNEY: B is between A and C.

DR. ABU-EID: I think it is the thickness of the cover that you have for the waste classification, that you need to have thicker cover for -- to comply with the performance objectives.

MR. McKENNEY: B and A are both based on long-term safety.

CHAIRMAN RYAN: There is another dimension. Don't forget protection of the worker. I might be able to help you here. Sometimes the B gets into stuff that on the packages' surfaces tends to be an R per hour up to 10 or 15.

MR. McKENNEY: Well, B did require -- the difference between B and A is that all of A theoretically could be in cardboard boxes.

CHAIRMAN RYAN: Yes.

MR. McKENNEY: And B has to be in wasteforms.

CHAIRMAN RYAN: Or packages.

MR. McKENNEY: Or packages, yes. It has to be structurally sound packages, right?

CHAIRMAN RYAN: It has to meet the four

criteria for compressor strength, biodegradation, radiation damage, and so on.

MR. McKENNEY: Right.

MEMBER HINZE: It strikes me that A is -- on your scale there, which probably doesn't mean anything, but Class A is this very long portion of the scale. And then, you have C, and I understand the need for that, and then B is just kind of --

CHAIRMAN RYAN: B, there's only -- Bill, B -- Bill and B, there's only one criteria that's different from B to C, and that's the depth of burial. Okay? Everything else in terms of structural stability and all that is the same, except because C is a higher dose rate and higher concentration material, it has to be deeper.

MEMBER HINZE: And that's based upon a very definitive change in the radioactivity -- I mean, the specific activity. It's -- there's no breadth to those lines between B and C, then.

MR. McKENNEY: Yes, pretty much. But B and -- B is also defined more for its long-term safety problem. It's environmental risk of release --

MEMBER HINZE: Okay.

MR. McKENNEY: -- for some of the radionuclides versus C which has much more been

designated -- much more of those radionuclides designated --

MEMBER HINZE: This is getting back to what Mike was talking about. There are more --

MR. McKENNEY: Right. And that's why they have to be at --

MEMBER HINZE: Yes. Okay. Thank you.

VICE CHAIRMAN CROFF: Mike, you had another one?

CHAIRMAN RYAN: Let's see. I did.

VICE CHAIRMAN CROFF: Senior moment?

(Laughter.)

Think about it, and let me launch in?

CHAIRMAN RYAN: Please.

VICE CHAIRMAN CROFF: Okay. I think first a comment. In reading through the draft from last fall, I agree with the remark over here, the IAEA is trying to head in the direction of using disposal systems as a framework for a waste classification system.

I think in general that's a good thing to do. But there aren't nearly as many conceptually distinguishable disposal systems as they have waste classifications. You know, in very broad terms, you release it, it's in the near-surface where it's

acceptable, or it's deep. End of story. That's the way the old system was.

I mean, that's sort of the way the U.S. has evolved, and that's the way the previous IAEA system was. And whether it's down at 100 meters or 300 meters, you're below the depths of, you know, most casual drilling, foundations, this kind of stuff. And whether it's a bore hole or you drill -- you dig a cave, it's about the same kind of a thing.

So maybe in theory where they wanted to head was okay, but they need classifications and subclassifications to handle some of these nuances, in my humble opinion.

Getting back to more practical issues here, a draft was on the table last year. The U.S. developed comments. You went over and talked to them about it in early December, as I remember. What is -- and they are presumably revising this thing. What is happening with it or going to happen with it?

MR. McKENNEY: It will be up --

MR. GNUGNOLI: Here's where we close.

MR. McKENNEY: Okay. It will be in the schedule?

MR. GNUGNOLI: Want to discuss the schedule?

MR. McKENNEY: That's all I --

MR. GNUGNOLI: That's all I'm at so far.

MR. McKENNEY: It's supposed to be up this spring or early summer on the next -- as all safety guides are voted for by the various committees that oversee their apportionments of the IAEA, the WASSAC Committee for Waste, is going to be meeting this spring. And that's on their table to vote for either the -- to publish it or not, the revised version. So it's on the short --

VICE CHAIRMAN CROFF: And there's no --

MR. McKENNEY: And then, it has to go through another committee after that, I believe, but it will be voted for this spring.

VICE CHAIRMAN CROFF: So there is no plan for any further comment iterations.

MR. McKENNEY: Not in this version of it probably.

VICE CHAIRMAN CROFF: I'm not sure what you mean by "this version." I mean --

MR. McKENNEY: Well, I mean, it will come up for a revision in a few years.

VICE CHAIRMAN CROFF: Oh, okay. Okay.

MR. McKENNEY: You know, that's what I meant.

VICE CHAIRMAN CROFF: Okay. I understand.

DR. ABU-EID: I think the process suggests this goes to the member states comments, and then after that it could go back to ask for review, and then, you know, they could provide some more comments from that.

MR. McKENNEY: That is always an option for WASSAC is to -- instead of --

DR. ABU-EID: Oh, this is --

MR. McKENNEY: Instead of voting it for approval is to have it do another round of draft. But at this point, it's in the process, it has went through one round of draft, and then at that point it goes to WASSAC for final --

VICE CHAIRMAN CROFF: Okay. And what's your sense of what will happen when -- in this committee? Will they approve? I mean, is this a rubber stamp, or do they often reject things?

MR. GNUGNOLI: The WASC, as any of the safety standards committees, have the authority to approve, approve with conditions or modifications, or just basically send it back and start over, make significant modifications.

The spring does not currently have this document on the review schedule for WASC or any of the

safety standards committees. So probably the earliest time that it will show up will be in the fall of 2007.

VICE CHAIRMAN CROFF: So there is some time potentially to comment further on this?

MR. GNUGNOLI: There may be. I mean, it really depends on whether the -- fundamentally, we've been told that these documents belong to the IAEA, of and they really, really want to do what they want with it, they can. But generally they have made every single or most opportunities available to the member states to put in their perspectives.

But they could -- anything could happen. They could send it into publication, they could send it back through the Safety Standards Review Committees for review, or even as a result of the meeting that Chris went to they could basically go back and start making some changes and go back out for members to review again. There's a lot of options they could take. At this point, I'm not exactly aware of what they're doing.

VICE CHAIRMAN CROFF: Well, the challenge we've got here, it's pretty obvious, is, you know, you've described the last public draft. They're presumably working on something else here, and, you know, we don't know what it is. I'm not -- do you

know what it is? I mean, do you know what this next product is going to look like?

MR. McKENNEY: I do, but it has not been released to everybody else, because --

VICE CHAIRMAN CROFF: You know, that leaves us in sort of a dilemma of how to deal with it. I mean, commenting on a report that is -- you know, we know is moot and is being modified is not, you know, a good use of anybody's time. That leaves us with one or two courses.

Basically, if it goes to this approval committee in the spring and is approved, then basically it exists and we deal with it, you know, and -- well, I mean, we deal with it in the sense it exists, and, you know, as a country we have to decide what to do it about it or not as the case may be.

The other thing is if a draft comes out this spring publicly, but it doesn't go for approval until next fall, we'd have a shot at it to go through it. Is that a fair characterization of what we're looking at at this point in terms of options?

MR. GNUGNOLI: Both of those options are certainly possible. There are others. It depends on how they want to deal with the publication process. At this point, I don't know what's being done to the

document. There will probably be another group either called together, either an expert group which is referred to as a consultant services meeting, where individuals from various countries are invited to address the issues brought up that came out of the meeting that Chris went to, and maybe further comments that have been provided.

The IAEA has opened up its process a great deal in the last few years in terms of how people can comment on it. So there could be comments that came into the IAEA that we would not be aware of from other countries and other sources, but recommending further changes.

With this information at hand, the IAEA has a number of choices. One, as you said, it could be -- go to publication. I suspect not. Or -- and I think they would probably have to aim for one more shot at the waste safety standards committees and other safety standards committees because it affects more than just waste I guess.

So I suspect that's probably still going to be a milestone. I can't guarantee it 100 percent, but I can't see them at this point just going to publication without any further review.

VICE CHAIRMAN CROFF: In that scenario, we

would have a crack at it?

MR. GNUGNOLI: Everybody would, because they would probably put it up on their website and anybody could write in and say, "Hey, do this, do that." I mean, there's nothing to stop this Committee as an entity in itself to send comments in.

VICE CHAIRMAN CROFF: Well, yes, but we don't have the draft to --

MR. GNUGNOLI: Yes, I know.

VICE CHAIRMAN CROFF: -- comment on.

MR. GNUGNOLI: Well, yes.

VICE CHAIRMAN CROFF: That's a serious impediment.

MR. GNUGNOLI: Yes.

(Laughter.)

But if it gets put up there, anybody can --

VICE CHAIRMAN CROFF: Oh, yes, if it gets put up there. I think, you know, we'd want to be involved, you know, as soon as that happened, to get a copy of it and hear your thoughts on it.

You say you have a fairly good idea of what this next thing will look at. How satisfied are you with it without getting into any gory details?

MR. McKENNEY: I was fairly satisfied.

(Laughter.)

VICE CHAIRMAN CROFF: I am not quite sure where to go with this, but I think we just wait and see I guess is what I'm left with, see if another draft comes available, or if they approve it. We'll look at what is approved and figure out the implications.

MR. GNUGNOLI: We're in the same boat.

CHAIRMAN RYAN: It sounds like a good place to stop, then.

MR. McKENNEY: I mean, I -- in November, what I saw in the meeting, to say what --

CHAIRMAN RYAN: Yes.

MR. McKENNEY: -- if there has been a new consultancy group that has been formed and everything else.

CHAIRMAN RYAN: That's fair enough.

MR. McKENNEY: I could be in a -- it's a bad position to say, no --

CHAIRMAN RYAN: Okay.

MR. McKENNEY: -- I was happy. I was happy; that's all I can say.

CHAIRMAN RYAN: Not altogether unwell.

MR. McKENNEY: Yes.

(Laughter.)

VICE CHAIRMAN CROFF: Okay. Well, I think, then, you know, we'll probably leave it at that. You know, we'll just wait and see what happens. If there's some motion there, in terms of a draft becoming available, or when you know when approval is scheduled, or whatever, we'd -- you know, please contact I guess Derek as the staff member and let him know what's going on, and we'll decide whether to hear further about it or what to do. But I can't see --

CHAIRMAN RYAN: And I guess I'm taking away the message, too, that you share at least some of our -- some recognition of the fact that we see other dimensions that help you define those various categories and that I get the sense that, you know, you'd probably feel better satisfied if there was a little bit more meat on that bone in terms of what's in the draft. And maybe that's a focal point for us to be thinking about as we wait for the public draft to comment on.

MR. GNUGNOLI: I don't think we should try to lead you down the primrose path here. The process here is that these -- that country members or experts go in terms of working on these documents. And when they bring their drafting capabilities, they'll also bring their experience and the understanding of these

other dimensions along with it.

If I had to bet money on it, I don't think you'll see those things jumping out at you from a safety guide, because the IAEA generally writes safety guides that are fairly general in nature. It's kind of motherhood/apple pie in many ways.

CHAIRMAN RYAN: I'm well familiar with IAEA safety guides, but that doesn't mean they can't make them better.

MR. GNUGNOLI: You're right. You're right.

CHAIRMAN RYAN: Ignoring these details in my view is a significant deficiency.

MR. GNUGNOLI: And you're absolutely right, but you may see it -- an effort that will completely categorize and look at every single bit of those things.

CHAIRMAN RYAN: Oh, sure.

MR. GNUGNOLI: But when you look at the result, you won't get the feeling that all that was looked into. That's the problem.

CHAIRMAN RYAN: And, again, I'm not asking for them to be analytic.

MR. GNUGNOLI: Yes, yes.

CHAIRMAN RYAN: I'm simply asking them to

recognize and advise that it's okay to consider these other dimensions when you decide where all these break points are.

MR. GNUGNOLI: Absolutely.

CHAIRMAN RYAN: In a more explicit way than what you've described.

MR. GNUGNOLI: Right.

CHAIRMAN RYAN: And so, you know, that's the takeaway message I'm taking.

VICE CHAIRMAN CROFF: Okay. I guess --

MR. HAMDAN: Mike Bell is still on the line. Do you want to talk to him or --

CHAIRMAN RYAN: No, we're good.

VICE CHAIRMAN CROFF: Not necessary. We're good.

Back to you, I guess?

CHAIRMAN RYAN: Yes. We're scheduled -- thank you. We're scheduled for a short break, 2:30 to 2:45. We'll reconvene with the topic of possible use of moderator exclusion for transportation packages at 2:45.

Thank you all very much for your time.

(Whereupon, the proceedings in the foregoing matter went off the record at 2:35 p.m. and went back on the record at 2:51 p.m.)

CHAIRMAN RYAN: Okay. Our next briefing will be on the possible use of moderator exclusion for transportation packages, and Ruth Weiner will lead us in this discussion.

MEMBER WEINER: Thank you, Mr. Chairman. We do have some people on the telephone bridge, and if you could identify yourselves, and say who you are. Anybody there? Let's see. Could you say again because our recorder did not hear.

MR. CARLSON: Brett Carlson with the National Spent Nuclear Fuel program at the Idaho National Laboratory, and there's about six of us here in the room.

MEMBER WEINER: Thank you. If any of you want - there's an echo here - if any of you want to ask a question, please identify yourself when you ask for the recorder. That's all. And our speakers are Nancy Osgood, and you have others with you.

MS. OSGOOD: Thank you, Ruth. I think that Bill Brock would like to say a few words introduction.

MEMBER WEINER: Please, Bill.

MR. BROCK: Thank you, Nancy. I'm Bill Brock. I'm Director of the Spent Fuel Storage and Transportation Division at NMSS. First, I want to

thank the ACNW, the Advisory Committee. We contacted staff and requested that this topic be added to the agenda on fairly short notice, and I appreciate the committee's agreement to support and sponsor this presentation. The topic of this presentation on moderator exclusion in transportation packages is one that Nancy will be walking through the background, but it's one that we are having quite a bit of interaction with applicants on development of packages to us, or to be submitted to us in the fairly near future, so we thought it was important not only for us to interact with the advisory committee, but as Nancy will be discussing, gaining within the agency other further deliberations and considerations. But I appreciate the committee's agreement to let us meet with you early in the process, so we can engage with you, and get committee feedback. And with that, let me now turn over the presentation to Nancy Osgood, and Gordon Bjorkman, and Carl Withie from Spent Fuel Storage Transportation Division, who'll be giving the presentation. Thank you.

MEMBER WEINER: Thank you, Bill. Go ahead, Nancy.

MS. OSGOOD: Thank you. My name is Nancy Osgood, and I'm a Senior Project Manager in the

Division of Spent Fuel Storage and Transportation. I've been working in NRC's Transportation program for about 19 years, and on a personal note, this is the first time I've had the opportunity to make a presentation to the ACNW, so thank you very much.

Today I'm here to make a short briefing on moderator exclusion in spent fuel transportation packages. It is a complicated issue, but I will do my best to provide an informative overview of moderator exclusion in the 30 minutes I have for the presentation.

First, I would like to give a definition of what we mean when we say moderator exclusion. Moderator exclusion means that a transportation package relies on the absence of water to assure nuclear criticality safety. So why are we here today? First, I would like to also thank the ACNW for rearranging its schedule to hear us at such short notice, and then dealing with the weather delays, as well. And we're grateful to get this opportunity. We wanted to give this briefing as soon as possible because potential applicants have indicated to us that they are developing package designs that may rely on moderator exclusion for criticality safety.

Using moderator exclusion as a basis for

design approval of a spent fuel package has significant safety, security, and policy implications. We believe that we need to seek commission guidance regarding this issue. We, therefore, wanted to provide an informational briefing to the committee on moderator exclusion and to present possible regulatory paths forward. Also, we want to receive any input or advice that the committee might have.

The current staff thinking is that an appropriate way to address the issue of moderator exclusion is through the rule making process. I would like to be clear regarding the scope of the briefing. Although the NRC transportation regulations apply to all fissile material, this briefing will focus on spent fuel transport. This is because the package designs in question are for spent fuel.

We would also like to discussion moderator exclusion from a policy and a safety perspective. Although there are security implications associated with the moderator exclusion issue, we will not address those in this open meeting. And here's our list of briefing topics.

First, I would like to establish some important points to take away from the briefing. Next I will discuss the regulatory basis for

transportation, including specific regulatory requirements in 10 CFR Part 71. I will discuss in detail the regulations for fissile material transportation packages; and, in particular, the regulatory basis for moderator exclusion. I will describe past experience with respect to spent fuel package approvals and established staff practices and regulatory guidance. I will discuss some points that need to be considered in addressing the moderator exclusion issue, and identify some potential paths forward. And I will present a conclusion based on the staff's current thinking.

First, important points to take away, and this is kind of just a summary. First, is the regulatory framework of Part 71. In a nutshell, NRC certifies designs for transportation packages. Once the design is certified, any number of individual packages may be fabricated, and any NRC licensee, state licensee, and DOE entity may use the package. I will discuss this framework, as well as specific regulations later in the briefing.

Another point is the importance of NRC's strategic goal of prevention of an inadvertent criticality. Transportation packages perform three basic safety functions; containment of the radioactive

material, shielding to limit external radiation from a package, and for fissile materials, prevention of criticality. Among the three safety functions of a package, prevention of criticality has special safety and public confidence significance. For shielding containment, should the package not perform adequately in a real accident, or should the accident conditions be different from the regulatory tests, the consequences may exceed a regulatory acceptance standard, but the impact on public health and safety would likely be small. Depending on the extent of a criticality, the consequences may be greater than just exceeding the regulatory dose limit. From an agency standpoint, prevention of an inadvertent criticality has a special place as a strategic goal.

Also, transportation is not limited to a single site within a site boundary. Transportation takes place in the public domain, and not within a controlled site; and, therefore, the public may be in close proximity to transportation package. Although we have a safe transportation system, accidents routinely occur in the public arena, and the accident conditions are somewhat unpredictable.

The third important point is that the assumption of water in a package is a fundamental

safety criterion. Designing a fissile package so it is critically safe with water inside is a fundamental requirement that imparts a margin of safety and defense-in-depth against accident criticality. It is important to note that it is not directly linked to any regulatory test or environmental condition. It is not directly linked to the presence or absence, or depth of bodies of water in transport. It is, therefore, independent of the robustness of the package design, but, instead, it is a fundamental safety requirement to assure criticality safety in any situation. Assuming water in the containment system provides a defense-in-depth, considering such things as uncertainties in the transportation environment, human factors, loading and unloading, and malevolent acts. This is a very important point, and I will be discussing the regulatory basis for this distinction.

The last important point is that rule making provides a pathway to risk-informed moderator exclusion. Notwithstanding the need to preserve adequate margins of safety in defense-in-depth against accidental criticality in transport, the staff believes that addressing the moderator exclusion issue through the rule making process, with participation of our various stakeholders, may allow some level of

regulatory relief for certain packages under certain conditions, while maintaining strong safety standards.

I would like to now talk about the regulatory framework for transportation. As you know, NRC shares regulatory responsibility for the safe transport of radioactive material with the Department of Transportation. DOT regulates carriers and package standards for small quantities of radioactive material. NRC is the agency that is responsible for performance standards and certification of designs for packages for large quantities, that is Type B quantities, of radioactive material, and for fissile material. NRC's regulations for transportation are in 10 CFR Part 71.

NRC approves of certifies designs for these Type B and fissile material packages using performance standards in Part 71. Once the design is certified, there are, in general, no restrictions on number of packages that may be built, the number of shipments, and typically no restrictions on routes, or modes of transport. In Part 71, environmental assessment and stakeholder participation take place during the development of the regulations. As you know, we recently completed a major Part 71 rule making, which was accomplished through the

participatory rule making process that included extensive public interactions. However, once the regulations are in place, there is no additional stakeholder input during the design approval process.

One unique aspect of transportation is that essentially all transportation by licensee's of Type B quantities of radioactive material and fissile material is authorized by a general license in Part 71. Basically, the general license in Part 71 authorizes any licensee to use any NRC certified package. There is a registration requirement, and certain simple terms and conditions in the general license; such as, the licensee must have a copy of the certificate of compliance for the package.

This system of use by general license is a very efficient way to regulate transportation, and imposes a minimum regulatory burden on licensees. NRC packages are also authorized for use by state licensees and DOE, and its contractors under DOT regulations. NRC approved designs may also be used internationally, including for import and export shipments, and shipments made solely within other countries; although, foreign regulatory authorities also, obviously, play a role there.

The regulations for fissile material

include requirements for single packages, and for arrays of packages. Today we will focus on 71.55 for a single package, since that is the section of the regulations that includes requirements related to moderator exclusion. This section lays out the fundamental safety principles. We call them general design criteria in the design of a fissile material package. And, of course, the focus is protection against inadvertent criticality, not containment, or shielding.

The fissile material package standards include specific design criteria to ensure sub-criticality of the fissile material under the three regimens of operations, normal conditions of transportation, and hypothetical accident conditions. The most fundamental of these design criteria is that a package must be critically safe with water in the containment system. That regulation is 71.55(b). I will paraphrase the regulation here. The full text of the regulations is included in the backup slides that are at the end of the presentation.

So 71.55(b) says that "a fissile material package must be designed and the contents so limited that the package is subcritical if water were to leak into the containment system." The regulation goes on

to say that "the fissile material must be in its most reactive credible configuration, consistent with the chemical and physical form of the material, moderation by water occurs to the most reactive credible extent, and there is close water reflection of the containment system."

Here it is important to note that the regulation does not refer to the normal or accident conditions tests. It is non-mechanistic requirement, a fundamental safety design criterion separate from the robustness of the package. Although the subcriticality of the package is also specifically addressed for the normal and accident conditions, which we will see in the next slide, but before that comes 71.55(c), which states: "The commission may approve exceptions to the requirements of Paragraph B of this section if the package incorporates special design features that ensure that no single packaging error would permit leakage, and if appropriate measures are taken before its shipment to ensure that the containment system does not leak. This provision, 10 CFR 71.55(c), is the regulatory basis for moderator exclusion."

There are two additional provisions pertinent to moderator exclusion regarding the

criticality safety of a single package, and these are 10 CFR 71.55(d), which states, in part, that "a fissile material package must be designed and its contents limited, such that under normal conditions of transport, the contents would be subcritical. Specifically, the regulation says that water must not leak into the containment system under the normal conditions of transport, unless water moderation in the containment system is assumed in the criticality analysis for the package, including arrays of packages."

Unlike 71.55(b), this regulation specifically identifies the regulatory test conditions defined in 71.71 as the normal conditions of transport. These normal conditions of transport do not include a water emergent test, but they do include a water spray test intended to simulate the effects of a heavy rain.

And, finally, there is 71.55(e). Paragraph 71.55(e) states, in part, that "a fissile material package must be designed and its contents limited such that under hypothetical accident conditions, the package would be subcritical, assuming that water moderation occurs to the most reactive credible extent consistent with the damaged condition

of the package, and the chemical and physical form of the contents." Here, again, unlike 71.55(b), the regulation specifically identifies the regulatory test conditions defined in 71.73. The hypothetical accident tests are those that we are all familiar with. These include the sequence of a 30-foot free drop, a puncture test, a fire test, and a shallow three-foot water emersion test. In addition, a separate fifty-foot emersion test with an undamaged specimen is also required. So these are the three cases where a single package must be shown to be critically safe.

First, with water inside the containment system, non-mechanistically as a fundamental design criterion. Second, under the regulatory tests and conditions, defined as normal conditions of transport. And, third, under the regulatory tests and conditions defined as hypothetical accident conditions.

I just wanted to add some brief regulatory notes here. First, just as a point of curiosity, a little history of 10 CFR Part 71, including 71.55(b) and (c). The regulations for spent fuel transport were first proposed in 1960. They were proposed again in 1961 and 1965. The performance-based system we know today was first adopted in 1966. The requirement

for consideration of water in the containment system has always been included in some form in the regulations that govern spent fuel transportation. Although the wording and the arrangement of the provisions have changed in form over the year, the fundamental requirement has remained in force.

As you know, IAEA also promulgates regulations for the safe transport of radioactive material. The current regulations are in TSR-1 in the 2005 edition. In general, Part 71 is compatible, harmonized with IAEA regulations, but not identical to them.

Similarly, in-leakage of water has always been an assumption IAEA regulations. The requirements were first promulgated in the very early 1960s, and, again, although the requirement has always been included, the wording in the regulations has changed slightly over the years.

Now I'd like to talk about our, I guess the staff practice and the history of our package approvals at NRC. No spent fuel transportation package design certified by the NRC relies on moderator exclusion for criticality safety. In NRC, our division, the Division of Spent Fuel Storage and Transportation, or SFST, certifies designs for

transportation packages, including spent fuel transportation packages. The NRC has a standard format and content guide for applications for package approvals. We have standard review plans, as well as a wide range of regulatory guidance that has been developed over the past 30 to 40 years of approving hundreds of package designs.

Currently, there are 23 certificates of compliance for package designs that are authorized for the transport of spent fuel. These range from packages that are designed to transport partial segmented fuel rods, research reactor and naval reactor spent fuel, truck casks for commercial spent fuel, and rail casks that are part of a dual-purpose system of storage and transport. In all cases, the packages are designed to be critically safe with fresh water in the containment system. Typically, any void within the containment system is assumed to be available for water ingress. These assumptions are made to satisfy the regulatory requirement in 10 CFR 71.55(b).

Notwithstanding the safety importance of 71.55(b), the staff recognizes that there may be cases where certain shipments may be made safely, even though a package has not been evaluated with water

inside. Although no applicant has requested approval of specific shipments that rely on moderator exclusion, the staff could support use of the regulatory exception in 71.55(c) for certain shipments with appropriate risk information. The staff believes that there are instances where approval under 71.55(c) is appropriate, but that this provision should be reserved for exceptional circumstances on a case-by-case basis, and not for design approval. These instances should be limited to certain shipments where appropriate risk information and compensatory measures can be used to ensure adequate protection against accidental criticality during loading, unloading, as well as transport.

The staff has never approved a spent fuel package design on the basis of moderator exclusion. The staff does not believe that this provision is intended for design approvals, for a number of reasons. As I described previously, under the current provisions of Part 71, design approval allows essentially unlimited shipments with no specific route or mode specified, because any certified design may be used by any licensee under the general license. This could then lead to the routine use of packages that were approved under a regulatory exception.

Second, such a design could reduce defense-in-depth against an accidental criticality. Potential accident conditions, human factors, loading and unloading, and potential misloading would take on an important new safety significance. Third, design approval may not be consistent with environmental and risk assessments that are founded on the basis that a criticality event in transportation is not credible.

I believe a very important point is that most spent fuel can be transported in packages that do not rely on moderator exclusion for criticality safety. Package designers use alternative methods to demonstrate criticality safety. Most packages incorporate some type of neutron absorber plates in the basket structure. Neutron absorber plates and other design features are used to assure adequate subcriticality, even in the presence of fresh water. Burn-up credit may be an alternative to moderator exclusion. Burn-up credit is quantifying the decreased reactivity of the fuel due to irradiation in the reactor. SFST has issued an interim staff guidance document, ISG-8, for acceptable methods of taking credit for fuel burn-up in criticality analyses for transportation packages. Additionally, SFST recently issued a package design approval taking

credit for burn-up even in excess of the ISG, based on the technical justification provided by the applicant.

It is also important to note that the transport aging and disposal, or TAD canister being designed for use at Yucca Mountain is being designed so that it is subcritical with fresh water in the containment system. So what packages may need to take credit for moderator exclusion?

According to applicants, packages with very large capacities, depending on the physical design of the package, may need moderator exclusion. In addition, Department of Energy, Idaho Office, has designed a smaller canister for transport of irradiated non-commercial fuel that may need moderator exclusion to demonstrate criticality safety. We continue to interface with DOE-Idaho to explore the technical issues associated with the future transport of their fuels.

Recently, we have also addressed moderator exclusion for packages that transport high burn-up fuel. The transport of high burn-up fuel presented technical issues in meeting the requirements of 10 CFR 71.55, due to its behavior under accident conditions. To address this particular problem, the staff issued Interim Staff Guidance number 19. In the past few

years, the typical burn-ups of commercial spent fuel have increased, and there was no longer confidence that the behavior of the fuel cladding under drop-test conditions could be well predicted. It was postulated that there could be brittle circumferential failure of cladding, such that sections of fuel rods could be severed and displaced within the lattice. The possibility of more reactive fuel configurations became a concern.

The staff developed a modified review practice to address the possibility of fuel reconfiguration under accident conditions. ISG-19 was issued in May 2003, to provide guidance to applicants that wanted to include high burn-up fuel as authorized contents. ISG-19 allows moderator exclusion under 71.55(e). It provides two methods for an applicant to use to address criticality safety under accident conditions; that is, to show that the package meets 71.55(e).

One method is to demonstrate through a physical test that the package does not leak. The other method involves developing criticality models of the fuel that reasonably bound credible fuel reconfiguration under accident conditions. Calculations performed by staff support the safety and

risk basis, since fuel rearrangements under accident conditions would not result in a credible reconfiguration that results in a critical system.

Although ISG-19 currently is limited to commercial spent fuel, and specifies a physical test to demonstrate no leakage, we believe that the guidance could be expanded for other fuel types, and other demonstration methods with justification. ISG-19 does not give relief from the requirements of 71.55(b). Applicants would still need to demonstrate subcriticality with water in the containment system. However, this demonstration could assume that the fuel is in its as-loaded configuration. Thus, staff believes that allowing moderator exclusion under ISG-19 still preserves the fundamental margins of safety against accidental criticality.

Points to consider in changing staff practice - there are many factors that surround the issue of moderator exclusion, and the staff has identified some points that should be considered, particularly if the staff practice were to change. The first is policy. The staff practice with regard to moderator exclusion has been established over the past 40 years of regulatory standards and spent fuel package design approvals. The staff believes that a

departure from this practice has important safety, policy, and security implications. This indicates a policy shift that should receive attention of the highest levels of NRC management and the Commission. In addition, because of the safety margins built into fissile material package standards, transportation risk studies do not evaluate probabilities or consequences from a criticality accident. Environmental and risk assessments have historically assumed that criticality is incredible. These assessments would need to be reviewed if the practice regarding moderator exclusion were to change.

Second is the agency's strategic goal of regulatory openness. Because design approval of packages that rely on moderator exclusion would likely lead to a routine use of a regulatory exception, it does not seem appropriate to approve designs that rely on moderator exclusion for criticality safety under the regulations in force today. Design approval of a spent fuel package that does not meet 71.55(b) would not be consistent with regulatory openness, since there is no public participatory process in Part 71 design approvals. Rule making would allow stakeholder participation and appropriate evaluation of risks.

The third is timing, including staff

resources and timeliness. When considering policy shifts in rule making, we recognize that the duration is longer than typical technical reviews. To give the committee a benchmark, we estimate that approval of a spent fuel package design takes approximately one year, provided there are no significant technical issues identified during the review. For a package design that presents specific technical challenges with respect to criticality safety, the review could be expected to take significantly more time.

And this brings us to the most important point, safety. Assuming water in the package is a fundamental safety principle that assures margin of safety and defense-in-depth against an accidental criticality, and the importance of criticality safety in transportation is clear, one most important point is that the requirement to include moderators not specifically tied only to the robustness of the package design; that is, the requirement is a fundamental safety standard. Risk-informing the regulation would address risks associated with both transportation accidents and other risks that should be considered. We recognize that transportation accidents do occur, and the conditions may be uncertain. For example, in a real transportation

accident with a package that relies on moderator exclusion, the advice to fight a fire may not be as clear cut as it is today. And most important, the prevention of criticality must be considered for all package evolutions, including loading and unloading, as well as transportation.

For example, transportation packages today must be shipped dry, and are vacuum dried and backfilled with inert gas. However, there have been three recent shipments where the packages arrived with significant volumes of water in the containment system. The introduction of water into the containment system did not occur as a consequence of a severe transportation accident. As a matter of fact, the three shipments were made without incident. Although contributing factors were identified with respect to these incidents, the route cause was difficult to determine. Contributing factors included design, proof of principle testing, and loading operations. Because all of these shipments were critically safe with water in the containment system, the risk associated with these incidents was small.

The staff has considered various regulatory options to address the moderator exclusion issue. We believe these three options present three

possible paths forward. The first is to continue staff practice. Current staff practice is documented in guidance documents, including the standard review plans for transportation package approvals. The current staff practice ensures a strong defense-in-depth against accidental criticality in transport. The current staff practice is consistent and in compliance with the regulations in Part 71. However, applicants have claimed that the practice could result in more shipments of spent fuel, since larger packages would need to rely on moderator exclusion.

The second option is to consider design approval under 71.55(c). We recognize that there is ambiguity in the regulations in 71.55(b) and (c). Although packages are robust, and the transportation system is safe, we have not approved designs for spent fuel packages under this provision. The staff believes that design approvals should only be considered if there is significant risk information to supplement the package performance information associated with fissile material packages that meet 71.55(b).

Rule making appears to be the most appropriate pathway to resolve technical issues associated with moderator exclusion. A risk-informed

regulation specifically addressing moderator exclusion in certain spent fuel packages and under certain conditions could be developed. This regulation could clarify the requirements of 71.55, and provide specific requirements for design approval using moderator exclusion. You see I put number four. We're open to other suggestions with respect to regulatory options that would provide a path forward.

I'd like to conclude by stating that the staff intends to seek commission guidance on the moderator exclusion issue. Approving package designs based on moderator exclusion would represent a fundamental change in NRC practice with significant safety, security, and policy implications. The staff is developing a policy paper to forward to the commission in the near future. In this fashion, the staff will seek commission guidance on this issue. And although the commission paper has not yet been completed, and is certainly subject to change, the current staff thinking indicates that rule making is the appropriate resolution pathway. This would allow a participatory process with external stakeholders. The rule making plan could systematically evaluate risks, considering security issues, the robustness of the packages, accident frequencies, loading and

unloading operations, and human factors. The resulting regulation could add clarity to 71.55, and provide for regulatory options for spent fuel packages that maintain a defense-in-depth, and appropriate safety margins to accidental criticality. And that concludes my presentation.

MEMBER WEINER: Thank you very much. For those listening on the telephone bridge, I'll explain the questioning protocol. We're going to ask the members of the committee first if they have questions, then I'll go to anyone on the bridge, and then I'll go to staff. So with that said, Dr. Hinze.

MEMBER HINZE: Well, I'm afraid I'm playing catch-up here, but the problem is that some of the containers, the shipping containers have leaked, and you're trying to develop a rule making for new designs that would make certain that they didn't leak. Is that what we're talking about?

MS. OSGOOD: No. It's actually a little bit backwards from that.

MEMBER HINZE: Okay.

MS. OSGOOD: Currently, the regulations require that a package be assumed to leak, and it's a non-mechanistic thing, so every package that we approve under the current regulations must be

critically safe assuming water can get in. There are applicants who want to develop designs, new designs to be approved under the regulatory exception, and they don't want to meet that regulatory requirement, but want to demonstrate that they are critically safe by the robustness of the package. The regulation in place now requires that we consider water in the containment system, and show that the package is critically safe with water, but applicants have said that's too much of a regulatory penalty for these robust packages.

MEMBER HINZE: So then this rule making would incorporate establishing tests that would show that to be true, and to validate the robustness of these packages. Is that -- am I --

MS. OSGOOD: No, not exactly. What the rule making - and we don't have a rule making plan, because we're going to request commission guidance with respect to pursuing rule making, but the rule making could evaluate risks from certain kinds of packages, in particular, spent fuel packages, and maybe allow some regulatory relief with respect to meeting the requirements in 71.55, recognizing that there is a regulatory exception that identifies at least two things that have to be included in a package

design to allow that. But to clarify that regulation, maybe allow a different avenue for certain spent fuel packages, we would develop a new regulation.

MEMBER HINZE: Okay. I'm going to pass at that. Thank you.

MEMBER WEINER: Dr. Ryan.

CHAIRMAN RYAN: Your last discussion with Professor Hinze was interesting. It's a little different than a lot of safety requirements, in that we assume it's design and works correctly, and then we evaluate failure. You design failure into the cask, and assume it works right. I mean that's the alternative.

MS. OSGOOD: It is the fail --

CHAIRMAN RYAN: But you're assuming it's completely filled with water, and it's failed, and that's the design criteria, so I understand what folks are asking you to reconsider. And there is an element of that's a bit backwards from lots of other things the agency does, so there's that element to help explain it a bit. Maybe that helps you a little bit.

MEMBER HINZE: Yes, it does.

CHAIRMAN RYAN: The other part here is that - and you've touched on it, but I think it would help if you would just go into a little bit more

detail - burn-up credit and criticality analysis are not unrelated. I mean, they're linked. Could you talk a little bit about how they link together? I mean, if you have fuel that's got high burn-up, you don't have as much fissile material, so criticality becomes a little bit easier to deal with in terms of you get more stuff in a cask. But on the other hand, I notice you've had comments that high burn-up fuel may have other negatives to it for reconfiguration. And, again, this is out of ignorance, so forgive me, but I struggle with what exactly are the limits, probabilities, or reasonableness of the assumptions in the scenarios used to drive your analysis in those areas. Can you help us understand that a bit?

MS. OSGOOD: That's a lot of questions.

CHAIRMAN RYAN: It is, I'm sorry.

MS. OSGOOD: I'll try to answer the first one first about burn-up credit.

CHAIRMAN RYAN: Sure.

MS. OSGOOD: Typically, and I'm going to go back a number of years where the transportation packages for spent fuel were designed for, I'm going to say, relatively fresh fuel out of the reactor. And because they had very high radiation sources, the spent fuel casks were actually designed for, I'm going

to say, a fewer number of fuel elements, because a lot more of the weight had to go into radiation shielding. So in the old days, the packages were designed with fewer fuel elements in them, because the cool time from the reactor was significantly shorter for the design-basis fuel. In those cases, it's easiest to do the criticality analysis, assuming no burn-up, assuming that it's fresh fuel, which is the most reactive, and meeting 71.55(b), assuming that fresh water is in there. And that was, I'm going to say, a relatively straightforward calculation, and applicants could usually demonstrate that quite readily.

As the casks have become larger and larger in capacity, because the fuel in them is much older and aged more, so there's less mass needed for shielding, as the casks have gotten larger and larger, and to accommodate dual purpose systems, the need for moderator exclusion or burn-up credit has become evident, because now you can no longer show that these very large packages that might have 32 PWR fuel assemblies in them are critically safe with water in them, and with no burn-up, so the alternative means has been the use of burn-up credit. And Carl Withie is probably the agency expert on burn-up credit, so if you have specific technical questions, I'm sure that

he'd be happy to answer those.

MEMBER WEINER: Could you add anything?

CHAIRMAN RYAN: That's fine for the question I wanted to ask. I mean, we could spend all day talking about how to get these calculations done, and I don't intend to do that.

MS. OSGOOD: Okay.

CHAIRMAN RYAN: The other kind of question I have is that - so it's not just moderator exclusion, we can't deal with moderator exclusion for all fuels. We have to deal with it for categories that burn-up, and so forth, so it's not a real straightforward question.

MS. OSGOOD: Right.

CHAIRMAN RYAN: Although it's straightforward, it's complicated, because there's lots of ranges of things you have to consider.

MS. OSGOOD: Exactly.

CHAIRMAN RYAN: So I appreciate that. You mentioned that there have been some cases where water has been in spent fuel casks, and was intended to be there. I'd be curious to know the range of percent filled that had been identified. I'm trying to get my arms around how big of a problem is water in casks.

MS. OSGOOD: The three incidents that I

mentioned all occurred since the year 2000.

CHAIRMAN RYAN: Okay.

MS. OSGOOD: And I think in that time, there have been approximately - and Rob Lewis might be able to correct me - but approximately 100 spent fuel shipments, and there were the three that ended up with water in them. Although, exactly why it wasn't removed is not exactly clear in all cases. As I recall, the quantity was not full, although in the distance past there have been casks that have been arrived full, but there were liter quantities of water. It was significant quantities, and the casks that were --

CHAIRMAN RYAN: Liters?

MS. OSGOOD: Liters of --

CHAIRMAN RYAN: Yes, okay. Liters is not half-full.

MS. OSGOOD: No.

CHAIRMAN RYAN: By any means.

MS. OSGOOD: Well, in one of the cases, the fuel actually was in a very small canister, so it could have been significant volume of that canister because the canister was in a larger cask, so the water actually was retained within a smaller canister that could have had a significant volume.

CHAIRMAN RYAN: Let me re-ask the question a different way. What was the change in K-effective by the presence of the water in the known cases?

MS. OSGOOD: In all cases it's less than .95, because -- and we didn't even do a criticality analysis for those, because we knew that the package had been evaluated with water anyway, so criticality safety was not --

CHAIRMAN RYAN: Yes, but that's a different question. I'm going in a different direction. What I'm trying to get my handle on is what's the risk?

MS. OSGOOD: Well, for those three cases, you know, the 3 percent of the casks --

CHAIRMAN RYAN: No, no, no. That's not my question.

MS. OSGOOD: Okay.

CHAIRMAN RYAN: My question is there have been hundreds or thousands of spent fuel shipments in the history of the world Part I. How many have had problems with water in the casks? What's the possibility of having an incident with water in a cask that has been given moderator exclusion credit? I'm trying to get my hands on the risk.

MS. OSGOOD: And I don't know that that --

CHAIRMAN RYAN: I think that would be helpful to help -- let me finish. I think that would be helpful to help us get at your question, which is which pathway forward do we think is the best one, because without - you know, it's risk times consequence. We've got to get the risk part understood a little better, I think. That would be helpful.

MS. OSGOOD: And I think that that was sort of our intention with respect to the rule making process, because I don't believe that those statistics actually have been gathered.

CHAIRMAN RYAN: Well, you don't need to have a rule making to gather the statistics. In fact, I would say you should gather the statistics before you decide whether you need a rule making. I mean, this is my own view. It's something to think about, anyway.

MS. OSGOOD: I agree.

CHAIRMAN RYAN: Okay. I'll stop there. Thanks.

MEMBER WEINER: Allen.

VICE CHAIRMAN CROFF: You mentioned about midway through that NRC didn't certify casks that had

moderator exclusion, or relied on moderator exclusion. Has anybody else done so?

MS. OSGOOD: To my knowledge, there has been one cask that was a very old cask design that was certified in France, I believe, but I don't believe it is any longer certified. I think internationally, I think the practice is very similar to us. I don't believe that people, that other competent authorities certify cask designs that rely on moderator exclusion. The regulation in IAEA is slightly different, but I think the intent is the same, and I think the practice worldwide is to design packages, package designs that are safe with water in them. I don't know if Rob Lewis might be able to -- Rob Lewis has more connection with the IAEA, and might have a better --

MR. LEWIS: I would just add that --

MEMBER WEINER: Identify yourself, please.

MR. LEWIS: I'm sorry. I'm Rob Lewis from SFST. I would just add to that, that many of the countries that are shipping spent fuel, are doing so for reprocessing, and often there's some design advantages for the package to actually ship it with water in it, so those are shipped flooded. In the UK, for example, they ship with water in the cask, not like we ship here.

VICE CHAIRMAN CROFF: Okay. Regarding this 71.55(c), your slide said routine design approval not appropriate under 71.55(c), and I'm not - I wasn't exactly clear why that was the case, even after hearing it. Can you try that again?

MS. OSGOOD: I think, basically, because the way 71.55(c) is written as an exception, it uses the word "exception" in the regulation, and because design approval basically allows unlimited fabrication of units, unlimited shipments, and unlimited routes, that that is using a regulatory exception for routine shipments, so it would change, I guess, the idea that you're approving something with important safety implications as a design approval, a routine design approval; whereas, the regulation specifies that it should be an exception.

VICE CHAIRMAN CROFF: The part that confused me is immediately above that statement, it says "specific shipments, not general designs, could be approved on a case-by-case."

MS. OSGOOD: Right. And that was a subtlety that I was trying to get across, in that we believe that 71.55(c) would be appropriate for specific shipments. For example, if you had certain shipment, you knew the route, you knew the number of

shipments, there are specific cases that we've sort of talked about, that that would be an appropriate use of 71.55(c).

A design approval, once we issue the certificate of compliance, basically, any number of packages can be fabricated, and any NRC licensee can use them, so there's no real control over the number of shipments, or the shipment routes, or modes once we give that design approval.

It wasn't - and a matter of fact, one of the interesting things about the development of Part 71 is, that's the way it is today, because, basically, all transportation is by general license. It's in the regulation, the license is in the regulation. We don't issue a specific license to, say a nuclear power plant, for shipping. The general license is in the regulations. That wasn't always the way it was in Part 71. In Part 71 spent fuel transport used to be by specific license, so there's been a little bit of change, I'm going to say, in the regulatory infrastructure, and it's a very subtle thing, but I think, basically, that's why we believe that 71.55(c) is not really intended for a general design approval that any NRC licensee could use, but should be reserved for exceptions to the regulations.

And just with that, it's a good question, and it's an important question, so I'd like to see if anybody else here wants to add something to that response.

MR. BJORKMAN: You said it quite clearly, Nancy.

MR. WITHIE: There was just one situation where we had thought about --

MEMBER WEINER: Could you identify yourself for --

MR. WITHIE: This is Carl Withie from the Spent Fuel and Storage Transportation Division.

MEMBER WEINER: Thank you.

MR. WITHIE: There was just one situation in which Idaho National Engineering Lab has spent fuel spread around in different locations, and wanted to consolidate. And out there during the dry season, they were to cross no bodies of water, those kinds of situations might be a good candidate for considering a site-specific, or a shipment-specific exception to the regulation.

VICE CHAIRMAN CROFF: I gather in talking to this, you anticipate a significant number of shipments would be made if this were to happen. I mean, we're not talking one and two, we're talking

routine basis a lot of fuel.

MS. OSGOOD: Right.

VICE CHAIRMAN CROFF: Okay.

MS. OSGOOD: And that's exactly the subtlety. It's a whole bunch of shipments, or specific shipments.

VICE CHAIRMAN CROFF: And it's not possible to design this cask to be critically safe with water in it using other means? I mean, Boral or something like that?

MS. OSGOOD: We have not yet received an application that is based on moderator exclusion, so what the, I'm going to say, the justification of using or requesting design approval under 71.55(c) is, I'm not sure yet. We do have a dialogue going with DOE-Idaho to discuss their specific needs with respect to their canister design for non-commercial spent fuel, and so we are going to explore those kinds of technical issues with them.

VICE CHAIRMAN CROFF: Okay. And I gather the applicant has specifically requested moderator exclusion.

MS. OSGOOD: Right.

VICE CHAIRMAN CROFF: As opposed to any other means to increase payload or whatever.

MS. OSGOOD: Right.

VICE CHAIRMAN CROFF: Okay. I guess, in general, my feeling is to focus more on problems and not solutions, regarding moderator exclusion is one solution, and Boral is another, burn-up credit is another, and combinations, and maybe there's other things, but okay. Thanks.

MEMBER WEINER: Jim.

MEMBER CLARKE: I'm sort of where Bill Hinze was when he started. I'm starting to understand this better. It's the moderator exclusion term that throws me. I understand it more as moderator inclusion, which is the current practice. How does this -- does this relate at all to - you're talking about large shipments, does things that are being proposed for Yucca Mountain, besides the Navy fuel at Idaho, the TADs, the dual purpose canisters, and where are we in all of that?

MS. OSGOOD: And I think that that's a very important question, because we have seen the design specification for the TAD canister, and it specifically states that the canister must be designed so that it is critically safe with fresh water in the containment system, so that package is clearly going to be designed without the need for moderation

exclusion under 71.55(c).

MEMBER CLARKE: And the DPCs that are in dry cask storage or the other kinds of containers are in dry cask storage, are they - have they been approved under the same?

MS. OSGOOD: And that's a good question, too. A lot of the canisters with spent fuel in storage facilities today at reactor sites were not designed to meet Part 71 requirements. They were only designed to meet Part 72 requirements. And because Part 72 does not specifically have a requirement for including water, I believe that probably a lot of the canisters at reactor sites could not be shown to be critically safe with water, as currently loaded. I think some of them could; as a matter of fact, we have an application in-house today for a canister design that was originally designed for storage only. They have a transportation over-pack, and they have gone to significant technical lengths to show that the package with the fuel that's loaded in it is critically safe with water in there, so although I can't say that all storage casks could be shown to be that way, there have been some in the past that probably could be.

MEMBER CLARKE: So this is an ongoing issue.

MS. OSGOOD: Maybe Carl would like to supplement that answer, as well. He's done a lot of the technical review on the storage casks side, as well.

MR. WITHIE: This is Carl Withie, again. As far as the TAD specifications, as we know it now, there appears to be enough room within inside the TAD specification to design into the design what we call flux traps, and that's a little bit of space between the poison plates, that allows moderation of the neutrons, and it allows the poisons to be more effective, but it does reduce somewhat the capacity of how many fuel assemblies you can put inside a specific diameter. And one of the places where moderator exclusion is coming up as an issue, are where people want to collapse the flux traps down so there is no space in there for the flux trap design; and, therefore, upping the capacity in the 32 assembly storage casks, or those types of ones that don't have enough space in there to make the poison plates effective enough. And we found out in terms of fabrication, you can't get enough poison in a real good plate to overcome that. You're asking the question about are there other things in the design, or can you put Boral in there. Most of the designs do

have Boral in there, but it's difficult to get a high enough concentration of Boral in there to overcome close proximity of the fuel that's packed in there tightly.

MEMBER CLARKE: Thank you.

MEMBER WEINER: I just have a couple of questions, and this is for anyone. Are you really confident that you can by design alone exclude water? In other words, that you can look at the design and say okay, this one - there is no chance, even if the cask falls into a river that water will leak in? How do you assure yourself of that?

MS. OSGOOD: I think that's a good question. I'd like to answer that. Because I think one of the important things to take away here is that it's not just simply the design of the cask being so robust that it can be immersed under 300 meters of water, or could suffer an impact, and then fall into 300 meters. It's not just that, there are other uncertainties, I think, associated with loading and unloading, which experiences we have had, and human factors, so there's a whole other, I'm going to say, elements of safety from loading to unloading that I think is just as important as the robustness of the package.

I've been working in this field a long time, and if there's anybody here that has really strong confidence in the safety of our regulations, it's me. And I think that the framework that we use for package approvals is very strong, and very safe. And I think one of the, I'm going to say, important measures that assures subcriticality is showing that even if water gets in non-mechanistically, that it's safe.

Now could we have a rule where there is some, I'm going to say, credit given to allow some kind of moderator exclusion, particularly under accident conditions with fuel reconfiguration. I think that that is part of the idea of possible rule making, because then you could review risks associated with loading, unloading, and look at human factors, and do some risk-informed decision making looking at moderator exclusion, not that you would eliminate 71.55(b), but maybe you supplement it for spent fuel casks, or, in particular, spent fuel casks that have some special robustness, or special design features.

MEMBER WEINER: Would it be possible to have enough burn-up that you wouldn't need moderator exclusion? In other words, could you -- would you ever be transporting fuel that has so much poison from

fission products and where the fissile amount of material has decreased to the point where you wouldn't need to guarantee moderator exclusion?

MR. WITHIE: This is Carl Withie, again. There is a point at which you could draw a curve for specified minimum burn-up amount for loading high density like that. One of the problems that comes up with that, it tends to limit the amount of inventory that's out there now that can be loaded under that particular set of conditions, so it's kind of a trade-off in terms of how flexible the design is, in terms of being operationally able to put different ranges of fuel that's out there in inventory now, but you could design so that a certain upper limit of the burn-up is allowed to go under that.

MEMBER WEINER: I was thinking of a rule that allowed alternatives, and that's the next question. Would you present this in such a way that there were alternatives? In other words, if the vendor didn't want to use a moderator exclusion, could make the choice between criticality prevention, moderator exclusion, and so on. Is that what you've got in mind?

MS. OSGOOD: I'm going to answer this - just me, personally. That's what I envision. I mean,

I think that that would be a fruitful approach, is to have alternatives in the regulations, have an alternative provision. You can use 71.55(b) and (c), or 71.55(b), or you can use this, if you have this kind of package. So that's me, personally, that's sort of my vision of it. I don't know if anybody else wants to add something. I don't know if my bosses over there would agree, but --

MEMBER WEINER: Anyone else want to ask a question? Let me ask first, before Frank, if there's anyone on the bridge who wants to ask a question? They're kind of in an awkward situation. Frank, I'm sorry.

MR. GILLESPIE: Nancy and Bill, we've squeezed you in, and you gave actually, for me, a very educational discussion on transportation. What do you want from the committee, because you're at the very throws of - are you looking for the committee to say this is a big enough safety issue that rule making, and the visibility rule making brings to a change is the right path, or is there more? I'm just trying to understand. If they're going to write a letter, what would be included in the letter?

CHAIRMAN RYAN: What's the question?

MS. OSGOOD: I think I understand the

question. Bill, do you want to --

MR. BROCK: Well, let me - if you understand the question, let me respond, then you can tell me if that's the answer to the question. This is Bill Brock. Frank, one, we, as Nancy laid out, we are preparing a paper to the commission. What we are looking for from the advisory committee are two things. One, if you recall the NMSS overall program brief to the committee back in December, prior to that briefing, it was identified to us by the staff that the committee was interested in hearing from us on the topic of moderator exclusion, and what our thoughts were, what our considerations, what our plans were, and that was, if you will, the purpose of today's briefing, was to lay that out to the committee.

Now going back more clearly to your point. Nancy mentioned in the opening of her presentation that we're looking for feedback from the committee, questions, views, concerns, and I believe clearly I've heard a number of points, comments raised today, is in that perspective with regard to our going to the commission. We are going to the commission with a paper, as Nancy has outlined, identifying considerations, options. Our current staff thinking, and I'm trying to choose those words carefully, is

that we believe rule making is, from the standpoint of moving forward, the best approach. And as Nancy has mentioned a number of times, rule making includes clearly opportunity, whether it's engaging with you all and in-house NRC interactions, deliberations, or in outreach activities with the various stakeholders in the area of transportation, especially spent fuel transportation. There's a large stakeholder community that's very interested in what we're doing, what we're not doing, so providing that opportunity in a rule making process to engage, we think, is the right way to go. This topic is one that, within the staff, and outside of the staff, there's some views with regard to methods and approaches we need to take to assure the continued safe transportation of materials.

MEMBER WEINER: Frank, I -- excuse me, go ahead.

MR. BROCK: So from the committee, we would be looking for comments, feedback in that regard.

MEMBER WEINER: Frank, I do want to apologize. I should have given you a briefing before this meeting of what the purpose was. Mike, you had a question?

CHAIRMAN RYAN: Thank you for that

clarification. I guess I'm trying to get my arms around why you've picked rule making, and I've asked a bunch of questions about what's the risk-significance of making the decision we need a rule, versus we can work with the existing regulations as they're written. I get the impression that if you had to, you could, and that's one way to deal with this. And the other way is to clean up, or clarify, or do new rules. And I don't have enough information yet to figure out for myself which one of those is better, or if either one is better, so to me, it kind of gets back to what I was asking a little bit about, is what are the risks, the real risks, analytic risks of moderator exclusion, burn-up credit, interactions between the two, risks of having a problem with having water in a cask, or not having water in a cask, as the case may be. I think the flooded cask in the UK is a little odd, because if they don't have water in those casks, they get a whole set of other big problems with, I think it's MAGNOX fuel, so that's a whole different scheme. I wouldn't use that as an example for us to think too much about, so I think we're willing to work through that with you, but we're going to need a little bit more information on these risk-related kinds of issues before we can form, I think,

a well thought out opinion. Is that a fair comment from my part?

MR. BROCK: Yes.

CHAIRMAN RYAN: And then we kind of get to the - what's the experience base been? I mean, have people had problems with either keeping water in, or keeping water out? I know we always talk about a cask falling off a bridge, but I'd like to know in a risk context what's the number of hundreds of feet of bridges we have, versus thousands of millions of miles travel, where the accident rate of falling off a bridge can be assessed? Again, it's a risk-based context, and if it's 10 to the minus 28^{th} of something falling off a bridge, it's not a risk I'm too interested in.

MEMBER WEINER: No, the risk is considerable.

CHAIRMAN RYAN: Considerable is what?

MEMBER WEINER: It's not insignificant.

CHAIRMAN RYAN: Well, considerable doesn't help me, important doesn't help me. Give me a number. I mean, that's what it's all about, it's let's get a little quantitative, and that gives us the basis to form an opinion of whether we think rule making is the right way, or we can deal with --

MEMBER WEINER: I'd be happy to supply the number.

CHAIRMAN RYAN: Well, I'm not asking you to supply it. These are the folks that are asking the question, so we can get them to supply it.

MEMBER WEINER: Allen had a point, and then Latif.

VICE CHAIRMAN CROFF: Yes. I'd like to build on what Mike said. I still feel I'm absent enough information to form a decision. My questions more relate to something I brought up before, just how often would this have to be used? I mean, there's places where they might like to use it, maybe it's a little bit more economic or something like that, but how -- what percentage, or how much fuel, or whatever, is this really proposed to be applied to? That seems to be an important thing - if it has to be used in an awful lot of stuff, that sounds more like a rule. If it's just a few instances, that sounds like an exception, to me.

CHAIRMAN RYAN: Have you had a public meeting like the decommissioning folks had to gather stakeholder views on how to proceed?

MS. OSGOOD: No.

CHAIRMAN RYAN: That might be an idea that

you actually have a one-day workshop, where you invite stakeholders in to say - to give them the same presentation you gave us, and say what do you all think, or how could it work? And we'd certainly attend that, if you did, and that might be a way to help you really solidify why you're going down a particular path, and better inform management and the commission of what's the basis for your thinking there. That might be something to think about. I just offer that as a suggestion while we're sitting here chatting.

MEMBER WEINER: Well, that brings to mind something else. I understand that one of the reasons you wanted to come to the committee was that you've had at least one application for moderator exclusion. You haven't yet.

MS. OSGOOD: No, but applicants have told us that they are preparing to submit them.

MEMBER WEINER: Well, could those applicants in the interim be handled by the exclusion, by 71.55(c)?

MS. OSGOOD: I think possibly, yes. And, as a matter of fact, the one, the DOE-Idaho canister case, we do continue our technical dialogue with them, and we've, I think, gotten a lot of information from

them that indicates to us that there is an alternative path than approval under 71.55(c) for the design, possibly for some fuels, but that we see that there may be a regulatory path alternative to moderator exclusion for that design.

MEMBER WEINER: Latif, you had a question.

MR. HAMDAN: Yes. Actually, I was thinking along the same line that Allen was thinking about, and that is, what is driver behind this? Is it the cost of transportation, the cost of the construction of the canister, that's one. And number two, how many of those, how many applicants? I think that has - you can handle individual applications under (c), but if you have zillions of them, that's completely a different story all together.

MR. DIAS: Can I?

MEMBER WEINER: Nancy, go ahead, and then Antonio.

CHAIRMAN RYAN: I want to remind everybody we're running over our time, so we need to wrap-up.

MS. OSGOOD: I think the answer to that is that essentially all spent fuel that -- we've got a number of spent fuel packages, including very large capacity casks that we've certified without needing moderator exclusion. I think that yes, I think that

it's cost, I think that the ease of doing an analysis where there's no water in the containment system, doing a criticality analysis with no water in the containment system is less of a technical challenge, than looking at the specific fuel types, and enrichments, and that sort of thing, so I think it's cost of maybe preparing the licensing application, cost of doing the analyses, a cask that relied on moderator exclusion would likely not require any kind of neutron poisons, would not probably require a basket that had structural strength, so there's - I think that there's a lot of incentives out there for applicants, but the bottom line is, basically, I think all fuels can be shipped in packages that don't rely on moderator exclusion.

MEMBER WEINER: Antonio, and then we'll --

MR. DIAS: I completely agree with Nancy, and it's exactly this, people do not want to have to perform criticality calculations because of the effort, and also because, in general, what results from this criticality calculations are a limitation on the number of fuel that they can actually choose to put in the transportation package, so you end up being penalized, if I can use that word, not only for the

effort you have to do, but you end up having a subset of all the fuels that you have in your pool, if I can say that, that you can now use, so they would much rather have the freedom of not having to - which one can I use? Do I have to obey this, this, this? There are some rules, tables that come out of that criticality calculation.

MEMBER WEINER: Rob.

CHAIRMAN RYAN: We have to wrap-up.

MEMBER WEINER: Okay. Rob, and then we really do have to stop; otherwise --

MR. LEWIS: Just to follow-up on some of the comments by the committee and the staff about risk information and cost benefit of this. The staff agrees completely that we need risk information, and cost benefit information to make an informed decision about even proceeding with the rule making. Kind of at this point, where we are is, we're trying to be responsive to a stakeholder identified need, and we're trying to get into a process - I think the risk information and the cost benefit information in our vision happens during the regulatory analysis portion of the rule making, if the commission thinks, as a policy matter, that this is an issue for the staff to pursue via rule making.

CHAIRMAN RYAN: And I guess I'm just suggesting that before you get that formal process underway, that a little bit more of laying that out for everybody to understand might be helpful to gain support for that decision, so there's some overlap there.

MEMBER WEINER: Since we really are out of time, I'll turn it over to the Chairman.

CHAIRMAN RYAN: Thank you very much. We do have some other matters that we have to take up, so I'm going to suggest - and I thank you all very much for a very informative period this afternoon. It's been very helpful, and we'll take a short 10-minute break, and come back at 10 after, and reconvene for our last session of the day.

(Whereupon, the proceedings went off the record at 4:02:37 p.m.)

CERTIFICATE

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

Name of Proceeding: Advisory Committee on Nuclear Waste 176th Meeting

Docket Number: n/a

Location: Rockville, MD

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

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

Office of Federal and State Materials and Environmental Management Programs

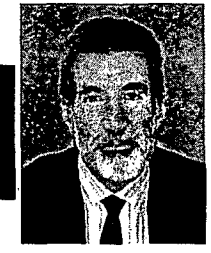
ACNW Briefing
Thursday February 15, 2007
Dr. Charles Miller, Office Director

FSME Office Director

- Welcome/Opening Remarks
- FSME Formulation/Organization Chart
- FSME Challenges
- Introduction of FSME the Deputy Office Director

Office of Federal and State Materials and Environmental Management Programs

OFFICE OF FEDERAL AND STATE MATERIALS AND ENVIRONMENTAL MANAGEMENT PROGRAMS
Charles L. Miller, Director
George Pangburn, Deputy Director



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February 1, 2007

Office of Federal and State Materials and Environmental Management Programs

ACNW Briefing
Thursday February 15, 2007
George Pangburn, Deputy Office Director

FSME Deputy Office Director

- Welcome/Opening Remarks
- FSME's/Regions Relationship
- Introduction of the FSME Division Directors

DIVISION OF WASTE MANAGEMENT AND ENVIRONMENTAL PROTECTION

ACNW BRIEFING
February 15, 2007
Larry Camper, Director

DWMEP Programs and Key Activities

- Expanded Comprehensive Decommissioning Program
- Growth in Uranium Recovery
- Prioritizing Environmental Reviews
- Implementing LLW Strategic Assessment
- Enhancing WIR Consultation & Monitoring

ACNW Interactions with DWMEP

- Risk-informing LLW management and emerging LLW issues
- Risk-informed decision-making for nuclear materials and wastes
- Prevention of Legacy Sites
- Performance of barriers for near surface disposal
- Decommissioning Guidance overview
- Waste Incidental to Reprocessing / Standard Review Plan

Challenges

- Alignment with Federal/State Agencies
- Restricted Use Sites
- Anticipating LLW Issues

DWMEP Future Interaction Needs

- Legacy Sites Rulemakings
- Assessment of Dose Modeling Approaches and Methodologies
- DU Disposal Analysis
- Revision of Guidance for In-Situ Leach Recovery
- Coordinate Annual Review of Rulemaking and Guidance on LLW Storage

Division of Materials Safety and State Agreements

ACNW Briefing
February 15, 2007
Janet Schleuter, Division Director
Scott Moore, Deputy Division Director

DMSSA Key Program/Activities

- Oversight and Implementation of the National Materials Program
  - NRC Licensees/Agreement State Program
- Source Safety and Security Branch
- State Agreements and Industrial Safety
- Medical Safety and Events Assessment

ACNW's Current Interactions with DMSSA

- Future materials activities, undetermined at this time, that fall under the purview of the Committee.

DMSSA Future Information Briefings to the ACNW

- Orphan Radioactive Material Disposition Program
- DOE Off Site Source Recovery Program

Division of Intergovernmental Liaison and Rulemaking

ACNW Briefing
February 15, 2007
Dennis Rathbun, Director

DILR Key Programs/Activities

- ENERGY POLICY ACT OF 2005
  - NARM RULEMAKING
- ALLEGATIONS AND INVESTIGATIONS
- PETITION FOR RULEMAKING RESOLUTIONS
- SUPPORT OTHER OFFICE RULEMAKINGS

ACNW's Current Interactions with DILR

- **FSME Support to NMSS:**
  Issue the HLW Repository Final Rule based on the Revised EPA Standard
- **FSME Support to NMSS:**
  Geologic Repository Operations Area Security Rule Development
- **FSME/DILR Support to FSME/DWMEP:**
  Legacy Site Rulemaking

DILR Future Interactions with ACNW

- Future rulemakings, undetermined at this time, that fall under the purview of the Committee.

International Conference on
Lessons Learned from the Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities

Sponsored by the International Atomic Energy Agency (IAEA), December 2006

U.S. Government Participants:

NRC: Dr. Charles Miller, Office Director, FSME
Andrew Persinko, Branch Chief, Decommissioning Directorate, FSME

DOE: Dae Chung, Andrew Szilagyi, Sandra Waisley, Frazier Lockhart (Rocky Flats)

U.S. presented seven papers (2 NRC; 1 DOE; 1 EPRI; 3 private industry)

U.S. represented on five panel discussions

Conference Sessions –

Session 1	Global Overview
Session 2	Regulation of Decommissioning Activities
Session 3	Planning for Decommissioning
Session 4	Implementation of the Decommissioning Activities
Session 5	Waste Management Activities
Session 6	Technology Aspects
Session 7	Decommissioning of Small Facilities

NRC papers:

"Lessons Learned: Past to Future," Author: Larry Camper, Director, DWMEP/ Presented by Dr. Charles Miller

"Using a Risk-Informed, Graded Approach for Decommissioning Small Facilities," Author and presenter: Andrew Persinko

Miller/Persinko Trip Report dated December 22, 2006. (ML070460088)

Conference proceedings to be available in a few months.

Summary of Lessons Learned:

Decommissioning strategies. While the preferred strategy for decommissioning is immediate dismantling, there are situations where deferred dismantling can be justified (e.g., lack of funding, lack of waste management arrangements, social and political reasons). Deferred dismantling does not mean "close the door and walk away." Requires a clear knowledge management plan.

Knowledge management. Time scales for many decommissioning projects are long and important knowledge may be lost (e.g., plant configuration, operating history) as members of the workforce retire. Need mechanisms for saving and managing this knowledge (i.e., knowledge management).

Regulatory. Decommissioning phase is dynamic, unlike the operational phase, and thus requires regulatory flexibility (e.g., internal authorization ~ 10CFR50.59). Graded approach needed to reflect the hazard level.

Importance of decommissioning funding. Lack of funding is a main reason for lack of decommissioning progress for many facilities. Very early planning during operation is performed mainly for funding purposes. Ideally, arrangements for decommissioning funding should be made before the facility becomes operational. While funds usually exist for civil power plants, this is not the case for other types of facilities. Responsibility for funding lies with the operators and ultimately with national governments.

Transition from operations to decommissioning. Changing from operations through the decontamination and dismantling cycle depends on a clear understanding of the changing work scope and the nature of the changing risks. Need a different skill set than when operating. Important to develop and improve personnel knowledge with an emphasis on how to manage the decommissioning project. Adequate planning and implementation of the transition phase is one of the critical factors for successful implementation of decommissioning.

Clearance of materials from decommissioning. Vast majority of material resulting from decommissioning is low activity below clearance levels. Use of clearance has the potential for considerably lowering waste disposal costs. Clearance levels should be harmonized between countries to avoid misunderstandings and transboundary problems.

Technology. Technology selection based on improvement of worker safety generally also lowers costs and duration. Starting quickly with a simple technology, then continually improving it, with the involvement of the workforce has greater success than highly engineered solutions with long deployment schedules. Usually simple technologies were the best. Examples of decommissioning technology were discussed (e.g., recycling concrete; cutting reactor vessel internals).

Decommissioning small facilities (e.g., research reactors, laboratories, sources). Small does not mean easy or inexpensive. Small facilities are the "orphans" of nuclear installations, displaying technolgies and physical housings dating back decades. Decommissioning funding often a problem. Important to plan well.

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

Overview of Revisions to DS 390: Classification of Radioactive Waste

Christepher McKenney,
Acting Branch Chief
Performance Assessment Branch
Environmental Protection and Performance Assessment Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs

Overview

- Current IAEA Waste Classification
- Proposed Changes to Waste Classification
- Discussion of NRC-related Waste Classification

Current IAEA Waste Classification

- Current IAEA Waste Classification in Safety Series No. 111-G-1.1 (1994)
- Pre-dates several key documents or approaches
  - Safety Standard Series
  - Publication of Safety Fundamentals
  - Joint Convention
  - Waste Safety Action Plan
  - Safety Guide RS-G-1.7 Exclusion, Exemption, Clearance

Current IAEA Waste Classification Categories

- 3 General Categories
- Exempt Waste
- Low-Level Waste
  - Several subdivisions of this category are possible by the member state
- High-Level Waste

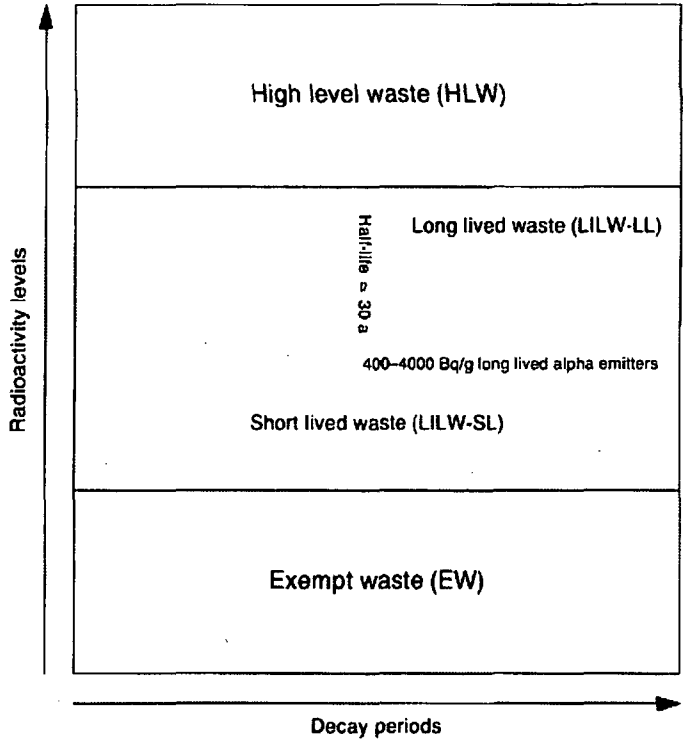


FIG. 1. Revised waste classification system.

DS 390 Proposed Classification Objective

(according to IAEA presentations)

- General system of classification
- Based on long-term safety considerations
- Assist development & implementation of waste strategies consistent with Joint Convention
- Facilitate communication and information exchange
- Identify boundaries and provide quantitative guidance
- Update SS No. 111-G-1.1

DS 390 Waste Classification Scheme

- 6 Waste Classifications
  - Exempt Waste (EW)
  - Very Low Level Waste (VLLW)
  - Very Short Lived Waste (VSLW)
  - Low-Level Waste (LLW)
  - Intermediate Level Waste (ILW)
  - High Level Waste (HLW)
- Both man-made and natural radioactivity included in scheme
- Generally, more risk-based approach than previous origin-based approaches

Example of Scheme for Visualization

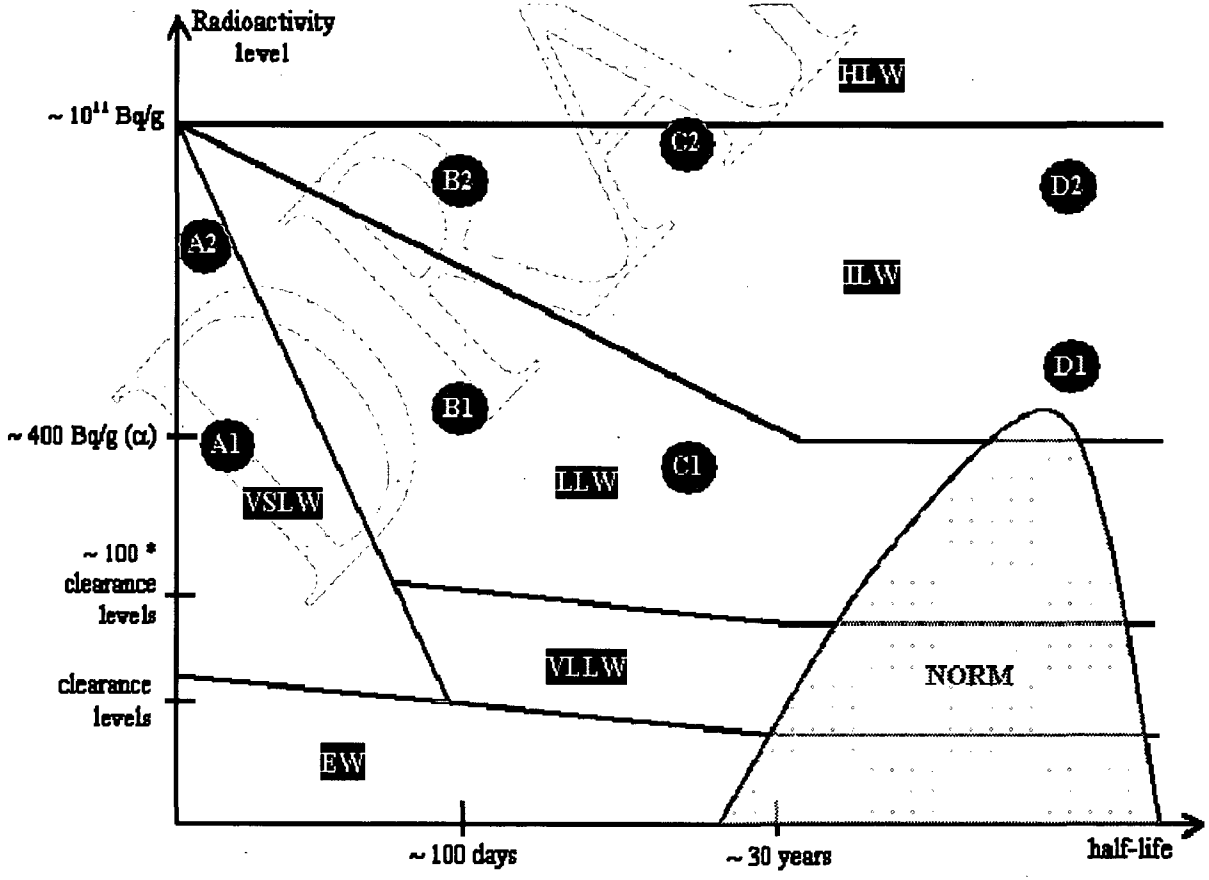
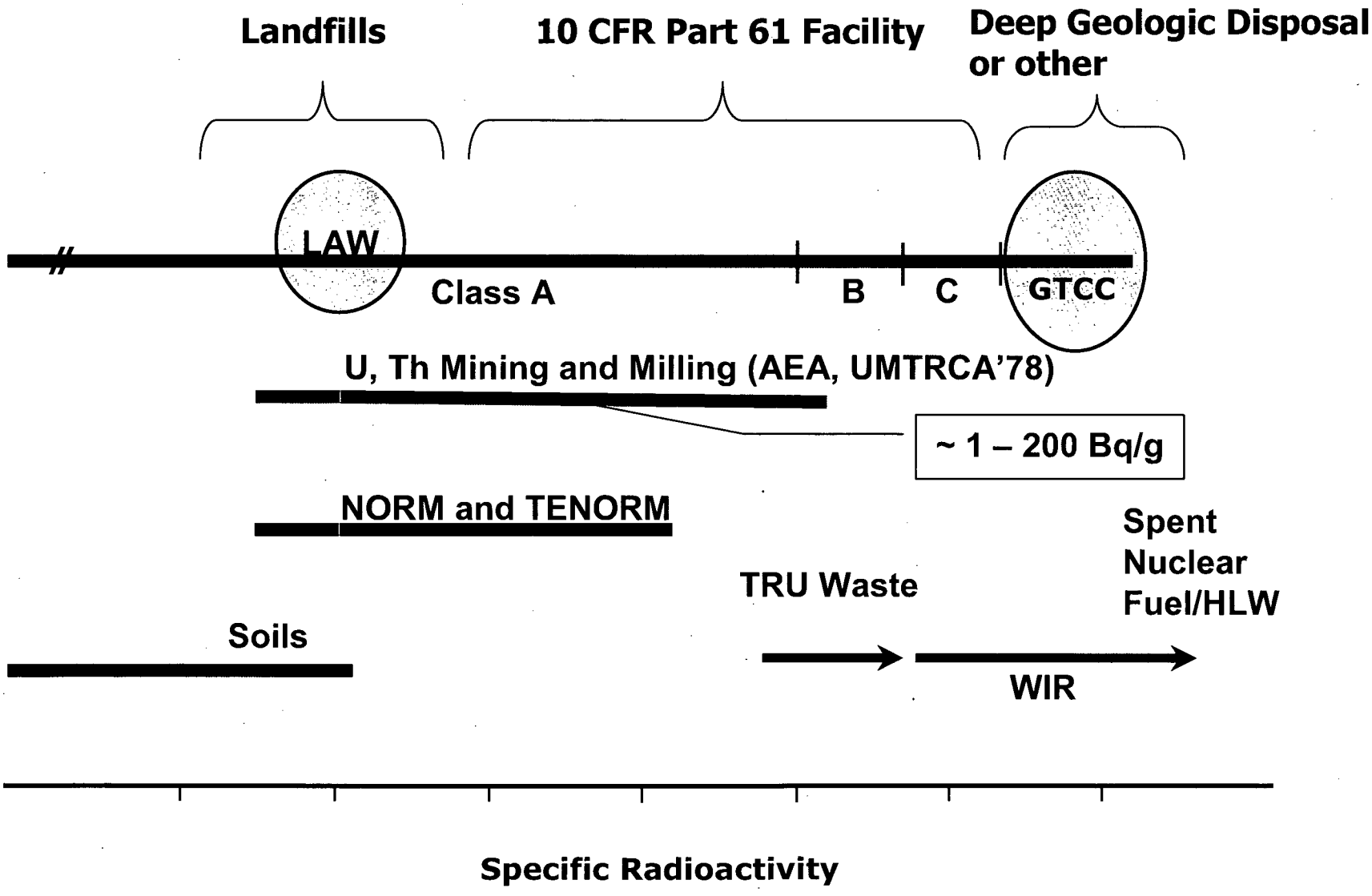


FIG. II-1. Example for the application of the waste classification scheme.

Visualization of NRC Categorization



10 CFR 71.55(b)

"Except as provided in paragraph (c) ... of this section, a package used for the shipment of fissile material must be so designed and constructed and its contents so limited that it would be subcritical if water were to leak into the containment system, or liquid contents were to leak out of the containment system so that, under the following conditions, maximum reactivity of the fissile material would be attained:

(1) The most reactive credible configuration consistent with the chemical and physical form of the material;

(2) Moderation by water to the most reactive credible extent; and

(3) Close full reflection of the containment system by water on all sides, or such greater reflection of the containment system as may additionally be provided by the surrounding material of the packaging."

10 CFR 71.55(c)

"The Commission may approve exceptions to the requirements of paragraph (b) of this section if the package incorporates special design features that ensure that no single packaging error would permit leakage, and if appropriate measures are taken before each shipment to ensure that the containment system does not leak."

IAEA TS-R-1

For the criticality safety of a single package, TS-R-1 (2005 Edition), Paragraph 677, states, in part:

"For a *package* in isolation it shall be assumed that water can leak into or out of all void spaces of the *package*, including those within the *containment system*. However, if the *design* incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include the following:

(a) Multiple high standard water barriers, each of which would remain watertight if the package were subject to the tests prescribed in para. 682
(b) [normal and accident conditions], a high degree of quality control in the manufacture, maintenance and repair of packagings, and tests to demonstrate the closure of each package before each shipment; ...."

Moderator Exclusion in Spent Fuel Transportation Packages

Presentation to the ACNW
February 15, 2007
Nancy L. Osgood
Division of Spent Fuel Storage and Transportation
NMSS

1

Introduction

- Moderator Exclusion Definition
  - A transportation package relies on the absence of water to assure nuclear criticality safety.
- Why We Are Here
  - New package designs may be proposed that rely on moderator exclusion.
  - Provide informational briefing on moderator exclusion and potential paths forward (rulemaking preferred option).
- Scope of Briefing
  - Focus on spent fuel transport.
  - Security implications will not be addressed.

2

Important Points (cont'd)

- Assumption of Water in Package Fundamental Safety Criterion
  - Robustness of package is not sole consideration.
  - Assures margin of safety considering loading, unloading, malevolent acts.
- Rulemaking May Provide Pathway to Risk-Inform Moderator Exclusion
  - Current staff thinking suggests rulemaking to codify moderator exclusion for certain packages under certain conditions.
  - Provides opportunity for stakeholder input.

5

Regulatory Framework for Transportation

- General Licenses
  - NRC approves package designs.
  - Use is by general license.
- Requirements in 10 CFR Part 71
  - Three package safety functions: containment, shielding, and subcriticality.
  - Three regimes: operations, normal conditions of transport, and hypothetical accident conditions.
- Fissile Material Package Standards
  - Criticality safety of single package (10 CFR 71.55) and arrays (10 CFR 71.59)

6

Other Regulatory Notes

- History of 10 CFR 71.55(b) and (c)
  - Requirement to assume water in the package has always been a fundamental principle in the regulations, and exception has always been included.
- International Requirements
  - IAEA Regulations for the Safe Transport of Radioactive Material (TS-R-1) have always had similar, compatible, but not identical, requirements.

9

Staff Practice

- No Certified Spent Fuel Package Relies on Moderator Exclusion
  - To date NRC has not approved any spent fuel transportation package designs or shipments that rely on moderator exclusion for criticality safety.

10

Interim Staff Guidance for Moderator Exclusion

ISG-19

- Under accident conditions, high burnup fuel may re-configure.
- Allows moderator exclusion under accident conditions (10 CFR 71.55(e)) using two methods.
- Does not give relief from 10 CFR 71.55(b), i.e., must still be safe with water inside.
- Preserves defense-in-depth against accidental criticality.
- Limited to commercial spent fuel.
- Possible expanded scope of ISG-19, with justification.

13

Points to Consider

➢ Policy Implications

- Departure from past safety practice.
- Evaluation of environmental and risk assessments that provide basis for transportation.

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Regulatory Options

1. Continue Staff Practice - no general design approval under 71.55(c).
2. Consider Design Approval under 71.55(c).
3. Rulemaking.
4. Other?

17

Conclusion

- Will seek Commission Guidance
  - Staff preparing a Commission paper addressing options for moderator exclusion.
- Current Staff Thinking – Rulemaking
  - Goal is to develop risk-informed regulation.
  - Allow moderator exclusion for certain packages under certain conditions.

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