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ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS

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186TH MEETING

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VOLUME III

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THURSDAY,

FEBRUARY 14, 2008

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Dr. Michael T. Ryan, Chairman, presiding.

MEMBERS PRESENT:

MICHAEL T. RYAN, Chair

ALLEN G. CROFF, Vice Chair

JAMES H. CLARKE, Member

RUTH F. WEINER, Member

NRC STAFF PRESENT:

NEIL COLEMAN

DEREK WIDMAYER

LATIF HAMDAN

MIKE LEE

JIM KENNEDY

BOBBY EIDS

DONALD COOL

CHRISTEPHER McKENNEY

ALSO PRESENT:

DAN SCHULTHEISZ

LAINE HOWARD

MIKE MOBLEY

MIKE LEE

DAN SHRUM

BILL HOUSE

PHIL RETALLICK

SCOTT ZOLLER

BILL DORNSIFE

RALPH ANDERSEN

JOHN GREEVES

A G E N D A

P R O C E E D I N G S

(8:32:54 a.m.)

CHAIR RYAN: Okay. I guess I'd like to ask everybody to take their seats and come to order, please. This is the third day of the 186th Meeting of the Advisory Committee on Nuclear Waste and Materials. During today's meeting, the Committee will consider the following: ACNW&M Working Group meeting on low activity radioactive waste, ICRP's draft report on environmental protection; the concept and use of reference animals and plants.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mike Lee is the Designated Federal Official for today's session. Mike has stepped out for a minute so I've asked Neil to take that responsibility until Mike comes back.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's session. Should anyone wish to address the Committee, please make your wishes known to one of the Committee staff.

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

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

Feedback forms are available at the back of the room for anyone who would like to provide us with his or her comments about the meeting.

I'd like to ask that -- I think somebody is on the bridge line. Would you identify who you are, and where you are, please. Is anybody on the bridge line? I guess not.

Without further ado, I'll turn to our first speaker of the morning, Dan Schultheisz from the EPA. Dan, welcome, and thanks for being with us.

MR. SCHULTHEISZ: Thank you. Good morning. Can everybody hear me?

CHAIR RYAN: Yes.

MR. SCHULTHEISZ: Okay. I want to thank the Committee for holding this session, and for inviting us to provide an update on the work that we started a few years ago, and, unfortunately, have had to put aside to pursue other priorities. So what I'm going to do today is give you some background, a little bit of background on where we were coming from in developing our approach to low activity waste, an update. And, in particular, to update the Committee on the public comments that we received. We did come

and talk to the Committee about four years ago during the public comment period on our Advanced Notice of Proposed Rulemaking, and at that time we provided some sort of overview, broad-brush comments. But this, I think, is an opportunity to give you some of the insights into some more detail on the level of comments and the spread, the scope, the breadth of the comments that we got from a variety of perspectives.

So moving on, I'll go through, and you'll see I'll touch on a number of the points that were raised yesterday. And I realize a number of people pointed to me as having all the answers, so, hopefully, you won't be disappointed. So one of the first things is the question of how do we define low activity waste? That was discussed a bit yesterday; what is it? Why is there so much interest in it? Why is there concern about it? How have we viewed this as a way to move forward to address this issue?

As I say, public comments and some of the major uncertainties that we see that need to be addressed in moving forward, so this is an update on the status of where we are. And as we look to the future, what are things that have happened in the interim that we will need to be thinking about as we develop an approach that's more detailed, and possibly

regulatory in nature. And then just some closing remarks on where we think this might be able to go.

So what is low-activity waste? The problem is there is, as we said yesterday, no real definition of it, not in statute, not in regulation, vague definitions the IAEA is trying to implement, nothing really specific. But, in general, we would look at this as being relatively low-risk material, relatively low-hazard material, but material that still requires some continued control, not something that can be free released. But the controls, they may not require the full suite of radiation protection activities as a Part 61 facility. This was discussed a bit yesterday by John Greeves. Not confined to specific categories. We now have a number of definitions based on where and how it's generated, or who owns it, or whether it's used for a particular purpose.

We considered cross-cutting these categories, low-level waste, mixed waste, TENORM, processing waste of the types that the FUSRAP program has been dealing with, NRC-exempt waste, the NAS study that was completed a couple of years ago included sealed sources within their scope in looking at low-activity waste. And the important thing, from our

perspective, is, is it amenable to an alternative method of management or control? Are there ways you can deal with is besides the full --

CHAIR RYAN: Dan, excuse me. I want to ask these folks to identify themselves.

MR. SCHULTHEISZ: Okay.

CHAIR RYAN: Did somebody just join the bridge line, please?

MR. HOWARD: Yes, sir. This is Laine Howard and Wes Patrick from the CNWRA in San Antonio.

CHAIR RYAN: Great. Thank you. Sorry, Dan.

MR. SCHULTHEISZ: Okay. So I'm moving on to slide 4 of my presentation, if you're following on the phone.

So there is interest in this topic, obviously. This is evidence of that. And one of the reasons is that most of the radioactive waste is at the low ended activity. Decommissioning waste, I think Ralph mentioned this yesterday. Decommissioning is a big driver for this. It can result -- 50 percent of decommissioning may involve costs related to waste management. TENORM waste, you can generating very large volumes from oil and gas, or other extraction-type activities.

And the other interest, the regulatory requirements, it's very difficult sometimes to know exactly what it is you need to do, and how they related from one type of waste to another. They may seem disproportionate to the risks that are involved, where you have waste of a similar hazard that have different requirements attached to them, or where waste with a lower hazard has to be treated in a more stringent way, just because of the way that it is addressed in the statute or regulation.

So the concern about low-activity waste is also that there's a lot of it out there. It's found in all sectors of the economy. There are other issues. Once you're in the Atomic Energy Act system, it can be difficult to get out. You're managing within the licensing regime. There are some provisions for transfers to unlicensed people, such as 10 CFR 20.2002, but these case-by-case kind of situations, they're time consuming, and they're labor-intensive, and they can lead to inconsistencies in the way they're applied. This was also mentioned yesterday.

If you're not in the system, you have more flexibility on what you can do, but you often don't know exactly what it is you should be doing, or what

you can do. At the state level, Ruth talked about this a bit yesterday, some of the states do have specific requirements, most do not. So what do you? They address different levels. There may be multiple regulatory authorities in a state that has jurisdiction, depending on where it comes from, and some requirements are incomplete or conflicting. And so the question that comes to the fore is, where do you best apply your resources to reduce the risk of the material that you're dealing with, and not with sort of defining another category of waste.

So in looking at that, we thought that this - looking at the hazard or risk of the material in question could encourage optimization of limited resources, risk reduction, more efficient use of available disposal facilities. One of the things Ralph mentioned yesterday was the –- how the waste management considerations can drive the level of cleanup, and your ultimate end state for a site that you're trying to remediate. It may be the difference between a greenfield and a brownfield, or a restricted release and a non-restricted release. So those are things that we think are important to consider.

So our approach has been essentially to look at is there a way to identify disposal options

based on the risk of the material, the hazard of the material rather than where it comes from. Low-level activity under the spectrum seems like it's ideally suited for this kind of an alternative analysis, given that there's so much of it out there. And then question of appropriate regulatory controls, what is really necessary to insure protection. So we have looked at use of RCRA Subtitle C, Hazardous Waste Landfills, as sort of the model for this; not saying that's the only way to do it, but it is something that seems a good entre into evaluating the overall approach.

So we put out our Advanced Notice of Proposed Rulemaking over four years ago now, a very long time, looking at this kind of an approach. It was very conceptual in nature. We did talk about several ways that might be used to define what low-activity waste is through modeling, through application of other existing regulatory or policy constraints. We talked about various ways that this could be regulated or non-regulatory approaches that might be applied, and mostly it was our attempt to try to lay out some issues, and get a lot of feedback from the stakeholders, which we did. So, just briefly, we got more than 1,500 comment submittals, most for

individuals who were just opposed to anything that they perceived to be deregulatory in nature. But we also got comments from a wide variety of stakeholders. And, overall, as I say, the environmental groups and the public were concerned that we were doing something that would reduce protections, increase risks.

There was some concern that we would be casting existing management practices in a negative light. Some support from the states, but wanting more clarity, waste generators gave us their horror stories about how they're discouraged from doing what seems to be the sensible thing to do, just because of these boundaries that have been drawn, and Subtitle C operators were interested, but they needed to know that this would be something that would be acceptable to the public, as well as to their immediate regulators, which would be the states.

So here's just sort of a summary of who we got comments from, a number of states, plus organizations, such as ASTSWMO and CRCPD that represent states, public interest groups, waste generators, waste managers, local political groups, one tribe, two of the Compacts, and 57 of what we call the expert public, which were people who may be consultants or had identified themselves as having

some experience or expertise, either with radiation, radioactive waste management, waste management in general, geology, hydrogeology, any of those sorts of issues that might be relevant to exploring this kind of approach. So I'll go through now in some detail some of the specific responses we got to the questions.

The states felt that we had not identified really that there was a clear need to pursue a rulemaking of this nature. They thought that there was sufficient capacity and options available. We didn't provide them enough detail to give them a good idea of what we were really thinking of doing, and wanted to be sure that cost of managing the waste alone was not justification for trying to identify just lower cost options. And they raised the issue of the state resources and flexibility, and this was also, I think, discussed a bit yesterday.

At the state level, they have limited staff, training, funding. This is potentially another burden for them to deal with. The public concern from an approach of this nature would be likely to increase the demands on them to go out and be more proactive in examining what the facilities are doing. They felt the states need to have the approval authority, which

I think would also be necessary. And the states must have some flexibility in deciding whether they wanted to exclude some waste from certain generators. DOE was mentioned prominently here, or what types of waste they would actually want to accept.

Issues that were raised related to siting of these facilities or the existing RCRA sites were how the RCRA system and the Part 61 system are comparable. Long-term site care is a big difference in regulation. They certainly wanted to maintain the real operator liability. There was some concern from the states that they had found, when a site went into sort of –- was abandoned, they found that the company that allegedly had responsibility was just a shell company that had no assets, and they had to try to dig very hard to find somebody who actually was responsible for the site. Some suggestions that we need to prepare RCRA facilities for perpetual monitoring and inspection, and some discussion of developing a market to deal with financial assurance issues that might arise in the sort of cross-pollination type of an approach.

One thing that was suggested was that any RCRA site should be okay. We had asked the question about commercial sites versus sites that are

essentially owned and operated by a company, known as captive facilities, where the company itself has waste that it generates from its affiliates that goes in there. And they thought they're all constructed to the same standards, there should be no reason why a company that had its own facility that wanted to use it in this way should be prohibited from doing so. And we also got some suggestions that we should revisit the RCRA post-closure care system, which right now requires a minimum of 30 years post-closure care, and potential for actual release or sale of the site.

One thing that was raised in a lot of comments was the Subtitle D issue. We had said we would focus on Subtitle C, and we did not expect to extend this to Subtitle D, so we got on both ends of the spectrum that said don't address Subtitle D. This would be likely to raise even more public opposition. It would hinder anything you could possibly do with the Subtitle C facilities. The facility standards are not consistent. There are many older facilities out there that are not constructed to the newer standards, and it would be even more demand for the states on the limited resources because of the number of Subtitle D facilities that are out there.

Others said there's no reason why Subtitle

D could not fall under this approach. It could provide the state actually more control, because the states are fully authorized. EPA does not delegate them authority to deal with Subtitle D, they have it; whereas, with Subtitle C that authority comes from EPA to implement that program. And that there are precedents that this approach can be effective. Big Rock Point is a case in point. And I think John mentioned yesterday that –- maybe it wasn't John. Somebody else mentioned the idea of having different sets of acceptable concentrations or limits that could go into a Subtitle D, as opposed to a Subtitle C, so you could do it that way.

The Compacts, some people certainly saw that there would be potential effects from the Compacts that would have to be hashed out damaging the viability of the Compact sites. We were accused of attempting to circumvent the law, and the Low-Level Waste Policy Act. If there are existing options, we should not divert waste from those options. And we could, of course, undercut demand for new sites.

Others saw this as completely ridiculous, because some of the waste we're talking about are outside the scope of the Compacts. The Compacts already have authority to regulate regional facilities

within their Compacts, and to prohibit exports outside of the Compact. And it was also pointed out that the Compacts have not made any real progress in siting facilities, so any claims that we would be undercutting the possibility of future siting is not credible.

On the issues of the waste, we had asked, there are a lot of waste types out there. Are there some that should be focused upon, or would this be reasonable to keep it broad. Some said we should limit it to mixed waste only. It was the easiest to address because of the RCRA jurisdiction there, and there were relatively low volumes. We had actually -- a version of this had actually gone through an OMB review stage some years earlier focused on mixed waste, and one of the reasons we decided to open this up more broadly was that the demand really is not there for mixed waste only for facilities to do this kind of thing. It's very difficult to do that.

Other people said that a broader spectrum of waste makes sense. People need assistance with all types of wastes that are being generated. They said no waste that has a current disposal outlet should go. Again, back to the Compact issues.

And some people said well, you can be

broad, but you should really limit the long life in mobile radionuclides. Those are the ones that would cause the greatest problem from a long-term care perspective. And if you do that, you're simplifying your analysis, and you're easing the institutional controls. So things like TENORM phrase applies, as well as some of the more mobile ones, like Technetium or Iodine, Carbon-14, Tritium. We might want to take a look at limiting those, or not allowing those.

DOE was a topic of a number of responses we got, and some –- there was some sentiment that we should not allow DOE to take advantage of this kind of an approach. We should encourage DOE to implement robust stewardship programs by keeping the waste within the DOE complex. DOE has avoided responsibility. Whenever they have been given an opportunity take advantage of something, they have gone well beyond what they should have done. And their waste presents unique difficulties. And in some sense, this is true, because they had a lot of legacy waste that is unlike waste that's generated in the commercial sector, waste that is not well characterized, that has been around for a long time. They have limited knowledge of what it contains, and so, in that case, there are some issues that would

need to be addressed.

Some said well, DOE shouldn't be prohibited from this, but there should be -- you should really take caution in how you deal with this. Before allowing DOE to get in, prove the concept through the commercial, the non-DOE generating sectors first, and then maybe they can come on. And make sure that the DOE waste, which is much larger in volume in a lot of ways, won't affect the capacity issues. You don't want to crowd everybody out because you're allowing DOE to take over the volume that is there. And then just some people were very inclusive, and said nobody should be excluded. If their waste is -- meets the criteria, no reason why they should not be allowed.

Some of the technical issues, what we had talked about was modeling, performance assessment-type modeling, and this was a question that came up yesterday. And the difference here is that RCRA does not rely on modeling. RCRA is a technology-based system. It's developed facilities are constructed, the design and engineering requirements are in the regulations. If you construct it in a certain way, then it's deemed to be sufficiently protected for the purpose. It's very different from the Part 61, where

there's a performance objective, and you have to demonstrate that you meet the performance objective. So one of the ways that we thought would improve the acceptability of this approach would be to take that modeling approach, the performance assessment approach, from the Part 61 world, and apply it to RCRA facilities, which really had not been done. Although, I know that some of the folks here, Bill Dornsife will probably tell you, Steve Romano probably can tell you that they have done, for their 20.2002 applications, they have done performance modeling of their RCRA disposal cells. So it has been done, but on a more limited basis. It has not been done in sort of a wide application, and that's kind how we would have viewed approaching it.

So on this issue, we got responses that said we should require –- this is also something that was discussed yesterday. One-size-fits-all, you set the standard, nobody can deviate from that, and it would avoid the disputes over this modeling parameter, that modeling parameter, whose model are you going to use, whose judgment are you going to use, and the states having to devote resources to evaluating these individualistic models.

Another suggestion for the intermediate

was we would establish a common baseline, but allow sites to show that they could do better. There would be some provision that they could submit performance assessments of their own, perhaps aimed at specific waste streams that would say hey, we can take higher concentration waste than you are allowing, in general. And that either we, or the state, would then evaluate these applications to see whether that was appropriate.

And others said at the other end of the spectrum, should be completely site-specific in all aspects. We should avoid using average parameters. We should go to site specific parameters. Each site would have essentially its own set of criteria that would be established either in a permit or in regulation. We can do it that way.

One of the things that we had looked at in the earlier mixed waste effort I mentioned earlier was on the wet site/dry site issue, was there a way that we could sort of draw a line between wet sites and dry sets. And we worked up a fairly simplified approach that took into account site characteristics in terms of depth to ground water, in terms of the type of soil in the unsaturated zone, in terms of precipitation, those kinds of things, and just try to say okay, if

you're on this side of the line, then these are the concentrations you can accept. But if you're on this side of the line, you can accept these higher concentrations, and that was a sort of simplified version of what was discussed yesterday by Dave Esh and some other folks.

On the implementation, how would you actually make this work? Where do EPA and NRC come down on their implementation rules. Some suggested NRC should defer completely to EPA, exempt these facilities, exempt the waste. It's now in the RCRA world, EPA deals with it.

Others said at the other end, you need a specific license from NRC. And then the permitting also has to be addressed, the RCRA permitting. Some said the NRC should issue the standards, so the facilities shouldn't have to get specific materials licenses. And there was general preference for a regulatory approach over a non-regulatory approach, where we would sort of establish guidance, identify best practices, put together industry groups that would adhere to a set of principles, that kind of thing.

And on the issue of the specific facilities, then what they would have to do, again,

the spectrum. They should have to do as little as possible to, they will have to change almost everything they do in terms of training, in terms of worker monitoring, they'll have to do dosimetry, they'll have to do all of these other kinds of things. And our preference going in was for the should not change much, that we should make this as transparent as possible, but build upon the existing RCRA requirements, and not create a whole new set of requirements that those facilities would have to meet, which would make it much less attractive for them to adopt this kind of an approach.

There were some suggestions and issues that NRC should address. The liquid scintillation cocktail exemption for similar wastes was one. They said we have wastes that are very similar to these, but we have to treat them in a different way. This was an issue for the biomedical research community. The use of mill tailings facilities, the Committee may have looked at the petition from the Fuel Cycle Facilities Forum a few years ago, and the National Mining Association. They also provided similar comments to us.

Residuals from drinking water treatment, this is an issue that has really come into high

visibility in the last few years, that EPA issued the Uranium standard in 2000; 2007 was actually the point at which facilities or drinking water systems needed to have their initial monitoring complete so that they could say how they were in compliance with these or not. And NRC has been thinking about ways to deal with the possibility that some of these systems will actually generate licensable quantities of Uranium, so they are looking at that on sort of a different track. But this is an area where, I think Phil Retallick is probably going to talk about this, an issue that is becoming very much of a concern to the states, is how they deal with these wastes that are either high in Radium, or high in Uranium.

And then some people said wait for NRC to come out with its clearance standard, and then EPA can do something, because the clearance standard will create a baseline, a lower limit that EPA won't have any risk of dragging these very low end things up into tighter regulation than they are now. So we all know what's happening with that so far.

The major uncertainties that still exist from our perspective, how much waste would be eligible, how do we define the criteria, and then define how much waste would be eligible for this kind

of a thing. And that is, of course, very important for the disposal facility generators in making some decision as to whether they want to try to take on something that may be very controversial. What's the economic benefit to them? Is there a waste stream out there that's going to be sufficiently viable for them to make whatever changes they need to make?

The need and level of NRC oversight is not clear at this time. The level of state support or adoption is also not clear. Disposal facilities and the generators both had concerns over liability and the public perception. The public acceptance is a critical factor for this, and one of the things that came very clear in the comments was that we need to define this so that this is all they're looking at.

We got comments that said we shouldn't be changing the transportation standards. We shouldn't be doing clearance. We shouldn't be doing this. Well, you know, we weren't doing any of those things, so look at what we are doing. And really what factors are going to be most influential in deciding some of these issues one way or another.

So getting on to where we are at this time, we, of course, have been consumed with the Yucca Mountain rulemaking, which we thought would have been

finished by now, but is not. It came down to us right at the time when we had sort of done our initial review of the comments, and so we didn't -- haven't been able to really move beyond that point. So, as I said, we do have the initial review, gave you some summary, a lot of complex issues. We need to narrow the scope if we're going to come out with a specific proposal, and just basically determine whether the rulemaking is what we need to do.

We need to do more work in terms of modeling, in terms of waste characterization to establish a technical basis, coordination with NRC. We had very good coordination with NRC on the ANPR. Jim Lieberman was lead staff attorney on that, and was very helpful to us before he retired, so we need to make those contacts again. Complete turnover with the Commission, complete turnover with a lot of the other staff.

There ought to be increased emphasis on the water treatment residuals, as I mentioned before. We're trying to do some things there. So we do intend to get back to this, I say here, not sure when. It really depends on when our Yucca Mountain responsibilities are done.

So in the interim, in the four plus years

that since we have put out the ANPR, some things have been happening. So we have –- it's taken a new visibility. And what we see is that getting out of the current system is the key point. How much can you get out of the AEA system, the Part 61 system, and what does it take to do that?

We have found that there are strong constituencies both supportive and opposed to any kind of an exit, or a door out of it. The fact that NRC has deferred their materials disposition effort may affect how we go forward with this. There was a lot of connections made in the comments that said that we should be doing something in coordination with that. And finding the middle ground, many disparate views from the stakeholders, how do we find the middle ground?

There are a lot of other things. They're federal, there's some interest on the Hill, Congressional interest. A couple of years ago there was a hearing that Senator Domenici had, his Committee, and he said he was going to do something about this, whatever that something would be. He's not running for re-election, so he may decide that now is the time for him to try to pursue something. We don't know that.

There have been some proposals to consider federal sites for low activity, or low-level waste. The Low-Level Waste Forum had a workshop about almost two years ago now to kind of look at that issue a little bit. And then there's the –- this Committee, as well as the staff, Low-Level Waste program review, emphasizing the 20. 2002 process, potential changes to Part 61. There's been some encouragement to go back and revisit the classification system, or develop a new one. Need to understand how those things are going to work.

At the state government and commercial disposal level, the Idaho and Texas facilities, U.S. Ecology, Waste Control specialist Steve and Bill will talk about that, have been very successful in working with their state regulators to identify areas where they can accept certain types of radioactive waste, and make a viable market, as well as demonstrate protectiveness. And Steve has warned me a number of times that they don't want us to do anything that's going to upset the delicate balance that they walk with their state regulators. And we don't want to be in that position either.

The Colorado permit modification for the Clean Harbor site, we'll hear from Phil Retallick

about that. I think Phil told me that they got their idea from our ANPR, so that's a step in the right direction.

The low-level waste site in Texas seems to be moving successfully along in its licensing process. But Barnwell, now it seems that they're serious this time about closing, and there will not be a last minute reprieve at this point.

International approaches, had some discussion of that yesterday. There was a conference in Cordova, Spain about three years ago that was dedicated solely to this kind of a topic. There was a lot of interest internationally, and the revised classification system that IAEA is working on is proof of that.

John mentioned yesterday the facilities in France and Spain, the low-activity waste facilities they have there are very similar to RCRA Subtitle C facilities, in the way that they're built.

The National Academy study, there hasn't been a lot of ground swell to try to implement those recommendations directly, but there may be some building.

The bottom line here is, as we get back into this, we're not in a time warp, it's four years

ago and we're just going to do what we were doing then. We need to look at what's been happening since then. We don't want to create new problems, get in the way of promising initiatives that have been growing since that time. We want to encourage solutions, and make sure that everybody's perspective is protected, and public health is protected.

So the outlook, we see that there are some promising signs for change. A lot more attention given to this topic. We like to think that the work that we've done has sparked some of that. Increasing recognition of the fundamental disparities in the system and the way that you're dealing with different types of waste.

We may be along a path where we're just dealing with limited or incremental change for a while. Regulatory action takes time and resources. I don't know if it was –- somebody mentioned yesterday, just issue some regulations. You don't just issue regulations, it takes time and effort. A lot of very different stakeholder views that really need to be brought into some kind of a convergence.

The public support will be critical, but not easy. I somewhat disagree with what John said yesterday about getting public acceptance, that this

is the way to do it. Well, it's a very difficult thing. But the key to this may be this idea, bringing people around to the idea, looking at the relative risks, relative hazard of the material, and dealing with the material as it's generated, and not as it's defined in the statutes or the regulations. So that concludes my presentation. Take any questions.

CHAIR RYAN: Thanks, Dan. Appreciate it. I'm going to ask the members to limit themselves to one question so we can get back on our schedule. We're have a full day, and can't get behind here in the morning, which is fine.

MEMBER CLARKE: I do have one question. Thank you. This whole topic of perpetual monitoring, the practicality of that, 30 years of post-closure care under RCRA, five-year reviews under CRCLA, where you're looking at a facility that's meeting the RCRA design requirements, and what can you do with all of that?

Given that the RCRA regulations are what, 25, 25 years old, but some existing facilities I think did end up with RCRA permits. And how far are we from having to deal with this in sites that have actually had 30 years or plus --

MR. SCHULTHEISZ: Right. None of the

sites have reached the end of that closure period, so we don't know what will be the attitude towards that. The first site that comes in and says we're at the end of our period. We have no detectible groundwater contamination. Our leachate collection system is working. We want out.

We've heard sort of informally from a number of state regulators that they are not going to allow that. And we've informally from some of the facility operators that they don't expect to be getting out, that they really do expect that there will be continued presence and maintenance of the sites for the foreseeable future. So the 30 years is a little -- it hasn't been tested.

MEMBER CLARKE: That's fine. That's all you can say.

MR. SCHULTHEISZ: Yes.

MEMBER CLARKE: And I guess we're several years from it being tested.

MR. SCHULTHEISZ: Yes.

MEMBER CLARKE: That was a great update. Thank you.

MR. SCHULTHEISZ: Oh, thank you.

CHAIR RYAN: Ruth.

MEMBER WEINER: What are the upper and

lower bounds, approximately, of what EPA considers low-activity waste?

MR. SCHULTHEISZ: We have been –- the upper bound –- well, the lower bound, we really didn't define it lower bound. We were looking at the possibility of some clearance type activity being done by NRC, and so we have not really looked at the lower bound at this point. The upper bound, as far as the classification system goes, we thought that Class A would serve as a de facto upper bound, because of the requirements in the regs for additional packaging requirements, additional burial requirements, and it would be very difficult to kind of say that this is low-activity waste you're required to deal with.

Now we understand that the classification system was based on certain assumptions, and certain types of analyses that may not always be the best for this. But we were also considering various ways of looking at this, whether it's long-term performance modeling, or some type of worker exposures, or an intruder type analysis, so those considerations are all relevant. But in terms of optics, Class A, we were thinking Class A would have to be the de facto upper limit.

MEMBER WEINER: Thank you. That's all.

CHAIR RYAN: One comment, rather than a question. One, 61.58 does allow for alternate classification systems so there is no absolute risk assessment associated with any concentration value.

MR. SCHULTHEISZ: Right.

CHAIR RYAN: So with that I'll ask Allen, do you have any questions?

VICE CHAIR CROFF: Just one. Can you tell me roughly how many RCRA Subtitle C sites there are in the U.S.?

MR. SCHULTHEISZ: There are roughly 20 commercial sites operating. That number sort of fluctuates, because if you look at them, some of them have limitations in their permits, they can only take certain kinds of waste. There are, as far as we know, and we can certainly go back, and we'll develop a more detailed evaluation of the interim period since we stopped really looking at this. There haven't been any new ones for a number of years. I don't believe there are any that are in the pipeline to be permitted.

VICE CHAIR CROFF: Okay. Thanks.

CHAIR RYAN: Dan, thanks very much. I hope you'll be with us the rest of the day. We are going to have some roundtable discussion toward the

end of the day, and hopefully you'll be here to help us out. Thank you.

Next up is Mike Mobley from the Southeast Low Level Waste Compact Commission.

MR. MOBLEY: I know Dan doesn't want my comments to be attributed to him.

(Off the record comments.)

MR. MOBLEY: Okay. Good morning. My water froze on the way in this morning. Man, it was bitter getting here.

After listening to yesterday's presentations, I'm going to kind of hip-hop through mine, because I think that a lot of it was covered. And I have some other comments that I've added on based on questions requested yesterday, and we'll go from there.

First, a disclaimer. I was involved in licensing a lot of these processor facilities I'm going to be discussing today in the early days. And I also, since my retirement in 1999, I have been involved with one or more, actually more than one, of the processor in the role as a consultant. So I have been consulting with them post-retirement to some extent.

Tennessee is unique amongst the states in

the sense that we do have a lot of major processors. We're not unique in the sense that we allow people to dispose of very low-level waste, or exempt waste, or if you noticed I have added an acronym. I didn't think we had enough, so for this talk I added the acronym NAW, and that's no-activity waste. Because a lot of this waste that comes into the waste processors is essentially no-activity waste. In fact, some processors have a special program for dealing with that kind of waste.

I'll talk about BSFR. I'll explain that in a moment, and then I'll talk a little bit about the approval process, but it's basically the same as what Jim talked about yesterday with the NRC's programs for Part 22.2002 exemptions. And then I'll talk about conclusions and comments.

The major waste processors in Tennessee, I tried to sit down last night. I thought somebody might ask me how many there were, and I'm going to say there's been eight to ten. It's kind of one of those things where it's evolved, and there's been more, there's been less, some have been bought out, some have consolidated. But through the years, there's been roughly eight to ten processors, some of them very major waste processors, some of just a small

niche processor.

In the beginning, the releases from the major waste processors were basically Reg Guide 1.86, Surface Contamination-type releases, and "Green is Clean", the no-activity waste type releases, where they would analyze it to a minimum detectible limit. And if they didn't see anything, it was released.

The BSFR program actually grew out of the Reg Guide 1.86 activities in that different processors started attempting to use different methods for doing the Reg Guide 1.86. I mean, obviously, you can do surveys, but as it evolved, they found that they could show that surveying, doing a surface contamination survey, they could do bulk surveys that basically implemented the surface contamination surveys. And, thus, they could do more material easier. And so that's where the BSFR process evolved from.

We didn't call it BSFR when I was Program Director. It was just different license activities at different processors. And each processor has their own particular process for doing this, as to how they do it. The state essentially looks at it in the same manner, but because of the material going to different landfills, because of different methods in which the

processor may wish to evaluate the material, each one of them is sort of unique.

The state, and it's like all regulations evolve, the state decided that it was better if they had a more, I guess, coherent program. It would be easier to evaluate the new proposals, as well as inspect the current operations, and so they started instituting a program called, they call it BSFR, and they devised some generic guidelines to begin to implement that at each different processor. And that's where the term BSFR came into being. And it's actually only just a few years old at this point in time, when the process has been going on for, I guess, a couple of decades.

And there's one other peculiarity to this process, and that is it involves the solid waste program. They actually issue, the landfills that are going to receive this material a special waste permit that allows them to receive the material. And the material has to go through the licensed facility, the processor facility, has to be processed through that facility, come out approved, and then it goes to the landfill that it's approved to go to, and is received their under a special waste permit issued by the Division of Solid Waste.

This, we've seen this yesterday, I believe, same old stuff, just what it is. We've seen this, and I'm going to just skip right through. Okay. Now I've talked about the process. I've talked about processors. What am I talking about?

For the material to be considered for BSFR, it has to be evaluated at the generator site, and shown to meet the acceptance criteria at the waste processors for this process. Then it's shipped as radioactive waste to the processor. And at the processor, then the processors generally have a pre-process survey that they just check each package before they start it through their analysis program, because some packages, if it's –- depending whether -- -- and there's different levels for different processors, but somewhere between 10-100 microrem per hour. It will just get kicked out automatically, won't even go any further. It's just kicked out as not acceptable at their facility.

Then it's brought into the facility, and put through a process of being analyzed. Basically, it's essentially almost like a –- in some cases almost like it's just a big sample that's put in front of a lot of detectors to analyze it, and it's counted, much like you'd count a sample in a lab, until they can

show that it meets the criteria, or that it fails the criteria. If it meets the criteria, then it's releasable provided the container surface dose rate limits are met, and it does not meet the requirements of the USDOT definition for radioactive material. Now I want to comment on that.

The only reason that's in there is just so that you're not shipping something to a landfill that's got a radioactive material placard on it. It can meet all the other criteria, but if it comes out and has something in it; for example, a few of the processors when the limits changed in the USDOT standards, a few of the processors had to go back and tweak some of their numbers to get them down below the limit. It was just a few isotopes that changed that made some difference in it. So nothing going to a landfill goes out with a radioactive DOT placard on it. It goes out as non-radioactive material going to the landfill under a special waste permit.

At the landfill, the material goes through a final check, and that's the standard plastic, large plastic scintillators which are actually very fantastic. If you send a load of material that meets Reg Guide 1.86, surveyed to the ultimate, and everything in that load meets Reg Guide 1.86, but it's

at or near Reg Guide 1.86, that load will be coming back to you.

Now most of those kinds of things occur when stuff goes to scrap yards. Very few of the BSFR shipments have actually come back. And we have had some processors that have never had a load returned at all. In one case, after decades, one processor has had one load returned in tens of years. It goes in as disposed.

I was going to talk about the request for alternate disposal, but it's basically, there's just a request for a license amendment in their license, and I don't think we need to go into that.

As Michael knows, I'm always intrigued by the differences, and I'm simple-minded. I cannot understand why if something is okay at one level, then why is other things not okay at that same level? And here's some items that just cause me concern.

The first one causes me concern period. We did not change our standards in Tennessee to allow this until we had to, and even then we did it under protest. I just think that this is not -- it's too much dose, it's been demonstrated that actual people get real doses in terms of 50-100 millirem, sometimes in adjacent apartments, from these releases of

patients that have significant radioactive material in them.

Medical radiation exposures in the years have gone from being a minor problem, although more than what we see in the nuclear arena, in the nuclear power plant arena, to 320 millirem per year, unreal. Safe Drinking Water Act, man-made radiation, and the state used this a lot in discussions last summer regarding the –- there's a big flap about BSFR in Tennessee at one of the local landfills, happens to be just outside of Nashville, which is affecting proposed legislation this year in the legislature. And they used this a lot, this man-made radiation beta gamma that you can get 4 millirem per year from your drinking water, and everybody that drinks that water is going to get it. Whereas, at the landfill, the person, the farmer, the resident farmer that lives on it, that eats his crops, grows his food, et cetera, et cetera, his cattle and everything else is only going to get less than a millirem a year, so trying to put things into perspective. They didn't use, and this is one of the things I said they should use, was the alpha doses, or Uranium doses, which can be significant.

And, with that, I wanted to talk about

some other specific issues that came out of you all's questions yesterday, or the comments yesterday. CRCLA disposal cells. This is just to provide some insight into some of the comments and questions that were brought up yesterday.

CRCLA disposal cells that are disposing of RAM are sited in areas that do not meet 10 CFR Part 61 or equivalent state standards, and they do not consider the intruder scenario. This is extraordinarily important. If you don't consider the intruder scenario, and you consider that you've got a liner and nothing gets out of this site, you can bury a lot of radioactive material in there. And, for example, in the DOE CRCLA cell in Oak Ridge, one of their final comments relative to it was they could actually dispose of greater than Class C materials in that disposal site. Now they did say that they would request specific approval from the state and EPA before doing that, but, I mean, there's a consideration.

There is a definition for radioactive waste out there that a lot of people are not aware of, and this is in the EPA Injection Well Standards. And they define radioactive waste as "any waste that contains radioactive material in concentrations that

exceed those listed in 10 CFR Part 20, Appendix B, Table 2, Column 2." Just an interesting item.

I have some concerns about the lack of a clearance standard in the U.S. We're sitting here talking about well, we don't have a clearance standard. We know that we're in a situation where there's international market. We know that this country imports a lot of stuff, and there's a clearance standard in the rest of the world. And they're proceeding apace, and for us to let the public in America believe that they're not receiving material that could contain –- they're not receiving items or equipment, or whatever, that could contain radioactive material is just –- we're just not letting them know the way things really are; and, therefore, we're not developing a standard that we should be developing.

I was a little concerned yesterday about the NORM out of that figure in the IAEA report. I've always thought that one of the reasons we have such difficulty with AEA materials is because the public doesn't understand that it's all the same stuff, it's all the same radioactivity. Radiation is radiation, and a rem is a rem, and we're working to try to protect people from the radiation. I think we need to put the NORM in there. We need to put all of it in

there, and so we've got to deal with it, and that way we can deal with all of it more effectively.

Somebody asked the question yesterday about, has anybody looked at RCRA site disposal facilities versus low-level waste disposal facilities? That brought a thought to my mind. In the Southeast when we were trying to site low-level waste disposal facilities, there was some guy who was allegedly from the EPA, and I don't know names or anything. I don't even know –- he may have been a clerk with EPA, but he was referred to as an EPA expert who was going around saying the RCRA disposal sites were much better than a low-level waste disposal site. So there's somebody out there somewhere that thinks they're better. And I don't have any clue.

Dose versus concentration. Dose is the way to go, but one of the problems you have to recognize with them, we've seen this with our processors. One of the problems you have to recognize is that you will then have sites that can accept different concentrations, and that's sometimes difficult for generators and the public to understand. For example, with the BSFR waste, because of the individually developed programs, there are slight differences in what one processor can accept and

process through their BSFR program, and what another one can. And so that will drive your waste in different directions, because of the oddity that develops when you just base it on dose, and back-calculate. I do believe that dose is the way to go.

The other side of that is it will drive better sites, because everybody is going to be want to be able to handle the most material, have the widest acceptable WAC. I'm intrigued by the 400 picocuries per gram Radium in a Colorado landfill. That's got to have –- I mean, if you've got much quantity, you've got a significant impact there.

One of the things that came out of the hearings that were held back in the summer in Tennessee relative to the BSFR program was that the BSFR waste going into the landfill was less radioactive than the dirt they were using for cover in the landfill. That was really intriguing to me, but it didn't seem to –- the public didn't seem to have any heartburn about it. They'd rather have the dirt than the BSFR waste. So that's kind of an insight into dealing with the issues relative to the public. It's very difficult to get the issue across to them.

And with that, I've got more discussion on the modeling, but I really don't think that we need to

go into that. With that, I'll take any questions, Michael.

CHAIR RYAN: Okay. Thank you. I appreciate your presentation. Allen?

VICE CHAIR CROFF: No questions.

CHAIR RYAN: Okay. Jim?

MEMBER CLARKE: No, thank you.

CHAIR RYAN: Ruth?

MEMBER WEINER: I want to thank you for a very thorough presentation, but I have no questions.

MR. MOBLEY: Thank you.

CHAIR RYAN: Mike, it's interesting. I think today's sessions are practitioners, both regulators and operators, so we're gaining some very important insights here. If you said what are the top two or three things that folks should think about when they think about taking low-activity waste and trying to dispose of it? What do you think they ought to really focus on to gain regulatory acceptance, to gain a path forward for materials?

MR. MOBLEY: Well, to gain regulatory acceptance, I think you want to have a process that's very robust, and very defendable. As the regulator, I want to feel comfortable –- I mean, to me, I mean the only way I would ever approve anything is I've got

to feel comfortable with it, and I've got to be able to go out and tell the public that I believe this is okay. Not only do I believe it's okay, I believe it's even better than okay.

For example, in this thing with the BSFR activities the summer, I went to all the hearings and participated in them to some extent. And I thought the issue, when they made the point, when the consultant for the committee that was doing the looking into it, made the point that this was less radioactive than the dirt that they were using as fill. I think that did have a little bit of an impact that set some people back, but it didn't totally turn the tide. But you just have to have a really robust program. And then, as a regulator, you've got to go out there, and you've got to be on top of it, and see that we're following through on this. And you also have to be poking around, what's happening here? Let's look at this. Are we really doing it all like we said we'd do it? Are there better ways to do it? Is it working like we think it worked?

I have to say, having been the regulator originally when a number of these things were evolving, and then being a consultant coming into some of the facilities, one of the things that I wanted to

do, and I've always had the leeway from my clients, was I kind of wanted to poke around in things to see how is this really working now. And I'm in the inside, how is it working? It looks pretty good. Actually, it looks real good. You know, you just go through the process. You've got your regulations, you've got your standards, but then you've got to make yourself feel, do I really believe this work?

CHAIR RYAN: It sounds like there's an element of having it be transparent, too.

MR. MOBLEY: Yes. That's a big element, but it's a problem. It's problematic in that you can have hearings, you can have discussions. With the siting low-level waste facility in North Carolina, we had public meetings, we went through all the process. The moment you target some place, some particular point, then people come out of the woodwork that haven't been at your meetings, they haven't heard any of the background material, they don't know any of the issues. They just come out of the woodwork. Makes it very tough.

CHAIR RYAN: Mike, thanks. I'm glad you're going to be here for the rest of the day, and some of our open discussions later on this afternoon. Thank you very much for being here.

MR. MOBLEY: Thank you for the opportunity.

CHAIR RYAN: You bet.

With that, we'll turn our attention to the Grandview, Idaho Disposal Facility, and Steve Romano from American Ecology is here to speak to that topic. Good morning, Steve.

MR. ROMANO: Good morning. Thank you for the invitation. We appreciate the chance to talk about our experience in Idaho. Hopefully, we're queued up on the presentation somewhere. And we do have copies of the presentation on the back table if anyone would like to see that.

CHAIR RYAN: While Steve is getting his presentation organized, I might mention that Mike Mobley has prepared some written materials that will also be available on the back table to go along with his presentation, so this handout is in the back.

I might also mention at this time that Commissioner Jaczko gave his opening remarks yesterday. Those opening remarks have been prepared and have been published, and they're also on the back table in written form, so thank you very much.

MR. ROMANO: Thank you very much. I'll proceed.

This is an overview of the site, sort of give you a feel for how much area we're talking about, permitted area. Actually, this slide was corrected. I guess we didn't get the new version in there. There's actually 490 acres permitted, and 160 acres in use. That change was through a recent siting approval by the State of Idaho that is a process they use at their RCRA site where they divide approval for siting of new landfill areas from the actual review of design, 1,252 acres including the buffer zone. The company does own the land, and this is a subject I'm going to come back to a little later as we talk about how one compares the use of RCRA sites and Part 61 sites. It's an important concept, and I'm going to come back to that. Nearest resident is 1.2 miles away, nearest community is 10-1/2 miles away.

This is a picture of the site. There's an aerial for you. So, basically, the 162 acres, which is currently in use, is within a fenced area. There's a larger area that has been approved for future landfill sites going forward.

One thing I'd also note here, too, is that we did expand the buffer zone, that we did a land transfer with the Bureau of Land Management, provide a buffer zone completely surrounding the site for

purposes of the state having control for monitoring purposes. So there is a surrounding buffer that cannot be developed that's part of the state's area to monitor the facility.

The site, semi-arid to arid site, 7.2 inches of annual precipitation, the pan evaporation potentially you can see there. Average temperatures, very good site, we believe, fronts with the Part 61 standpoints. There are very thick layers of clay beneath the site. The geothermal aquifer is about 3,000 feet deep. There's a monitored zone above that, the saturated zone, which is not an aquifer, but does allow us a zone about two to three hundred feet, depending on where on the site you are to monitor for compliance purposes. But it's not a watertable that's used for any purposes in the area. Groundwater movement is very slow. Actually, obtaining groundwater samples is a bit of a challenge.

There is also, we believe, a positive from the site having virtually no upgrading and surface water flow on the site. So in terms of some of the Part 61 concepts of not having the surface water flow on the site, and having very long flow paths away from the site does apply to this particular site.

There's a little bit of an aerial, a

cross-section of the site. You can sort of see that clay layer that Glenns Ferry formation is about 500 feet thick, and above that is the upper saturated zone that I discussed a little earlier that kind of sits on top of that clay layer that does give us a monitoring zone which is well above the aquifer, which is quite a bit lower.

The design, I won't spend a lot of time with this. Most of you are probably familiar with this. It's a standard RCRA Subtitle C design with the two plastic liner systems, and the three foot of compacted clay beneath that liner system, with the sump for collecting leachate. In this desert environment, we collect very little leachate. There is some in the winter months, but it's basically very limited.

A little bit of history on the site. 1973 was disposal in a pre-RCRA phase, `88 the RCRA Part B permit was issued. And we note here that NORM was actually included in the original RCRA Part B permit. 1998 was the first shipment of FUSRAP waste from the Army Corps of Engineers, and that was basically under the authority that allowed NORM to go to the site. In 2001, U.S. Ecology, American Ecology, the parent company, purchased the disposal facility. And a

number of things also happened the year we purchased it.

We felt that the existing regulatory regime and statutory regime was, frankly, a little too loose for public acceptance purposes, for having sort of a clear line of what we were attempting to do. We wanted to go ahead and define fairly specifically what the intentions were, so there wouldn't be confusion. So we did go ahead. The law was amended, a regulation was adopted, and our permit was modified to identify a number of regulatory controls to set some specific numeric limits on total activity acceptable, and to basically allow some specific exemptions. And one example is the general exemption for unimportant quantities of source material under 40.13(a). And we also identify a number of the Part 30 specific exemptions for consumer products, items, and devices, smoke detectors, and what have you.

In 2005, the permit was modified to allow us the ability to accept fission and activation products subject to case-by-case exemption reviews, and issuance of exemptions by NRC Agreement States.

And in terms of how much waste we've accepted to-date, and I think this is an important consideration, there's been a lot of discussion about

well, gee, can we use RCRA sites for disposal of this kind of material? Well, we've taken over 2 million tons, so this is a current practice. This is not some new thing we need to be exploring and talking about. We're not the only ones doing it, but here's one site where more than 2 million tons of low-activity waste have been disposed of to-date. That's certainly much more in the time frame that has been disposed of by the Richland and Barnwell sites combined., much more. Of course, there also is large amounts of material disposed of in the Utah site. But, again, this is an ongoing practice. This is not something new to be figured out how to be done.

In terms of the acceptance, in the seven-year time frame, 2000-2007, you can sort of see here that there's slightly more hazardous and non-hazardous industrial waste disposed at the facility than low-activity material. But the low-activity material is a very significant amount of what it is we're accepting. The great bulk of that is from the U.S. Army Corps of Engineers FUSRAP program, but there also have been in the last several years significant quantities from NRC licensed facilities where there has been review and approval of that by the NRC.

What we've disposed of, typically, is bulk

contaminated soil and debris. That's the FUSRAP material, EPA superfund cleanups. A good example there was the Shattuck Chemical Radium site in Denver. Currently, the Molycorp Washington, Pennsylvania facility is shipping large volumes to the site. All of these things with review and knowledge by the regulatory agencies. Oil and gas industry and ore processing operations, Zirconium sands processing would be a good example there for the ore processing. Oil and gas industry NORM primarily. Minor amounts of accelerator-produced material and some of these general exempt items, but that really has not been a major category. There simply aren't the volumes.

Idaho has adopted a process that we believe is very consistent with what the NRC has set forward, and also the process, we think, is pretty well accepted and discussed in this IAEA safety guide, which we have kind of considered in the way we approach these things. Our permit allows us to take these materials on the basis that these are going to be either generally or specifically exempt from regulation under the Atomic Energy Act for disposal purposes. That's a concept that's clearly allowed under the Atomic Energy Act. It's embedded in the regulations, it's been used for quite a while. As I

believe was discussed yesterday, the 20. 2002 Alternate Disposal Authorizations have moved away from the sort of in the backyard of a specific generator, to being more applied at facilities, such as our's. As you'll, I'm sure, hear from WCS, they also have extensive experience doing this.

In looking at exemptions, we felt it was important to not only have an Alternate Disposal Authorization issued by the NRC, or in the case of an agreement state that would apply. That applies to the generator. For the disposal site, we believe it's appropriate, and again consistent with the IAEA guide for exemption to go ahead and say okay, we've done the review. We've looked at this specific facility on a case-by-case basis, and we concluded that the limits that are set are acceptable, and there's not going to be a safety issue with the dose. So what the process in Idaho is, is very specific, it's very transparent. The generator working with us is the operator. We'll submit our information to the NRC, or an Agreement State. They'll review the information. They'll make a finding as to whether an Alternate Disposal Authorization for the generator's purposes is appropriate, and whether an exemption can be issued to allow the waste to be disposed of at a RCRA facility.

Once that's done, the NRC, they can turn it down, or they can approve it. In the case of where it's approved, then we then go to the State of Idaho with the NRC's finding, that exemption having been issued, and with our own finding as the operator saying okay, we would now like your concurrence to go ahead and dispose of this waste at our site, again, providing a level of transparency. That, then, is the State of Idaho's decision to make, whether or not they decide no, we don't want you to take that, whether they'd like more information, or whether they concur.

In practice, we like to work with our regulators. We don't want to be submitting packages that they're going to say by gosh, why did you give us that? We're not comfortable with this. We would like to work with them in advance to avoid that. And, in fact, we've never had one rejected. We have had requests for additional information, and that's been appropriate.

But, to us, this is a very simple process. We've had folks say well, gee, this seems awfully complicated. In fact, it's not. And I'm going to talk a little later –- I think the NRC has developed a very good process within the staff to, in a fairly straightforward way, be able to review these exemption

requests, these Alternate Disposal Authorizations, and to, in a fairly straightforward way, be able to make its decisions. It's a process that's provided for in the regulations right now, the practice has improved, there's been greater uniformity, greater certainty for the regulated community, both in the generator and the disposal end, not all that complicated. And it does provide a transparency, and it does link to the idea that you have material that is licensed under the Atomic Energy Act for purposes of disposal, and material which does not have to be. But the decision as to whether or not it does or does not fall under the AEA regulation for disposal purposes can be made on a case-specific basis, and it can be done in a straightforward way.

Our radiological protection program at the Idaho site, I'm going to talk about this slide in some detail, and then move pretty quickly through some of the details. But we asked ourselves the question when we first got into this, was how do we decide a proper radiological control program. We did this back in 2001 when we looked to regularize this process. What could we learn from the experience we've had since 1963 in operating low-level waste disposal sites in Washington State, in Nevada, also in Kentucky and

Illinois. So we've had the experience since 1963. What can we learn from that? What is an appropriate level? What is a risk-informed level of control to apply at one of these kinds of sites?

So we said well, there ought to be site-specific safety assessment supported by modeling. It need not be the same level of site-specific safety assessment than one would apply to a site obtaining a license under Part 61 for all Class A and Class B and C waste, so an appropriate level of modeling based on the waste.

Personnel dosimetry should be part of it. Environmental and occupational monitoring, contamination controls and surveys, independent audits and training. These are all features of any sound radiological protection program. And the question in our mind is how do we look at the elements of that that makes sense for this kind of a site?

We would disagree with the concept that one would say okay, fine, any RCRA site can take a certain level of material and forget all this. We're only going to have material that –- where none of this would matter going to a RCRA site. To us, that would be unnecessarily restrictive, and, in fact, it is appropriate to have a radiological safety program

geared to the kind of material you're actually receiving.

So going through this rather quickly, the RESRAD code, this is what we use. We have made it site-specific, and we have used this on a case-by-case basis, so we have a model in place. When an exemption request goes into the NRC with the Alternate Disposal Authorization, we would take the specific source term for the waste that is part of that project, consider it with the overall source term at the site, and we then provide that assessment as part of our package.

Also, we are required on an annual basis to report to the State of Idaho the entire source terms as it's built up over time at the site, and so we have an ongoing responsibility to update our models, and to look at our overall source term, so it's not just an academic exercise undertaken at the beginning, and then forgotten about. We use Microshield for the operational doses. Basically, models and codes that are in the public domain, again, for transparency purposes.

Our performance assessment, I note here that Idaho imposed on us, and we accepted a 15 millirem per year standard to members of the public for the post-closure dose. That came from their

wanting to have the same standard apply to us, as is applied to the Department of Energy out at the Idaho National Laboratory. We were comfortable that this would not be an issue. The standard for exemptions is several millirem a year, so we saw no problem in complying with this.

Our bounding case in our model is the, and I note conservative resident farmer intruder scenario, all the business of drinking the cow's milk and the water, and whatnot. It is conservative, but that is our bounding case.

There were some site-specific modifications. We have a thicker trench cap at the site. This for considerations for Radon emanation. That's part of our modeling. We define five vadose zone layers based on site-specific data. We took credit for the three foot thick clay liner meeting the EPA specs, which is underneath the site. We did not take any credit for the plastic liner. We did not feel it would be appropriate to do so, given the limited amount of knowledge of how plastic liners will actually perform over the long term. We don't know yet.

No aquatic pathway applies here. Again, there's no drainage from the site of significance,

nothing onto it. We did not assume a basement in our disposal cap design trying to make this realistic. One cannot really find a basement in that part of the world, and so we didn't think it necessary to model that into the dose assessment.

And, again, we have used this model. The NRC has used it, and reviewed it, and done some independent analysis of their own in terms of looking at different exposure scenarios, and what we may have considered in granting approvals based on this specific model, using this specific site data.

Dosimetry programs in place, you know what those are, I won't go through it. But it was appropriate, in our mind, to put TLDs on all of our employees, not only in the field, but also in the office. Here, our air particulate rate on groundwater soil monitoring, and also, we do weekly swipes for contamination surveys throughout both the controlled area, and also the administrative and office areas.

Waste receipt and release surveys. Again, I don't think I need to spend a lot of time here, but just to note that we do these things. Basically, do the surveying both coming in and going out. Audit and training program, Russ Meyer, who's with me today, is our Corporate Radiation Safety Officer. Russ has

responsibility of auditing this facility independently of the site radiological safety program staff. Russ has a dotted line, direct reporting responsibility to me, as the President of the company. I look at his reports myself.

We also have training that Russ undertakes, and we have the advantage, which is helpful, and actually, the workers have really enjoyed this, I think, of being able to take our staff at Grandview, Idaho, have them go up to Richland, and give them the training that they can receive by being involved and handling Class C waste, and some of the hotter materials, some of the high-dose rate shipments that we handle from the Entergy Northwest Nuclear Power Plant, comparing the experience they have with the bulk materials, versus, say, control rod drives coming into the Richland facility. There's a difference, and it helps us educate our staff on the relative hazards of the material we're receiving.

Some conclusions. The RCRA permit, we believe, works very well for diffuse NORM, as well as low-activity waste beyond NORM. So both the general exemptions, and also the specifically exempted material from regulation for disposal purposes under the Atomic Energy Act.

The NRC's case-by-case authorization process, we think works just fine. You'll have to ask the NRC staff whether or not this has been unduly onerous on them, as a burden. But I would note that, from my perspective, these reviews are leading to actual cost-effective decisions on actual sites, and I would respectfully suggest that that, perhaps, is a more useful application of limited resources than trying to adopt grand national schemes, which may not really change what's happening in the field very much. This, to us, seems like a very good use of resources.

I also would like to compliment what the NRC has done in achieving significantly better coordination than we first experienced in this area two or three years ago, or four years ago, where the different Regions would have different approaches for considering exemption requests, and Alternate Disposal Authorizations. Jim Kennedy and some of the other folks that he's worked with in the Agency have, I think, done a very nice job providing a coordination function with the Regions, so that each exemption request isn't a new adventure.

To be honest with you, when we first started doing this, it tended to be that way. Each region would kind of on its own decide how they're

going to approach this kind of thing. For the generators, for our company, as an operator, it's important to us to have some uniformity to it, some certainty to the process. We can live with most processes, we just like to know what they are.

Other point I would make here on Part 61 performance objectives, and it's been noted earlier, that 61.58 does allow Alternate Waste Classification Systems. We think that's very interesting. It's something to look at for further discussion. But one thing we do note is that 61.58 does reference you back to the performance objectives, including the intruder control. And one of the things I think that has to be looked at very carefully, we draw no final conclusions, but I think it is a relevant topic for this group to consider, is how you grapple with the factor of institutional controls. We've touched on it a little bit with the well, how long are you at RCRA sites? EPA says 30 years, in practice, that's not likely to be the case. Part of institutional controls is who owns the land.

I noted earlier in the case of Idaho, we don't own the land. And there is not a provision right now in our system in Idaho that would allow us to provide that land, to convey it to the government

afterwards. So I think an important consideration to look at is in looking at what is done to take waste to a RCRA site, how is that resolved?

Now one thing I'll note in my last bullet here, to follow-up on that, is Part 61 is a very flexible rule. Our view would be you don't need to change it to do a lot of different things that can expand options, and make better use of options that are before us today.

As I've hopefully laid out, the exemption process is a clear process that's working well right now. It can be used. I draw a line in my mind between where the exemption process ends, and where you start getting into an area where you are looking, indeed, at applying Part 61 in its totality in relationship to the performance objectives.

Now whether or not institutional controls are needed I think is going to depend on the site-specific performance assessment. There aren't that many of the sites in the country that are doing this. There's room for others, of course, to be reviewed. I don't think it's unrealistic to look at these things on a site-specific basis. That will be the most informed risk-assessment at the end of the day, to look at it that way. No reason not to, there's time

to do it. But this is one of the considerations I think that comes into this, is how do we handle, again, this question of where Part 61 starts, and where you're sort of saying the material is not licensed under the Atomic Energy Act for disposal purposes.

Drawing that line between exemption and when you're getting into a license, that's actually completely consistent with the NRC's guide. They have some tables in here that list individual isotopes, and basically says at 10 times these limits, or thereabouts, generally, IEAE says that's an appropriate level for exemption. Above that, you're talking about something different. To us, this is not a bad framework. And, again, when you're going beyond that, when you're going to be applying a Part 61 license, then I think we need to be careful to not to summarily dismiss parts of the overall Part 61 systems framework, such as the institutional controls, without really considering what the risk assessment tells us. And that concludes my prepared remarks.

CHAIR RYAN: Steve, thank you very much. You held up that guidance, said NRC guide. I think you meant IAEA guide.

MR. ROMANO: I'm sorry. I did mean IAEA.

CHAIR RYAN: Okay. Just wanted to make sure.

MR. ROMANO: I apologize for that.

CHAIR RYAN: That's all right. You corrected it later on, but I just want everybody to understand that.

MR. ROMANO: And if anybody –- I certainly have the reference here, if anybody would like that, but it's –- this actually took, I believe, about 10 years for the IAEA to get this thing out. And there's all the appropriate language in here about how individual member states will have their own decisions to make about these things. And that was probably the extra language that took the last five years of the process, but it's useful information.

CHAIR RYAN: One of the interesting things about calculational codes is I think everybody is familiar with RESRAD to one level or another. We heard yesterday from David Esh and others on the staff that they're working on a GoldSim base which gives you probabilistic kinds of capabilities to look at a wide variety of characteristics, both waste, packaging, engineering features, site features, and all of that. So I'm wondering your thoughts on, if you had a tool that would allow you to look at, easily look at a wide

variety of parameters, would that be an asset in the process you've described?

MR. ROMANO: I think it would. I referenced a little earlier, Mike, that we've tried to use models and codes that are in the public domain.

CHAIR RYAN: Right.

MR. ROMANO: I think that's one of the ways you get around the public concern. This has been some black box that's not understood or available.

CHAIR RYAN: Right.

MR. ROMANO: To the extent that there could be models developed that provide an accepted consensus framework to look at some of these other issues, when you consider the system contributions from, as you say, the waste packaging, and waste form, and other considerations, I think it would be very helpful.

CHAIR RYAN: Okay. Thank you. Allen, any questions?

VICE CHAIR CROFF: No, thanks.

CHAIR RYAN: Ruth?

MEMBER WEINER: You've answered all the questions I might have had, Steve. And I'm very glad that you brought up the question of institutional control, and especially consideration of things like

the intruder scenario. So I think that's something for us to think about. But thank you, I have no questions.

CHAIR RYAN: Jim?

MEMBER CLARKE: Yes, just one quick specific question. I have several others, but I think they're more appropriate for the roundtable. Can you pull up Slide 13?

MR. ROMANO: I'll do my level best.

MEMBER CLARKE: Yes, your RESRAD PA. And let me back up and ask one before that. Have you closed any disposal cells yet at your facility?

MR. ROMANO: We've not closed any disposal cells that accepted significant amounts of radioactive material. We will be doing that coming up sometime soon, probably in the next two years. As mentioned, we are required to maintain a minimum –- a larger trench. It's about 3-1/2 meters minimum cap between surface and the buried waste.

MEMBER CLARKE: My question was about the cap, and the cap design. You've got thicker disposal unit cap there. Given your environment, are you going to go with the RCRA cover design, the composite hydraulic barrier, and all of that, or are you –- do you have any interest in evapotranspiration cover?

MR. ROMANO: We are committed to an evapotranspiration cover. In fact, what we actually have done at a --

MEMBER CLARKE: So your PA was for that design?

MR. ROMANO: Yes. And the pre-RCRA trenches actually at the site have been closed. Those have been approved for evaporative cap. We actually had developed a five-acre test plot area. Some of the folks that have done work at Los Alamos --

MEMBER CLARKE: You did a demonstration of equivalency.

MR. ROMANO: We did. We had a five-year demonstration phase. That data was needed. We basically looked at Bromide Salt penetration into the demonstration area, and then used that as our proxy to help us with our assessment.

MEMBER CLARKE: Terrific. I think that's a good way to go. Thank you.

CHAIR RYAN: Okay. With that, Mike Lee has an announcement.

MR. LEE: Quick question. Steve, the expected -- at your current rate of waste receival, what's the service life for your facility, do you think, in terms of waste receipt?

MR. ROMANO: I mean, frankly, with 498 acres left to go, I'll be long gone before we have to worry too much about that, many decades into the future.

MR. LEE: Thank you.

MR. ROMANO: And one last point, if I could just close with, too, is to make the point that on the 61 flexibility, nothing in there prevents anyone from submitting a Part 61 license application for a subset of Class A waste. I mean, that can be done.

I think one of the problems of the whole Compact system was, is that everybody had this obligation to go for Class A, B, and C. And one of the biggest regrets of my professional life in getting the Ward Valley license, is that we wanted to get a Class A license first for Ward Valley. And there were certain generators who generated B and C waste, were just adamant that we not do that, because they were worried they'd be left behind. And we acceded to that, and if I had it to do over again, I would have been insistent that that was a bad way to look at it. And I think if we had gone at it differently, we might have a Class A waste site in California today.

CHAIR RYAN: Thank you, Steve. We really

appreciate your insights from the operational perspective. It's very, very helpful.

Well, last up before our short break will be representatives from the Clive, Utah facility of Energy Solutions, Tye Rogers and Bill House. Oh, Dan Shrum. I'm sorry. The agenda has got the wrong name. Dan, welcome. Good to see you.

MR. SHRUM: I'd like to thank the Committee for this opportunity. My name is Dan Shrum. I'm with Energy Solutions, mostly at the Clive Facility. Tye asked me to give this presentation, but if there are any really difficult questions, he's right in the back, and you can direct those at him.

My objective, or the objective that I was given was to provide a summary of the differences between a RCRA hazardous waste landfill and an LLW landfill, licensed under Part 61. I thought I'd have a little bit of fun with it, since the Super Bowl just ended, so this is going to be HAZ versus RAD.

As I looked at this, there were three main things that I felt we needed to discuss or look at. The first one was the siting objectives. That's the where. The design objectives, that's the how. And the performance criteria, and that's the how long, or the time required for these facilities.

This has already been discussed. This is the what. And, specifically, I think we're focusing our attention for the 20.2002 exemptions. And that's already been discussed, so I won't get into that any further.

I took a little shortcut for myself. We have both of these facilities licensed at Clive. We have a Part B permit, so that we can dispose of hazardous or mixed waste. We also have a license so that we can dispose of Class A. We are only licensed to dispose of Class A. And Steve was just talking about that, and maybe he would –- your facility would have gone forward with the Class A, my experience has been you would have never got the B and C of those, but we definitely have our Class A.

I used the federal regs to look at the RCRA side of it, and I used our state regs because that is how Part 61 is implemented in the State of Utah. That's what it looks like to me. It looks like these state regs.

One thing I do need to point out is that most states, or many states have additional siting criteria for 264. There's additional things that the states add on. I know, specifically, in the State of South Carolina, there's additional siting

characteristics, and also in Tennessee. And then, of course, R 313, which are the state rules, are derived from Part 61.

The first thing we have to look at is the geology. Neither facility can have faults nearby, neither facility should be operated in a flood plain. However, with Part B, it does state that if a facility is located in a 100-year flood plain, or as opposed to how 61 is implemented, you cannot put a facility like this in a flood plain. Of course, that goes to location. Neither facility are allowed to be near salt dome formations, underground mines or caves, then, of course, WIPP. And that's found in the state rules, also.

Now we're looking at all the additional rules that have been –- our siting criteria that we have; that is, you can't site one of these facilities near parks, monuments, recreation areas, areas of scientific, ecological, natural areas, damn failure flood areas, landslide, mud flow, farm land, within five miles of an existing dwelling, five miles from surface water, 1,000 feet from an archeological site, near a recharge zone, groundwater recharge zone, and the State of Utah actually adopted that the facilities have to be above, sited above groundwater that's got

greater than 10,000 parts per million TDS. It cannot be within a five-year travel time, plus 1,000 feet for existing drinking water well. And these are some other groundwater issues. And then the last one that's been brought up by several others is that arrangements have to be made for ownership. And I'm not going to get into that other than that is one of the siting criteria.

Now on the design side of it, we follow the Criterion 6, which says that our facility has to be designed for 1,000 years, minimum of 200, but we've been able to design our's for 1,000 years, to limit the release of Radon. This has been discussed, 40 CFR 264.117, hazardous facilities are more on a 3o-year time frame. And as Dan mentioned earlier, that that may be extended, that may not be extended, but that's what the requirement is right now, that there has to be a 30-year closure. Before the facility is closed, they have to monitor it for 30 years.

I would like to point out, as Steve already did, but we have noticed that some of the RCRA facilities that are receiving this type of material have enhanced their design to become more –- in order to meet the 20.2002, and to get closer to the 61, they have enhanced their design.

We modeled, did some extensive modeling to get to our design for our facility. Some of the things I'd like to point out about our facility is that we're above what's called a Class 4 Groundwater, very high TDS, TDS of around 65-70,000 parts per million. That's twice as salty as the ocean, not as salty as the Great Salt Lake. Salt Lake is very salty, but it's very salty there. We used EPA's HELP model, an Un-Sat H model, and PATHRAE. We've stuck with PATHRAE. It was developed several years ago, but that's what our regulators are familiar with. So before we start or open a new embankment, we go through this performance criteria.

We have site-specific KD values, but if we don't have a site-specific KD value, we use the lowest literature values found to make our model very conservative. We have modeled out to 500 years for the radiological, and 200 years for the metals. Our compliance points are all 90 feet away from the embankment. And we also constructed a test cell to evaluate the parameters and the assumptions made in the model. And the test cell is continuing to operate. It's a challenge, because the test cell has electronic things in it, and our salts don't like electronic things, so that's been kind of a challenge,

but we are getting good data on the infiltration rate through our cover design.

This is what 264.301 requires. It requires a native material or clay compacted and tested to three times –- or one time to the minus 7^{th}, and you have to have three feet of that. We can get that with our clay at our facility. Then there has to be a geomembrane, which on top of it, you have to have some sort of leachate collection system. And then on top of that there's another geomembrane, and another protective soil and leachate collection. And wherever there's a geomembrane, there has to be a collection pipe to collect leachate that goes through the system.

However, 264.301(b) allows for an exemption for landfill not to have a liner system. And this needs to be evaluated, and should be evaluated when a 20.2002 petition is made, is what is the system really –- what was actually constructed? Our Clive facility, we added another protective soil leachate collection and liner system just to –- because it's a mixed waste. Our's actually is a mixed waste facility. And it wasn't required, but we thought that provided an extra level of protection.

This is what it looks like kind of in the field. You can see these are the leachate collection

pipes that go into the ground. This will later be -- this is a cell that's being constructed, and the pipes go in, and we check for leachate on a regular basis. And this is actually how close our monitoring wells are to the landfill. This gives us a good indication that if there were to be problems, and we monitor those on a semi-annual basis.

One of the questions that has come to my mind is, 264 requires that you continue to remove leachate until leachate is no longer detected, and there's really no time criteria on that, so that would be something that would need to be evaluated, because it's not completely against Part 61, but the presence of liquid in your liner system, the way I've been taught Part 61, that could be a problem, because that's not the way a 61 facility - it was designed to have a leachate collection system.

This is what our low-level embankment looks like. First, we start with, we've got some very impermeable clays, and we dig into those clays, about 10 feet. Then we build and install a clay liner system, which allows for some absorption of liquids, for precipitation when that happens. But we're also required under our license, that whenever there are l liquids on the liner system, we have to go remove

them. So we have an ongoing –- during operation, we have to go and remove liquids that collect on the liner system so that liquids aren't collected.

We then place waste in two-foot lifts, and compact it, and build up the waste column. Then we have two clay liners. The first one is a Radon barrier. It's built to 10 to the minus 6, and then we have an infiltration barrier, which is also clay, which is 5 times 10 to the minus 8 centimeters per second. After that is built, then we have our cover system. And we do not have a vegetative cover, because we can't get anything to grow out there. Also, our analysis has shown that a rock cover system meets the criteria for Part 61 to be able to take this out for 1,000 years.

Very quickly, we have a drainage layer, a Type B filter. We have what's called sacrificial soil. This was built to protect the clay. It's a freeze/thaw barrier, and we modeled that, and been able to demonstrate that that thickness will prevent the clays from going through a freeze/thaw cycle, because that will affect their permeability. We have another filter, and then we have Rip Rap, and the Rip Rap is large cobble-size rounded material that we have located at our facility.

Add to this how we did the RCRA part of it, and that is, we have the leachate collection systems at the bottom. Of course, those were installed before, but for better effect to put them in at this time. Anyway, with the three leachate collection. And this, to me, is possibly the biggest difference in the principle, or the conceptual thought of 61 versus RCRA; and that is, a RCRA tries to contain the water, and a Part 61 should shed the water. So don't let it get wet in the first place. RCRA allows - this is my opinion - but RCRA allows it to get wet, and to be contained, and Part 61 doesn't want it to get wet in the first place. So in order to prevent the bathtub effect, we had to put another geomembrane in the cover system that was at least as impermeable as the liner system.

Another difference, to me, is 61, because it has such a long time frame associated with it, we've worked very hard to prevent any voids in the disposal embankment, cracking of the cover system. If you had differential settlement, you could get cracking, and so we had to meet a 90 to 95 percent compaction of everything that we place in the cell. We do settlement monitoring before we close the cells up so that we can get the differential settlement out

of it, because, again, this was designed in our conceptual model for a longer period of time.

One of the requirements in 264 is that if you put it in the cell, this is a RCRA rule, put it in the cell, you have to monitor for it. I don't know if additional monitoring would be necessary for a facility to look at the RAD. At our facility, we do look at the RADs, because our license requires it, but that is something that should be considered; or, in many cases, most of these things aren't that mobile, and you could probably be able to justify not doing the monitoring for the radiologics.

Is employee monitoring necessary? This is required in Part 61, or in our rules. These are very low-dose things. Maybe that's not necessary. We do, however, do quite a bit of monitoring. This is our facility. This is our LARW embankment, and this is the one that we've closed. This is the vitro embankment, and it was closed by the Department of Energy and the State of Utah back in 1988. This gives you an idea of the monitoring we do. We have 29 air stations, 67 soil stations, 9 vegetation stations, and 89 groundwater monitoring wells to evaluate the performance of our facility. And turn it over to Bill. I'm assuming you're on here. Oh, would you

like to ask me any questions?

CHAIR RYAN: Why don't you go ahead and both finish, and then we'll go from there.

MR. HOUSE: Okay. Thanks. Good morning.

CHAIR RYAN: Good morning, Bill.

MR. HOUSE: Thanks for this opportunity to give a little perspective on low-activity waste, and waste disposal evaluation methods.

As our later speakers have been saying, we've talked about most of these things throughout the course of the working group yesterday and today. Each facility, licensed, or exempt, or otherwise, has their own waste acceptance criteria. Those things certainly need to be met, and it's a lot of cases, a case-specific evaluation on some waste packages, waste shipments, and waste streams. And that's consistent with these alternate methods for approval, and the 20.2002.

These factors are common, I think, to whatever level of waste that we're speaking of, greater in Class C down to - I learned a new term from Mike Mobley, NAW, no-activity waste. And, so, you have to –- you need to consider these things. The quantity is really more important, overall, than a specific concentration. The waste forms and the

packaging certainly affect the abilities of the materials to be contained. And as we know from Part 61 evaluations, it's a whole systems approach, and you need to look at the natural and engineered features provided by the site. And one key criteria is what are we protecting to? What are our standards?

These things, I think, are consistent with what Dr. Esh talked about yesterday. And that concept could be expanded, should be expanded to consider a wider range of applications for disposal evaluations.

So some specific cases here that we have had at Barnwell over the years. And each one of these cases did not specifically meet the waste acceptance criteria, as it was written, and the procedures that were written to classify the waste. The first one, there was a reactor pressure vessel that had one curie, basically, of greater than Class C material, if you only looked at that small amount and concentration of that small amount. The overall RPV had 10,000 curies in it, so we were able to average over enough materials internal to that RPV and the state allowed acceptance of that material.

In core detectors, this particular batch of detectors had high concentrations of Nickel-63, and we are required to classify and characterize on each

type of metal that's in an irradiated hardware shipment. So this 3,100 curies was slightly above the Class C concentration limit, if characterized using only those materials. Allowing an average over the entire shipment, even though they were different metals, allowed the 9,000 curie shipment to be acceptable.

Down on the lower end of the spectrum as far as quantities, this fraction of a gram of TRU didn't meet the averaging concentration limits in that compacted puck, so with additional packaging inside a high-integrity container, it was deemed to be acceptable.

Americium source 50 millicuries, it was packaged in two encapsulations inside of a high-integrity container, and then with that robust packaging deemed acceptable for disposal at Barnwell.

We've made some other changes to the processes that we use, and ways that we do business that are risk-informed methods. The disposal site license requires that waste be ready for disposal, and properly packaged as it arrives at the site. However, for transportation considerations and ALARA considerations, we're allowed to receive some contaminated pumps and piping, et cetera, and then do

the encapsulation at the disposal site. That allows use of traditional and standard casks for transport, and allows the materials to get here meeting DOT.

We're now allowed to segregate waste classes, A-unstable waste, from A-stable, B and C by individual bulks, where Part 61 specifically says separate trenches. Especially with the lower volumes we're facing and receiving these days, that helps with overall operations.

We're allowed to average for our steam generators RPVs, et cetera, over the internal metals, and the grout-fill when that's used, so that certainly helps with the classification of those large components. Also, the shell of these large components have been structurally assessed, and they meet the structural requirements that are equivalent to our concrete disposal vaults, so they're acceptable as the vaults.

When there odd-shaped pieces from power plants, typically, we are allowed to design specific vaults that meet the size of those components coming in, and get approvals from the state, again, for those things on a case-by-case basis for disposal of the individual components there. Sometimes these are -- these vaults and the components are put in the vault,

and then encapsulation is required, and we do that encapsulation right in the vault, sometimes.

What are some considerations for risk-informed disposal evaluations? Primary topic at this workshop is low-activity waste, and I think we need to consider reasonable assessment methods. I was involved with a decommissioning of a small facility in Columbia, and the licensee literally spent more time and effort doing the final survey for gridding, dose rates, cores and concrete, et cetera, than they did removing the known contamination that was already identified before this final survey was done. And this was -- the final survey was done to insure that when they rubblize the buildings and so forth, that there would be nothing there of any consequence.

This same facility, they transported the waste probably 80, 90 miles into an industrial landfill for disposal. So the state regulatory agency was all on board with that, and accepted that as a method of disposal.

Sealed sources. We have a situation now with current requirements. A 55-gallon drum can only hold 30 curies of Cesium and meet the acceptance criteria. There are some larger sources out there that need to be secured, that need to be disposed. In

my opinion, they're better encapsulated and disposed than left in a closet somewhere. So there's a number of ways that we can improve the packaging, and, therefore, improve the overall site assessment for larger sealed sources, and being able to dispose them.

Irradiated hardware. We've got two controlling radionuclides in the longer term, Niobium and Nickel-63, and we need to give some consideration to the intruder scenario. We saw Dr. Esh's sketches yesterday. A Part 61 site has a 100-year institutional control period, and yet when we do this intruder scenario, we consider that at year 101 there's going to be no acknowledgment that a disposal site ever existed there. And that's contrary to the evaluation that's done when we also say we're going to have the latest and greatest John Deere tractor up there plowing and excavating, and modern drilling equipment to drill into the waste. So we need to take a look at that, and consider that the site is going to be recognized for much longer than just the minimum institutional control period.

The bottom line is this; we need to consider that ALARA applies to everybody throughout the entire process. I've categorized the groups that actually get real dose doing this work, and managing

the waste. We do our best to minimize the public dose during operations, but then we go into this hypothetical evaluation on a person having a well at the compliance point drinking two liters a day, and all the things that go into evaluation of long-term site performance. So we need to consider that we shouldn't trade large amounts of real dose to workers now for some potential dose out into the future, including the intruder scenario that I mentioned earlier.

CHAIR RYAN: Thank you, Bill.

MR. HOUSE: Thank you.

CHAIR RYAN: Allen?

VICE CHAIR CROFF: No, thanks.

CHAIR RYAN: Okay. Ruth?

MEMBER WEINER: I have one question for each of you. For Donald?

MR. SHRUM: Dan.

MEMBER WEINER: Dan. Do you really get leachate at Clive? I mean, I've been there and it never rains, and it's just -- and yet all this leachate.

MR. SHRUM: We actually get leachate in our RCRA cell that we have to manage. We do monitor for water going through our -- I didn't show it in the

design, but we have collection lysimeters in the site, and we do not get water in those. But because of the design of our Part B facility, we get a little bit, not very much. We don't get any in the two lower pipes, but the one right where the waste is, you can get a little bit of water.

MEMBER WEINER: That's interesting. Thank you.

MR. SHRUM: Sure.

MEMBER WEINER: For Bill, this is a more general question. I'm intrigued by your last comment about –- because this comes up all the time. Trade-offs between current occupational dose and some long-term hypothetical. If the way that you monitor and regulate your site –- well, how could you make it more risk-informed, and would making it risk-informed alleviate that trade-off?

MR. HOUSE: Well, we do a lot of site-specific and case-specific evaluations for waste coming into Barnwell, and the regulator is not only involved in the initial approval of the processes that we use, they're involved throughout. For example, the State of South Carolina approves every Class C waste shipment that comes into the site. They have for quite a number of years, so they stay involved, and

know what's going on, and what waste are being accepted.

If we applied some of these concepts that we've all talked about of risk-informing waste classification systems, that could allow disposal of more materials, at least the higher end materials, at a licensed Part 61 site, and minimize collectively some public dose, maybe.

The realistic, as realistic as we can make it, modeling for future potential dose to the site should be done so that we can see what's actually going to happen as best possible. We build in all the conservatisms to get acceptance sometimes. The fact that a person is going two liters of water per day, he's not going to drink any soft drinks, he's not going to drink the bottled water, it's all going to be from that one single source. So all these subservitisms are built in in the classification system of the waste right on through to the projection of hypothetical dose. So if we go more realistic about that, we would be able to manage more waste, and hopefully provide ALARA for the entire population.

MEMBER WEINER: Thank you.

CHAIR RYAN: Jim?

MEMBER CLARKE: One of the things we've

learned is the difference between average annual rainfall and episodic events is pretty important in designing these facilities. And that's the –- some of the ET caps have suffered from not looking at what can happen in one big gully washer. I did have a question for Bill.

In looking at your first slide, and the NRC Reg 20.2002 has come up a number of times, and it seems to me it's an important piece of all of this. And I wondered what your experience has been with it.

MR. HOUSE: I've been involved in a few of those specific requests, and also some similar requests; the one I spoke of earlier with the facility in Columbia being decommissioned. It was directly involved with the State of South Carolina, so it wasn't –- the same scenario was used.

We've heard a good bit about the Big Rock Point decommissioning project in the last couple of days. DuraTech was a contractor on that project. And, again, the conservatisms were significant as they were built into this assessment. The actual man-made radioactivity limit was set at 5 picocuries per gram, and that's how the assessment was modeled, or the source term was modeled. But, in reality, the concentrations were much less than that.

Also, the Big Rock Point case was considered for two or three locations for disposal, and ended up in the landfills closer to the decommissioning location, so transportation is a important factor. We used the 1 millirem per year dose limit, and it turned out to be a fraction of a millirem for not only the drivers of this load concentration material, but also the landfill workers. And those drivers are not going to feel that 1 millirem per year, even if they got that much, but they sure would feel it when a truck accident happened. So we need to have some consideration that dose is there, we've got to protect people from dose, but look at overall hazards.

MEMBER CLARKE: Thank you.

CHAIR RYAN: Dan, one last question for you. You've had probably the longer experience at Clive with two regulators and two, at least two substantial permits and licenses coming from different, perhaps, technical perspectives. Could you just give us a quick summary of how that's working, and how - if it is working well now, how you keep it on track? And how do you deal with two simultaneous regulators?

MR. SHRUM: It works very well. One of

the things we do is we meet with both of them in the same room, because they'll come up with –- they're coming at it at different approaches, so I think it's worked very well. There are some design things that we've had to work through that we had to get either creative with, or had to come to the realization that something had to give, but we typically have fallen to the Part 61 side, because it's always more conservative. There's some things that –- we'll, I'll give you an example. The bathtub effect - we got to the point where actually it wasn't the regulators, it was their consultants, said this isn't going to work. And we said okay, after 30 years we'll go poke holes in the liner, will that make you happy? Well, of course not. That's not what we want. Then what are we going to do? And that's where we came up with a slightly different design on the cover system. It's worked very well.

CHAIR RYAN: There are challenges, but if you've got them all at the same table at the same time, it seems to go forward, huh?

MR. SHRUM: And they're cross-trained with each other, so it's worked very well.

CHAIR RYAN: Thank you. Those are helpful observations. Appreciate it.

MR. SHRUM: Okay.

CHAIR RYAN: With that, we will take our morning break, and we will start promptly at five minutes of 11.

(Whereupon, the proceedings went off the record at 10:41:36 a.m., and went back on the record at 10:55:39 p.m.)

CHAIR RYAN: While Allen is making his way back, the rest of our morning is going to be taken up with two presentations from the Deer Trail in Colorado, and Button Willow in California facilities. From the Clean Harbors Company, Phil Retallick will be first up. Following Phil will be Bill Dornsife from Waste Control Specialists, so I think this morning we've heard from a very good array of both regulatory folks, and now folks that are actually in the business of managing these wastes, and these practical and operational insights are very, very valuable to the Committee, so we appreciate everybody's participation this morning.

I guess Allen will catch up in a minute. Phil, I'm going to turn over the microphone to you, please. And if you'd go ahead, we'll jump right in.

MR. RETALLICK: Thank you, Chairman.

CHAIR RYAN: You're welcome.

MR. RETALLICK: Thank you, everyone. Good morning. I'd like to acknowledge two other colleagues from Clean Harbors that are with me today; Mr. Scott Zoller, who is our Radiation Safety Officer and Corporate Health Physicist, and Industrial Hygienist with the company, and Mr. Frank Ferratti, who's our Vice President of Business Line Management. He has responsibility for many of the projects that go into these sites. We appreciate the opportunity to be before the Committee to share some advice, counsel, and wisdom of what we learned going through the process.

We are going to talk about just a short primer and case study of two landfills within our six landfill system within Clean Harbors. Clean Harbors has six Subtitle C landfills, one is captive to the Deer Park Incineration facility in Texas. We have five other facilities that accept waste from all varieties of commercial sources. We have approximately 45 million cubic yards of permitted but unused capacity remaining within the corporation, so we have a significant amount of assets here that can be put to good use, both for our hazardous waste management generators, as well as for any future low-activity waste generators who need a safe and reliable

means of disposal.

Our Button Willow, California facility is a long-established facility. It's located in Kern County, which is outside of Bakersfield in the northern part of California, north central. It is a semi-arid environment. This facility has multiple cells, both hazardous and non-hazardous. They're RCRA MTR minimum technology requirement designed cell. As you've heard Steve Romano and the folks at the U.S. Ecology, and our folks at Energy Solutions talk about their cell designs. We're similar in many respects. It had a start-up date in 1982, about 320 acres in size. We have in excess of 10 million cubic yards of permitted capacity at the site, and our current constructed landfill capacity is about 950,000 cubic yards. We just built a large MTR landfill cell at this site last year.

Here's an overhead view of the facility showing a number of different cell configurations. You'll see in the lower corner here, the WMU series of cells. They are non-hazardous cells for some of the CAL HAZ waste.

CHAIR RYAN: Excuse me, Phil. If you need a pointer, there's one right there on the mouse pad.

MR. RETALLICK: Oh, thank you very much.

CHAIR RYAN: No, no, no. It's the little stick there.

MR. RETALLICK: Okay. Great. Thank you.

These cells are primarily non-hazardous cells. The large cells here you see are our active and inactive cells for RCRA hazardous waste management. This has a very high evapotranspiration area here. We have very little rainfall in this area. The geology in this area is primarily clay, silty, with very little sand lands. Groundwater is very deep, an ideal location for RCRA hazardous waste management facility, and also a site that could equally manage low-activity waste. And we do handle NORM waste at this facility.

It has numerous approvals from California EPA, the Department of Toxic Substances Control. In California, the counties play a very vital role in the regulation of all landfills, both municipal, solid waste, RCRA, and industrial waste. And that's one consideration I think as the Committee moves forward, that there is another stakeholder in this process, and it's the county governments. They do play a major role, particularly if they issue conditional use permits, which mirror in many ways the RCRA permit that we get from California EPA.

We have an excellent relationship with the Kern County Board of Commissioners, and their Planning Department, and we work very closely with them. And I think that's a consideration that allows us to take NORM and TENORM at the site.

In terms of construction, the site has a one and a half foot thick protective soil layer. We have a typical MTR, we call it RCRA minimum technology requirement standard design with multiple geosynthetic liners, coupled with clay liners, permeability at 10 to the minus 9th in this case for our base liner. We have a secondary leachate collection and removal system similar to what U.S. Ecology and Energy Solutions has at their cells. We also have a three foot thick clay liner with a permeability of one times 10 to the minus 9th, and for the purposes of management of the NORM materials, there the DTSC has considered that to be an equivalent liner for the perspective of controlling Radon gas.

We have radiological materials acceptance limits in our RCRA permit, and in our Kern County Conditional Use Permit. We're limited to 1,800 picocuries per gram of NORM and TENORM. We don't have any specific isotopic limits for this particular landfill. This landfill has been receiving NORM and

TENORM waste since the late 80s. It has received primarily oil and natural gas in geothermal energy generation scale.

There are several areas within California where geothermal energy is becoming quite economical, and certainly a mainstream for alternative energy. As a consequence, these types of geologic steam generating formations with hot water do generate significant amounts of NORM and TENORM that need to be managed.

That site has had its share of controversy through the years as a result of management of some 11(e)(2) material from the east coast, from the Lindy project in New York. There was some concern about the receipt of FUSRAP waste, 11(e)(2) waste there with very, very, very low man-made components, primarily Cesium-137. But as a result of negotiations with some local environmentalists, and with the Kern County Board of Commissioners, and the DTSC, the Department of Toxic Substances and Control, we're still able to accept 1,800 picocuries per gram of NORM and TENORM at that site.

We typically average between 2-3,000 tons NORM and TENORM. It's primarily voluntary. There's really no rules or regulations compelling the oil and

natural gas industry to bring it to us, but they do. And I think it's becoming more in the vein of social responsibility that the larger oil, natural gas, and public utility companies are beginning to voluntarily seek out disposal. And we're seeing that at our Colorado facility, as well.

The more intriguing site is the Deer Trail facility in Colorado. This site is located approximately 80 miles east of Denver. It's located in the proverbial city of Last Chance, Colorado. I love to refer to that. You see it when you fly over on your United Airlines map as you're heading toward the west. The facility opened up in 1991 under BFI. It's been through numerous owners. We acquired it in September of 2002-2003 time frame when we came over as Safety Clean. And then, of course, then it was purchased by Clean Harbors Environmental Services.

It's a very large site. It's a one square mile site. Of that, about 325 acres are permitted for the RCRA purposes, for RCRA Part B. It has a very large capacity. It has a permitted landfill capacity of 2.7 million cubic yards. Current amount of unused capacity, 2.25 million cubic yards. This has numerous cells, MTR cells, primarily. You can see here that we have a couple of cells. We have actually three cells

here. There was a closed cell, almost closed cell, and a new cell that we constructed, Cell Three. This Cell Three has about 500,000 cubic yards of capacity.

Cell three is the cell that we have designated to receive NORM and TENORM. And that was through the licensing process with Colorado Department of Health and the Environment. It is a mixed waste cell. It can handle RCRA, PCB, megarule waste, and NORM and TENORM waste.

We decided to apply for a license to give us flexibility for managing the Denver Radium waste site. These were materials taken from the Denver streets from historic use of Radium tailings for base rock under the street, so we took advantage of being at the right place at the right time where they were completing that project, and we were able to take about 25,000 tons of that project into the cell as part of the license.

We also have a RCRA Part B permit. We originally started out going down a path of getting a RCRA Part B permit modification. It would have been a Class 3 modification, handle NORM and TENORM. But as we evolved into the discussions with the CDPHE, we decided the best approach would be to go for a license under their Part 14 requirements.

We think for the purposes of flexibility in accepting NORM and TENORM, and other potential non-man-made waste, even above-source material levels over time, it would be better for us to operate under a license. It gave us a lot more of an open communications role with the Department, and with the people who live in the area. And I'll get into community relations, because that's a key component of this. We also have a waste water discharge permit, but because we're in an arid environment, we have very little discharge.

The construction of our cell is primarily similar to what you've already seen. I won't spend a lot of time on this. We do have, in addition to a leachate collection system, a sump leak detection and removal system, so we have basically a U-tube under the cell that has sensors and monitors in it to detect if any water gets by our liner system, our redundant liner system, or gets into the sub-surface area where our secondarily clay layer is right here.

It's a robust system. We've had no issues with it at all. We have 72 monitoring wells around the facility. It's very hard to get water in the wells to monitor. That's an issue, of course, because of the semi-arid environment.

For the purposes of the design of the system from the license perspective, particularly with the cap, we did arrive at a RCRA cap component coupled with an additional two to three feet thick layer of clay to act as a Radon cap on top of the existing design that we have.

From a financial assurance perspective, we did negotiate an extended 100-year financial assurance program with the state. We worked closely with Zurich International, our AM Best A-Rated underwriter to assist with that. And really, I thought from the beginning that would be an issue, but it wasn't one. Zurich understood the terms and conditions of the license. So I think from the perspective of the financial assurance side, if you explain what you're doing, if your regulators are there with you, you can easily, I think, get the financial assurance that you need.

This is just a cross-section of our landfill design. This site, incidentally, is a unique site because back in the late 80s, this site was primarily one of the sites that would have been selected to be a Regional Compact site, because of the sensitive aspect of looking at good geology. This site has 4,500 feet of unweathered Pierre shale. It's

a soup bowl. Combined with the fact that we don't get any rain, this is a site that you could have used without an engineered liner system for a Part 61 landfill facility, so it's got a lot of redundancy built into it, plus there's very little sensitive receptors that need to be concerned about from a groundwater transport pathway.

Here's a picture of our new cell that we constructed with the liner. You see the Met tower there, meteorological tower. We had to do 12 months of monitoring before we were able to obtain our license. As part of the license requirements where they're set forth in the materials license, we're limited to typical source material, 0.5 percent by weight of Uranium Thorium, that's our upper limit. Total activity, 2,000 picocuries per gram of NORM and TENORM. We have a Radium-226 limit of 400.

Most of the material that we're seeing coming to us is in the form of the large-scale project we did for Denver Radium. We've gotten some waste from some of the colleges and universities that do a lot of mining and minerals beneficiation projects. We're seeing a lot of interest from the drinking water residue folks who are looking for a safe and secure disposal site for their materials. And with the

advent of $100 a barrel oil, there's a lot of tertiary recovery going on at oil and gas wells. We're seeing a lot of interest for oil and gas disposal, typically drilling muds, cuttings, and scale.

If you look at the process, it was about a 15–month process to go through from the very beginning when we had our first public information session with the community to discuss what we intended to do with the site from a permitting and licensing perspective. That began in September of 2004, and it ended in December of 2005 with a CDPHE license. But in-between that, we found working with the CDPHE, it was very, very important to have community outreach sessions on a very regular basis, coupled with the fact that CDPHE did something I thought that was very innovative. They actually put on radioactive classes, the Theory and the Practice of Radioactivity. They held three separate classes for the community, and one of their health physicists, Phil Lagiti was the teacher. And we had pretty decent –- when you consider that the population in the area is one to two people per square mile, you'd have 40 or 50 people show up at the local school, and he'd put on a class on "What is Radioactivity? What are the hazards? What are the misconceptions, or myths about it? What is NORM and

TENORM? How is NORM or TENORM treated in the environment today? Why is it necessary to have a disposal site for NORM and TENORM", et cetera. I can tell you that that took many of the fears of the community away.

We were very adamant that we weren't going to handle man-made waste at this facility. This was targeted for the needs of the State of Colorado and the western slopes of the Rocky Mountains. We got through the process, and I've got to say that between getting the license and working with the Compact, this was the first time this Compact had ever designated a site. And I've got to tell you, there was some storm and drag going on with the Compact, but we were able to get through that, as well, and get our designation. So the process, surprisingly, went very fast, but I think it was due to the fact that we spent a considerable amount of time up front working with the community.

So, in conclusion, we've got two facilities now within our RCRA suite of facilities that handle NORM and TENORM. The sites are located within excellent geography and excellent geology. Our cell construction was accepted in both states, California and Colorado, for the purposes of handling

NORM and TENORM. We were able to, I think, work very closely with the RCRA and the RAD people in Colorado, working collectively. And they admitted to us this was the first time they really got together to talk and converse on how we should go about doing this, and were able to satisfy most of their concerns under the RCRA MTR requirements.

And we think based upon our discussions with the state that this type of facility, the way it was designed, and how it was licensed, it could be a prototype, and the process could be a prototype for the Committee moving forward as they determine what would be the best approach to allow more low-activity waste into a RCRA facility.

This site has had a little bit of political controversy. I'm sure you've read about it in the press. We're still involved in some litigation with the local county that issued us our Certificate of Designation, but I think that is par for the course. I think you're not going to get through this without a little bit of scarring. But as we stand now, we received about 35,000 tons of waste from a variety of different sources, and I would suspect over the next couple of years, between the drinking water residue, and also the oil and natural gas development,

we're going to see a considerable amount more. So with that, I'll open it up for questions.

CHAIR RYAN: Phil, thank you. On your Slide 13 you showed the profiles for the site construction. I just noted you have both an 80 mil HDPE and a Claymax or a Bentonite impregnated fabric.

MR. RETALLICK: Yes.

CHAIR RYAN: Is that a belt and suspenders approach?

MR. RETALLICK: Yes, it is, definitely.

CHAIR RYAN: Okay.

MR. RETALLICK: Of our landfills, primarily the newer landfill cells that we're constructed, we're going to that older design that we've used throughout the years.

CHAIR RYAN: And that's –- I mean, my own reckoning on that is it really helps you overcome any challenge to the HDPE lifetime.

MR. RETALLICK: Absolutely. We know that for –- even for the RCRA waste, we have some arguments that the little bits of solvent that get in there will break down that liner. But having that additional Bentonite clay geotextile membrane is a big plus, and it's a big plus for NORM and TENORM waste disposal, as well. Maybe other LAW.

CHAIR RYAN: Gotcha. The other question that comes up always in my mind, the oil field waste, the NORM/TENORM kind of mix, and whether it's pipe, scale, or slag, or whatever it might be. How do you get to 2,000 picocuries per gram? What do you add up? Do you add up all the individual radionuclides, including the short-lived ones, or is it just the key radionuclides? How do you get there?

MR. RETALLICK: My health physicist, Scott Zoller, is working on that process right now.

CHAIR RYAN: Right.

MR. RETALLICK: Scott, go ahead and address that, if you would.

CHAIR RYAN: Scott, would you mind just coming to a microphone and tell us your name, and all that for the record, and let us know what you're doing.

MR. ZOLLER: Scott Zoller with Clean Harbors. The decision analysis included the daughter progeny, so those are included in the 2000 currently.

CHAIR RYAN: So what do you do, for example, if you get a waste that's not in equilibrium, but soon will be?

MR. ZOLLER: You assume –- we currently assume equilibrium.

CHAIR RYAN: You assume it's going equilibrium, so you have a little bit of conservatism built in your radionuclide inventory.

MR. ZOLLER: That's correct.

CHAIR RYAN: While you'll always be at least even with what's really there, or conservative as you receive it, but it's never going to grow into something more than what you have accounted for. Is that right?

MR. ZOLLER: That's correct.

CHAIR RYAN: Okay. Great. Thanks. That's very helpful. Allen?

VICE CHAIR CROFF: No, thanks.

CHAIR RYAN: Ruth?

MEMBER WEINER: Would you see the need -- well, let me put the question slightly differently. What would be the advantages or disadvantages of having some kind of federal generalized standards that you would have to meet?

MR. RETALLICK: Well, I'm going to look ahead 10 years. I think we're going to have an explosion of low-activity waste coming from geothermal, oil and natural gas, the development of property along the western slope and the eastern slope of the Rockies. We're already talking about a light-

rail transit system out there, where we know that the environmental assessments are pointing toward NORM, that will have to be removed to do the cuts for the track locations and such, and we've already been in communication with the transportation authorities and the state about the need for disposal for that.

I think what's going to happen is the technology of monitoring and assessing is caught up, and the need to dispose of the material will be great. So I would like to see a bit of a federal overlay. I think it's good. I mean, listening and talking to my colleagues over the past couple of days, it may be radical, but I wouldn't mind seeing a couple of RCRA waste codes being added to RCRA that dealt specifically with LAW, because the RCRA waste code system has been in place for 25 years. The states are used to accepting a RCRA waste code, how your permits are amended to adopt or add new waste codes. So if the NRC and the RCRA folks could coordinate on development of a code system similar to what we have with RCRA, it would make it much easier, I think, for facilities like our's to be able to modify our permits to take this type of waste, because it's something the public understands. They understand the process of RCRA, and how it works.

So, yes, there's many different ways to skin the cat in terms of how you would want to modify it, but I think you've got to be careful about keeping a patchwork quilt, because the patchwork quilt in RCRA didn't work until we had the LDRs in place, until we had a more rigid authorization system for RCRA going to the states. And I'd like to see a bit of a standardized overlay.

MEMBER WEINER: Thank you.

CHAIR RYAN: Jim?

MEMBER CLARKE: In the talk prior to your's, we saw what I thought was a nice comparison of the regulations between RCRA and Part 61. And I think you addressed that to some extent. I wonder, did you go through that analysis as you were putting your application together?

MR. RETALLICK: We did not, and I thought we would have to, but we were dealing with very informed regulators. They had the experience of talking to the Idaho regulators, and the U.S. Ecology's permitting, plus Energy Solutions. They learned from that. And they felt that for the purposes of managing NORM and TENORM at the limits we established, that RCRA Subtitle C was a very robust, protective system.

MEMBER CLARKE: The reason I asked is because I think one has to do that analysis within a site-specific context. I just wondered if you had done so.

MR. RETALLICK: No, we did not.

MEMBER CLARKE: Thank you.

CHAIR RYAN: Anything else?

MEMBER CLARKE: Not from me.

MR. LEE: Yes. Phil, have you all done any kind of, I don't want to say performance assessment, but safety assessment to evaluate how you think your disposal system is going to behave, a la what we heard from Steve at the Grandview facility, vis a vis --

MR. RETALLICK: Actually, we did a fairly -- working with Dave Moeller and Associates, our health physicist and nuclear consultant, we did a fairly robust performance evaluation looking at intruder scenarios coupled with unusual climatological changes, because we do sometimes get a 25-year storm event out there in the eastern part of Colorado. And when we came through with all the scenarios in the modeling, we were very safe, 10 to the minus 6^{th}, 10 to the minus 5^{th}, for the most part.

MR. LEE: Okay. Thank you.

MEMBER CLARKE: If I could --

CHAIR RYAN: Sure.

MEMBER CLARKE: -- just follow-up on that. Is snow melt a major factor out there, as well?

MR. RETALLICK: It has been. That's a very good point. It has been, because the area is not immune to getting snow storms. And the largest snow storm event out there has been about two feet of snow over the past 25 years. And, so, when you factor that in, that's one reason we have the leak detection sump at this facility. It's not completely arid, and we also have leachate storage containers, large leachate storage tanks at the site to be able to accumulate leachate.

Most of the time, our leachate is used as a spray control for dust on top of facilities. It's a dusty environment. You do have windblown sand, silt, and soil in that area.

MEMBER CLARKE: So you test it, and then you can use it for irrigation.

MR. RETALLICK: Yes, we can.

CHAIR RYAN: Well, that sounds like it answers what you've run up earlier, Jim, on episodic events.

MR. RETALLICK: We modeled for those, as

well. We did model for those, as well, and the state found they were acceptable risk.

CHAIR RYAN: That's great. Well, Phil, again, these practitioner insights are very, very valuable to us. We appreciate your coming.

MR. RETALLICK: We appreciate the opportunity to come and speak with the Committee. Thank you.

CHAIR RYAN: That's great. Thank you.

Next up is Bill Dornsife from Waste Control Specialists, Andrew County, Texas, or Anderson County, Texas. Sorry.

MR. DORNSIFE: Andrews.

CHAIR RYAN: Well, it says Anderson on my thing. I thought it was Andrews. I said it right, but then I read it off the sheet.

MR. LEE: Freudian slip.

CHAIR RYAN: Oh, well.

(Off the record comments.)

MR. DORNSIFE: Well, it's a real pleasure to be invited to address you all for another time on this issue. I've been dealing with this low-activity waste issue for over 10 years, and probably have done some very innovative-type things in order to build our business on this issue. So if I get passionate about

it, please excuse me.

There's been a lot of interest in the differences between a RCRA disposal facility and Part 61 in terms of some of the requirements. You've heard about siting. These are really more of an overview, captures, I think, some of the more important issues that are different between the two regulations.

First of all, as you've heard before, RCRA requires a minimum of 30 years active maintenance, versus five for Part 61. So at a surface glance, RCRA is better than Part 61 in terms of active maintenance requirements. And we've also heard that it's very unlikely that 30 years, when you consider leachate collection and detection, 30 years is really going to be the time when somebody reasonably walks away from a RCRA facility. So it will probably extend beyond that 30 years, just like active maintenance for Part 61 could well extend beyond five years.

RCRA requires deed restrictions in terms of future use of that facility. Part 61 is really silent on that issue; but, obviously, it gets addressed by government ownership to a great extent. Many RCRA facilities, including our facility, has a five meter engineered cover which automatically satisfies the intruder protection requirements under

Part 61.

The RCRA facilities have to meet very prescriptive design requirements, and we're talking about double liners, leachate detection and collection system, which, obviously, although for the short term they're very helpful, obviously, in terms of preventing releases. And people typically, when you do performance assessments on these facilities, and I have, you don't credit, obviously, for those engineered facilities –- for those engineered design features with the exception, possibly, of the three feet of clay that's required as part of the liner system. But in terms of the plastic liners and others, you don't take credit. But, realistically, you can probably expect they'll survive for about 100 years, at least. And many of these radionuclides we're talking about, unlike the hazardous constituents, will decay away in that time frame.

There is –- and, obviously, Part 61 has no facility design requirements, in reality. RCRA facilities –-

CHAIR RYAN: Bill?

MR. DORNSIFE: Yes.

CHAIR RYAN: That's not quite right. There are technical specifications and –-

mR. DORNSIFE: But in terms of prescriptive design requirements like RCRA, there are none.

CHAIR RYAN: There are performance objectives, though.

MR. DORNSIFE: Yes.

CHAIR RYAN: Okay. All right.

MR. DORNSIFE: They're pretty vague. And having fought that battle, Mike, as you're well aware, with our Pennsylvania facility, they objected when we tried to include engineering.

CHAIR RYAN: That's why I'm smiling, too, Bill. You had a different story then.

(Laughter.)

CHAIR RYAN: You know, I think just for everybody's benefit, the regulation says, and I'm quoting: "But institutional controls may not be relied on for more than 100 years following transfer of control to the disposal site owner." And the Commission determines the institutional control period, it's not five years. I'm reading from the Reg, 61.59.

MR. DORNSIFE: No, I'm talking about active maintenance, not institutional control.

CHAIR RYAN: Well, that's part –-

mR. DORNSIFE: I'm talking about just the active maintenance.

CHAIR RYAN: It's called the closure period in 61.

MR. DORNSIFE: Well, it's called –-

CHAIR RYAN: That's a different concept.

MR. DORNSIFE: Active maintenance is what it's called.

CHAIR RYAN: Okay. I think the point, though, that you're confusing is that the Commission or an Agreement State could specify anything up to the 100-year period.

MR. DORNSIFE: Oh, absolutely. I'm just saying what the –- the minimum that the regulations require. Okay?

CHAIR RYAN: Right. Thanks.

MR. DORNSIFE: For RCRA, obviously, there's no requirement for long-term government ownership. But, as you're well aware, this requirement has been waived for one licensed facility. And at WCS, it's kind of a moot point, because if we get all of our licenses, we will have at least two federally-owned facilities for long-term care, and one state-owned facility directly north of this RCRA facility. So, obviously, even though there's no

government control, our facility will have that long-term protection.

I think, also, RCRA facilities require all the typical types of financial assurance requirements that you see for low-level, including for closure. The only thing that they don't typically require is any long-term care of funds to be set up, because, again, it's assumed that the company will be taking care of that for at least 30 years.

And I think finally, and very importantly, studies have shown that the long-lived toxicity of RCRA waste is comparable to low-activity waste. In fact, I've done a number of papers that actually compare the intrinsic toxicity of RCRA versus low-level waste. I've looked at a variety of energy producing facilities, and just looking at different types of waste, comparing low-level radioactive waste, for example, to coal ash, comparing it to soil. And, basically, those studies use the EPA drinking water limit as a yardstick in terms of what the intrinsic toxicity is. So it assumes, basically, that you eat the waste, and you ingest that waste.

I think some of the conclusions from some of those papers are very interesting. For example, like I said, RCRA, if you consider both the long-lived

with no decay, the long-lived stable toxicity of the heavy metals, and the shorter term toxicity of the organics, the curve looks very similar, and the toxicities are very similar between the average low-level waste, including all the classes, versus the average RCRA waste that you'll find in the disposal cell.

Also, if you look at energy sources, you find very quickly that the amount of coal ash produced by a typical 1,000 megawatt coal plant has the same toxicity as the low-level waste produced by the nuclear plant. Also, if you look at high-level versus other kinds of waste, you quickly see that after 1,000 years where all the shorter lived radionuclides decay away, the toxicity of the mill tailings that basically were used to make the fuel is about the same toxicity as the long-lived toxicity of the spent fuel. So the question comes, is it better to take all that diffuse waste and put it into a small package where you can protect it, or let it out there for the public, and essentially, in some extent, a very poorly managed system, where you can get exposures.

And, also, those particular studies have really helped, I think, with –- particularly, in our efforts in Pennsylvania for the Appalachian Compact,

in terms of providing some perspective for the public in terms of the toxicity of low-level waste. For example, if you can say okay, at a certain time the toxicity of this waste is no more toxic than the soil that it's being disposed in, that's a very, very powerful statement you can make in terms of what these people ought to be concerned about.

In fact, we actually embodied that in our regulations. Basically, we defined hazardous life; and, obviously, this was against NRC kicking and screaming, but it was a legislative requirement in Pennsylvania, but hazardous life is basically the time it takes for the radioactivity to decay to the level of soil. And we committed in the regulations to provide long-term care for that period, until that actually would occur. So those types of studies, I think, are very valuable in terms of providing perspective to the public on these particular issues.

Also, just want to mention that our 11(e)(2) byproduct facility that we have a draft license issued, has been issued by TCEQ, it also includes a RCRA liner system. Although there was no requirement to do that, we have proposed a full RCRA double liner, double leachate collection system in our 11(e)(2) cell that's in the process of being licensed.

Basically, looking specifically at Texas, essentially, there are two different agencies that regulate radioactive waste and material in Texas. There's the Department of State Health Services, formerly known as the Health Department, and the Texas Commission on Environmental Quality, the TCEQ. In an agreement between those two agencies, it basically says that materials that are exempt from regulation can be disposed of without regard to its radioactivity. And that is, essentially, the authority we use at WCS to dispose of low-activity material, so we're strictly limited to materials that are exempted under the regulations.

We probably dispose of about 300,000 cubic yards at a cost of two to three dollars a cubic foot. And I think, also, I think it's important to note, you heard about the 20.2002 process previously, and Jim Kennedy saying that NRC had approved WCS to take the material under that agreement. Well, we never were able to because, again, as you've heard before, the states are where the rubber meets the road. The states basically said that you are not –- there is no specific exemption under Texas rules to allow you to take material that NRC released under 20.2002. And we tried to get a rulemaking to add that to the list of

specifically exempt material, but that never came to fruition for a number of reasons. So there are other roadblocks at the state level that can jump up and bite you, even though you have something at the national level that allows acceptance.

We've also disposed of DOE waste under this exempt ballpark. Basically, the DOE has a similar process. It's called the Authorized Limit Process, where they can essentially do a risk-assessment, and determine that the material meets certain dose criteria. If it meets, I believe it's 1 millirem, they don't need any headquarters approval to go ahead with that. So DOE has to go through their own process, and then, obviously, we need to go through the state process. The state has to accept it, but we have disposed of DOE waste in our RCRA landfill.

Basically, I'm not going to go through this in detail, but these are essentially the exempt materials that Texas recognizes in their regulations. The first is the only one that's really unique. Texas has an exempt level for NORM at 30 picocuries per gram for Radium, and 150 picocuries per gram for any other NORM radionuclide. And we've accepted quite a bit of material that has met the 30 picocurie per

gram requirement.

Obviously, we've talked in detail about the .05 percent. I'm going to talk to that in a little bit more detail, because we're the ones that actually saw that opportunity, and got the NRC to adopt their policy in terms of it being able to be disposed in a non-licensed facility.

I also wanted to bring up an issue that, I don't know if you can help or not, but we frequently get requests for exempt devices. A company wants to do the right thing, and not throw the exempt smoke detector, for example, in the trash. And they want to dispose of it in a RCRA facility. Well, we used to have very little problem with it. But recently, since NRC has classified all of the sealed source device catalogues, it takes months before someone can actually go and look at that catalogue. And I guess my question is, why are the exempt device catalogues classified? Why are they not more available? I mean, certainly, they're a totally different category than the higher activity sources. It would certainly allow these folks that want to do the right thing and dispose of these exempt devices a lot easier road to travel.

I think you also need to recognize that in

th is business, this low-activity business, competition is really very important. And the competitive edges that one company has over another become extremely important. I mean, obviously, there's differences in the regulatory requirements. For example, as you heard, the Idaho facility and the Colorado facility can take higher levels of NORM than we can, so we're at a definite disadvantage.

In addition, our regulator requires us to have a sample, or the equivalent for every 20 cubic yards of waste. The other states, particularly Idaho, has a much less stringent requirement for sampling, so we're at a competitive disadvantage there.

Now it doesn't really matter very much when you're talking about low-level, but when you're talking about two to three dollars a cubic foot for disposal, it makes a big difference. These other costs add up very quickly. For example, transportation typically costs much more than disposal, so the distance from the generator, generating site to the facility is a huge factor. The transportation dominates the cost. So those things, I think, make certainly the decision making and the competitiveness, and other things an extremely interesting challenge to deal with.

I just want to quickly talk about our site. The site is in west Texas, right on the New Mexico border. Our evapotranspiration is about four times the precipitation. Essentially, starting at about 20 feet on the average, we have a very thick layer of red bed clay that typically has a permeability of 10 to the minus 9 centimeters per second, very tight clay. At the 225 zone, we have a fairly uniform zone of saturation, and that's really all it is. It's a saturated zone. In fact, we use that zone as our early warning sampling system, and all of our performance assessments are based on that depth to groundwater, even though that is not a productive groundwater zone. It's not –- you can't –- imagine it being defined as an aquifer. It's just non-productive. In fact, when we take samples, many times we deplete the water. We don't get enough water to even adequately sample it in some of the wells.

The real groundwater is at about 1,000 feet, and at various points it extends above that 1,000 feet. And that groundwater is also non-potable. So the real travel time, I guess the travel time to the 225 zone is in the range of a couple of hundred thousand years for most of the long-lived radionuclides, except, of course, for the mobile ones.

And the travel time to the Santa Rosa is in the order a half a million years, so it is a fairly good site. And, obviously, we're undergoing a lot of analysis because of the Part 61 license, and Part 61 and 11 (e)(2) licensing process that are ongoing. And, again, our RCRA cell is probably 100 yards from the proposed location of these other disposal facilities.

A quick picture. This is a picture of our cell. Actually, this is an early picture. We now have a couple of cells that have a preliminary cover, a sand cover on some of the cells. And we also, really at the request, and at the concerns expressed by the regulator on a number of issues, we actually have performed a performance assessment of the radioactive material, the low-activity wastes that have been disposed of in that cell.

We not only looked the long-term dose, and intruder dose to the public, but we also looked at worker dose using a program that DOE developed called "TSD-Dose", which was actually designed for a RCRA facility. It's a very useful tool in terms of looking at the full spectrum of risk from unlicensed disposal. And I'll talk about that in a lot more detail later. So we did this assessment, and as you can see, the dose to the future on-site resident is zero well out

to 100,000 years. The only dose from an intrusion standpoint was a well-driller, can get a minimal dose. And this was a very conservative assessment. It assumed that all of the waste in that RCRA cell was low-activity waste. And they were all at their maximum concentrations; in other words, everything was at .05 percent for the source material. Everything was at 30 picocuries per gram. So when you really do a performance assessment, you can see these sites turn out very well.

We have, similar to what you heard from Steve, but our's is a little different, because we have a licensed treatment and storage facility in the RCRA permitted area. So, basically, all of the workers that we have are covered by our radiation protection program that we have for this existing licensed facility. So all the workers are badged, and they're covered under the site radiation safety program.

We also have a complete site environmental monitoring program for our existing licensed facility, and we also do water monitoring for the RCRA cell, including looking at RAD components in that monitoring program. So, essentially, from the standpoint of radiation safety, it is no different than a fully

licensed site, at least in our case.

Basically, in terms of receipt requirements, the exempt waste is actually received as industrial waste under our RCRA permit, and it requires approvals of waste profiles. WCS has to -- the generator has to submit a profile. WCS has to approve that profile. Also, fairly recently, within the last two years, our RCRA permit has been modified in that we have to provide 14-day notification to the agency, the regulatory agency, including the profile, including all of the data, the sampling data, everything pertinent to that profile, and the state has 14 days to review that, and get back to us with questions, or any concerns.

Now we've been implementing that - I mean, even though it says 14 days, we have in all cases waited for a response, either negative or additional questions from the state, before we proceeded with disposing any materials. So, recently everything has been approved by the state in terms of disposal.

Obviously, under the profile, notification is required, and shipments are typically tracked by a logistics company. And then under RCRA, we're required to do the screening studies, fingerprinting that's required for all RCRA waste. And, in addition,

we do radiation surveys of the package, if it's exempt material. So, again, from the standpoint of low-level waste versus this material, it's very similar to what we intend to do for acceptance of low-level waste at our licensed facility. In fact, in many cases the fingerprinting and the screening surveys are more frequent than what you need to do under our proposal for low-level waste.

Mentioned the .05 percent, and the fact that we were the ones who actually recognized the potential market there. Prior to 1999, essentially, this source material that was under .05 percent was -- even though it was exempt under NRC regulations, NRC required that it be disposed of at a licensed facility. So we made a full court press on the NRC, including commissioners, including the higher levels of management, said hey, why don't you -- if this is exempt material, why don't you treat it as exempt material? And we were able to convince them, and that was the birth of this case-by-case risk-assessment that you've heard other people discuss. So there are ways of making inroads on a case-by-case basis for material like this that is a candidate for disposal as low-activity waste.

I think it's -- as you heard from Steve, I

mean, we're talking about a very large amount of material that has been disposed of under the existing system. So the existing system is working, and we're talking over 2 million cubic yards of material. This has -- probably the only reason many of the sites on the NRC decommissioning list ever moved forward was because this option, this low-cost disposal option was available. I mean, those sites had very limited amounts of cash, and they had been on the NRC's SDMP list for decades, and never was making any progress. Finally, when we had this low-cost effective disposal, there was progress made on many of those sites that were causing real health and safety risks to the public in terms of their location, in terms of how the waste was being managed at the site. So from the standpoint of health and safety, this existing program has saved a lot of taxpayer dollars. It's fixed some real sites that had health and safety issues, so it's been a very useful system.

So, I guess, we really ought to be careful, if we look at new concepts, of doing away, or changing this existing system. I mean, you're talking –- if you're talking about a new regulatory concept, no matter how simple it may sound, it gets –- the details are in the implementation.

CHAIR RYAN: Bill, just a thought there. I think you hit on a really important point. One thing that the Academy reports talked about was incremental approaches, first of all, guidance. Second of all -- well, license conditions, first of all.

MR. DORNSIFE: Right.

CHAIR RYAN: Individual, and then we heard many examples of that today. Second is guidance. It's a little bit more of a broad industry, or a broad segment kind of a view. Everybody should do it this way. We've heard some examples, and I think some suggestions for that sort of thing. The third would be if there's a real mismatch between one regulation or another, or within a regulation, you can change a regulation. I think the last one up the chain is law. So the reason I interrupted you, I really wanted to get your view on how much of the current system, patchwork or otherwise, do you think really can be handled with these lower tiered kinds of approaches of license conditions, of guidance?

MR. DORNSIFE: Well, the only part -- I think from the standpoint of most NORM and source material, I think we're doing as well as can be expected in terms of the patchwork system. That's working.

CHAIR RYAN: So it's working. That's the bottom line.

MR. DORNSIFE: That part is. The part that's not working very well is the byproduct, low-activity byproduct material part.

CHAIR RYAN: Right.

MR. DORNSIFE: Because, like I mentioned, the 20.2002 process is not recognized in all the states. And I'm going to talk later about some of the efforts that we made in Texas to try to –- to create that kind of system.

CHAIR RYAN: Let me suggest, too, that if you would, what we're going to do this afternoon, I'm just previewing a bit for everybody's benefit, is all the participants are going to hopefully get at this, the two tables here and the front table here, and go over some of these issues in more of a dialogue than an individual Q&A.

MR. DORNSIFE: Okay.

CHAIR RYAN: So if you want to finish your presentation, and then we can get out lunch early. We're going to leave a lot more time, which I think will be a productive roundtable.

MR. DORNSIFE: Sure. Absolutely. I'm only going to be about 10 more minutes.

CHAIR RYAN: That's great. But, again, I'm previewing this for everybody's benefit who's spoken already, and who will participate this afternoon, is that you've really hit on kind of a -- as other speakers have. And I want to get kind of people interacting on that. That will be really beneficial to the Committee.

mR. DORNSIFE: Absolutely. I look forward to that, also.

CHAIR RYAN: Okay, great. Thank you.

MR. DORNSIFE: One of the issues that has been a problem is the blending issue. I mean, NRC is starting to recognize allowing blending of higher activity waste with lower activity waste in order to meet an exemption, for example, in order to look at classification issues. But, particularly, in this area, we're talking about exemptions.

Well, in Texas, again, because that's where the ultimate authority lies, there's a regulation that says you can't have any dilution, you can't dilute waste to change its classification, including RCRA treatment. Okay? So that puts kind of a roadblock in terms of us being able to use the blending option, which I think is very important in terms of solving some of these problems.

Maybe, I mean, dilution and blending, to me, are two different things. Okay? And maybe some sort of NRC guidance on the blending issue may be helpful in terms of getting more uniform interpretation of what is allowed as part of this so-called blending option.

CHAIR RYAN: By the way, that's not a new concept. As you well know, and I'm sure others do, there is a waste averaging guidance document in place already.

MR. DORNSIFE: Right. I understand.

CHAIR RYAN: A technical position on averaging.

MR. DORNSIFE: But this is low-activity.

CHAIR RYAN: Again, it may be a different --

mR. DORNSIFE: It's a little bit different.

CHAIR RYAN: -- waste, with a different radioactive material concentrations and content, but the concept of blending materials together is not new.

MR. DORNSIFE: I understand.

CHAIR RYAN: Okay.

MEMBER CLARKE: If I could add.

CHAIR RYAN: Please.

MEMBER CLARKE: In decommissioning, there's an intentional soil mixing.

MR. DORNSIFE: Oh, absolutely. And, surprisingly, Texas accepts that soil mixing part, but they won't accept taking piles of low-activity and mixing it with higher activity. So it's a difficult issue to deal with. And, again, it's a competitive issue.

I just wanted to talk briefly about some of the efforts. Again, I've been a veteran of trying to come up with new concepts in this area, and in Texas we actually petitioned the agency to develop a disposal concept at RCRA facilities in Texas. And Mike, initially, my concept was that we use a dose-based standard, and let the facilities fall or rise based on that dose-based standard.

Well, the state didn't like that. They said it was too difficult for people to implement, that everybody had to do a risk-assessment in order to use a facility. That was too difficult for the licensees to deal with. It was tried, but it didn't succeed. I mean, I totally agree that that is the best concept, because you can utilize the full capacity of the facility that you're specifically sending it to. And that, in essence, is how the .05

percent system works. NRC approves a specific facility for that disposal.

Now, obviously, it's limited to .05 percent, and most every RCRA facility can easily meet that, so it doesn't become an issue. But, obviously, for some of these other things it could.

We also, basically –- since there was an existing rule in Texas, and this petition was submitted to the Health Department back in 2002, so we've been dealing with this issue for quite a while. It was modeled after their existing rule that allows disposal in sanitary landfills of short-lived radioactive material. And I think, Ruth - you heard Ruth briefly mention that, Ruth McBurney.

Basically, it's a concept where it's based on 1 millirem per year, and it's limited to 300-day half-life material. And it's worked very well in Texas, and, unfortunately, it has become the model for other places, because it's a very effective way to deal with that very short-lived material.

But, anyway, the concept was modeled, and that concept essentially requires each generator to get approval to use the concept. And they in terms are the implementer, so if the licensees –- the material really gets released by the licensees,

individual licensees, and then it's sent to a disposal facility. And, again, this was based on discussions. I mean, the Health Department supported this concept of developing low-activity disposal regulations for RCRA facilities, and we had several meetings before we even submitted this petition.

It was modeled after the EPA draft rule in that there was essentially two sites, two RCRA sites in Texas, one was wet, one was dry. So we used the wet/dry model. And, finally –- well, the next thing, and importantly, it was based on a dose of 1 millirem per year.

Now unlike the EPA, it was a great model because it's a concentration-based rule after EPA. The difference is, is that we looked at worker doses, how you make sure you're not exceeding a limit for worker doses. And, again, we used TSD-Dose to model that part of it.

We thought we were making some progress, and then the Health Department requested review by NRC and EPA. And as NRC many times does, they came back with a letter that said you better not get ahead of the national effort on this; meaning, the clearance rule and the EPA rulemaking, so here we are six years later, and there's absolutely no progress been made on

there. And that was, essentially, a death knell for this rule. I mean, it's the perfect excuse for a state not to do anything when NRC tells them don't get ahead of the national effort.

This is just for illustrative purposes, so don't worry about being able to understand it.

CHAIR RYAN: We can't read it.

MR. DORNSIFE: Yes, I know. This just gives you from this –- this was the risk-based dose limits were converted to a concentration-based rule. And this is just an excerpt from that risk-assessment that shows you essentially how that was done. Obviously, there was a dose to the truck driver, which was probably the most limiting for many of the radionuclides. And I assume either less than 50 miles, because one of the things that we were proposing was that we, as a licensee in Texas, could have the authority to release material at our facility. In other words, generators would send it to us, and then we would release it; so, therefore, the transportation distance would be a lot lower, if it came directly to our facility as low-level waste.

So there's a 50 mile, and a greater than 50 mile, and as you can see, it makes a pretty big difference for some of the gamma emitters. And the

numbers are pretty decent. We're talking over 200 picocuries per gram for Cobalt-60, 1,000 for Cesium. I mean we're talking significant amounts of what's currently Class A low-level waste that could have met this rule.

And then based on the worker considerations, what we did was come up with a total yearly concentration; other words, you say okay, there's a certain number of workers that are involved in this activity, and if you limit the total activity that the site can take for a year, then you maintain those doses to the workers. So you can see there's an annual limit for the amount of each radionuclide that the site can receive.

We also, like I mentioned, we looked at the wet/dry site. Obviously, a wet site for certain radionuclides, the mobile radionuclides, it didn't fare too well. But, again, and I'm going to be totally honest here, this was –- this is the problems you run into with a kind of a regulatory-based system. You can make a risk-assessment do anything you want, you know that as well as I do, and one of the things, we had a competitor in east Texas, and you could turn that risk-assessment around to have them be able to receive very little at that wet site. So, again,

that's the problem when you deal with a competitive system that regulatory –- that people can mess with. You don't always get an even playing field. Okay? And, again, I'm being brutally honest about this issue, because it was part of our planning.

I think the other thing, based –- obviously, there are a lot of radionuclides that fell out, either they were unlimited from the standpoint of the RES RAD, there were no limit, essentially would never reach the 225 zone, and there were certain radionuclides that were gamma emitters that were not limited from a worker standpoint. So, basically, we said well, what are we going to do with those radionuclides, so we decided at the time to use what was then the draft IAEA Exempt Levels for radioactive material. And, again, the consideration was it wouldn't come to the site as radioactive material under transportation rules, because it was pretty evident that they were going to be adopted at the time.

The last issue I want to talk about is, we've tried to keep this alive, and the Texas Radiation Advisory Board, which is a statutorily mandated group in Texas that advises both the Health Department, and TCEQ, and they have periodic meetings,

and they make recommendations on proposed regulations, typical of a State Radiation Advisory Board. Well, they got very much interested in this issue. And I think they got interested because on the one hand, they were seeing no progress being made in terms of some of these risk-based concepts that we were proposing; like, why can't you simply adopt a rule that says Texas –- in Texas, the 20.2002 is exempt. So they got very frustrated, and they also were very much interested in risk-based rulemaking, so they actually supported, they actually came to a meeting with a proposed regulation that was very similar to what we had proposed previously, a concentration-based limit. However, it was different in terms of implementation. Under this proposed rule, all the waste would come to a licensed facility, a facility that's called licensed under –- as a treatment and storage facility. And the material would get released at that facility, and then that's where the determination would be made whether it met the concentration or not.

I think, to me, that's a very big issue, because the public is very concerned about accountability, waste accountability. So if you can say from the generator to the place where the material

is being released, that's a license process, and you're following all the regulations that are required under Part 61 and Part 20, it makes it a more credible process.

Again, we did risk-assessment. They actually –- the TRAB actually presented and recommended adoption of this proposed rule at their January 2007 meeting.

CHAIR RYAN: Is this your third bullet you're talking about?

MR. DORNSIFE: Yes.

CHAIR RYAN: I don't know how anybody could say that collective dose to the members of the public be .1 person rem per year. My individual dose per year is .36 rem for background.

MR. DORNSIFE: No, we're not including background.

CHAIR RYAN: I know, but that's a nutty thing. It's –-

mR. DORNSIFE: Well, what it turns out to be, Mike, in terms of implementation, a 10 millirem per year limit on the workers.

CHAIR RYAN: It says "integrated to all non-radiation workers."

MR. DORNSIFE: Yes.

CHAIR RYAN: That doesn't make any sense.

MR. DORNSIFE: It turns out to be, based on the modeling, a 10 millirem dose per year to any one worker.

CHAIR RYAN: It says "non-radiation workers" in the bullet.

MR. DORNSIFE: But this is for any RCRA facility where you may have non-radiation workers. Okay? The rule is intended to apply to any RCRA facility, not just a licensed facility.

CHAIR RYAN: Well, a worker is covered at 5 rem per year. That's what a radiation worker –-

mR. DORNSIFE: Well, these may not be radiation workers.

CHAIR RYAN: So if they're not, you're covering it a third of background per person. That's bizarre.

MR. DORNSIFE: That's to get as close as we can to the 1 millirem per year dose standard. Okay? But, again, in reality it doesn't turn out to have very bad results. Again, here's an excerpt of some of the radionuclides, the Cobalt, for example, has gone down a little bit, 169 picocuries per gram. The Cesium –-

CHAIR RYAN: We'll have to take your word

for it.

MR. DORNSIFE: Huh?

CHAIR RYAN: We'll have to take your word for it.

MR. DORNSIFE: Yes. I mean, it works. I'll give you a copy of the risk-assessment, if you want to see it.

CHAIR RYAN: Sure.

MR. DORNSIFE: The difference was, again, we had –- a lot of the radionuclides had no limit from the standpoint of RES RAD. However, in this case, we used two things. We used the IAEA, and now the U.S. standards for exempt transportation. Texas also has a unique concentration-based limit for release to sites. We threw that in for political reasons, because that's something that's already accepted in Texas as being non-regulated. So, basically, we used the lowest of any of these limits in terms of establishing a concentration-based limit that is in this proposed rule.

Now, unfortunately, the TCEQ now has regulatory authority for moving this rule forward, and they keep telling us they're too busy with our other licenses to do anything, so it hasn't advanced, even though the TRAB keeps bugging them, asking them what's

going on. So, again, I just thought I'd present these from the standpoint of historical efforts that have gone on to try to address the missing link, if you will, of low-activity that's really not addressed in the current system.

So with that, if you have any questions?

CHAIR RYAN: Thanks, Bill. That was interesting. Anybody? Jim?

MEMBER CLARKE: I'd just like to make a quick comment. I think the fact that you're monitoring that zone that's well above the actual groundwater is to your credit, because it is, in fact, an early warning system. Monitoring groundwater itself, I mean, what do you do when you find something? You may be into remediation, so I think --

MR. DORNSIFE: I mean, obviously, in addition, we have the leachate detection and collection system which is very close to the waste.

MEMBER CLARKE: Sure.

MR. DORNSIFE: It's built into the RCRA.

MEMBER CLARKE: Now you've got a monitoring point below that.

MR. DORNSIFE: Exactly. Yes.

CHAIR RYAN: Ruth?

MEMBER WEINER: I'll save my questions.

CHAIR RYAN: Allen?

VICE CHAIR CROFF: As will I.

CHAIR RYAN: Okay. And I will, too, Bill. I think we're going to have a good discussion here with everybody. We've actually gained a little bit of time. Seeing that now it's 12:15, we will start promptly and exactly at 1:30. So please make all your phone calls, have your lunch, and do whatever you need to do, and we'll start promptly at 1:30. Thank you all.

(Whereupon, the proceedings went off the record at 12:08 p.m., and went back on the record at 1:38 p.m.)

CHAIR RYAN: Folks, I think we will go ahead and open our afternoon session. If I could ask everyone to come to order, please.

A couple of announcements, we had a block of time scheduled for stakeholder comments, views, and perspectives. We have not had anybody sign up to offer views outside of those that we've heard on the panel. If anybody does come in, or if you see anybody that does want to make an additional comment, then they are welcome to do that, but we'll go ahead and get our roundtable session started.

I guess what I'd like to do is suggest that the Committee might want to each make some kind of summary statement on what they heard this morning and so forth, and then kind of open it up for question and comment and observation by all of the participants who so capably gave of their time, talents, and knowledge over the course of this working group. So we really, first of all, very much appreciate all your contributions. It will be invaluable to the Committee as they deliberate how to advise on low-activity waste.

There are a couple of things I kind of took away as themes from this morning. First of all, I'll mention that Bill Dornsife has provided a copy of the full paper with his assessment from which he extracted those tables in his presentation. So everybody now will have a copy of that Performance Assessment Report at the back table. It's available for anybody and will be part of the official record of the meeting as well.

So Bill, thanks very much for getting that to us.

A couple of themes that I heard this morning were not necessarily a uniform view, but a kind of a leaning on a dose base for how do we begin

the process of deciding what's okay and what's not okay. And there's going to be a dose out there somewhere that we calculate. Now maybe it's to one person or a theoretical kind of person or maybe it's even looking at a population or a group or an area, but a dose is really seemingly the basis of what might work.

I heard kind of a trend also that the path forward ought to be incrementalism, for lack of a better word. Let's take one site, one specific kind of waste, let's look at that in a particular location, do that assessment, and then proceed on from there. If there are other ways or other opportunities for operators to look at or people need materials disposed, that that kind of incremental view of how things could be done certainly makes sense in some ways to go.

There were some opinions about more global or national kinds of things that could be done, but that incremental approach seemed to be something that most folks had used as they did their work. Rather than going as a first effort lobby Congress to change a law, they say well, let's see if we can work within the existing framework to make some assessments to determine whether this is safe or not, and really

that's the kind of the determinant there, was it safe or was it not?

So that's kind of my take on some of the big themes that I took away, kind of integrating everybody's view, that there are ways to address low-activity waste and to dispose of these materials in non-10 CFR 61 sites, such that it is specifically licensed for low-activity waste, the international case versus RCRA Subtle Cs and/or Ds that are either sole use or dual use or maybe even triple use for a variety of ways.

With that, I'll turn to Allen. Do you have any comments?

VICE CHAIR CROFF: Do questions --

CHAIR RYAN: Questions, comments, sure.

VICE CHAIR CROFF: Okay. Yes. I guess first, in listening to all the speakers, just about everybody talked about first getting the waste out of the AEA system and then proceeding on to a RCRA site. Can I infer from this that trying to get AEA waste, in other words waste that is not exempt into a RCRA site is sort of in the too-hard pile, that there are just sufficient impediments in this kind of thing that you just can't get from here to there?

MR. DORNSIFE: I don't think it's too

hard. I guess it depends on how you look at it. First of all, yes, I mean exempt -- it's still under AEA, but it's a special class of waste under AEA. It's in the regulations. It specifically says what's exempt.

MR. ROMANO: I guess I'd slice it a little differently. To us, the exemption process, of course, is provided, but once the exemption is issued, then it's outside AEA. So I would slice it two ways. I would say that certainly the easier path is to obtain the exemption and then for the material to go to a RCRA facility. It's harder, I think, but not too hard, to think that the regulations could be used to take non-exempt to a RCRA facility. It hasn't been really, really done in that manner, but I think the regulations allow for it.

VICE CHAIR CROFF: In that case, would that RCRA facility also need an NRC license?

MR. ROMANO: My personal take would be that if it's not exempt, then it should have an Atomic Energy Act license. The way our company has viewed it is again you can sort of think it's consistent with sort of the IAEA conceptual framework because you have clearance levels. Then you have exemption levels. And each of those are levels where essentially the

Atomic Energy Act regulation for disposal purposes is not being applied. But then you get beyond that, I think it's conceivable that you can indeed -- perhaps it would be to look at a subset of Class A waste and way okay, it's not exempt from the Atomic Energy Act, so there ought to be an Atomic Energy Act license, whether it's NRC or agreement state that would apply for material that's not exempt.

And I think at least what our view is and I think we heard a little bit today is that's doable, but harder, but I would say a heck of a lot easier and more practical than trying to write a national scale piece of -- a national scale regulation where all the stakeholders of interest are going to nod their heads and say and this is the exact way to do that. I think the tools that you have now would allow you to without going through that regulatory rulemaking.

MR. DORNSIFE: And also recognize, you know, by having quote AEA approval and get that, by the way I talked about our proposed rule. That is, in essence, having an agreement state say it's okay to dispose of this material in a RCRA facility. That's AEA approval.

VICE CHAIR CROFF: Okay.

CHAIR RYAN: But a friendly amendment to

that, Bill, would be contingent upon the fact that that regulatory scheme was authorized and approved under its agreement state agreement.

MR. DORNSIFE: But states are pretty flexible on what they can do in terms of that end of the spectrum.

CHAIR RYAN: But you could also envision that that approval could come from the state agency outside of its authority under the AEA. But nonetheless, authority within the state.

MR. DORNSIFE: Right, right. That's more difficult --

CHAIR RYAN: It's not a guarantee.

MR. DORNSIFE: If you have a state regulator that doesn't have authority over these materials trying to develop regulations, then it gets pretty messy, but if you have the radiation control agency that's developing these regulations to allow use of RCRA facilities, then it's a lot more easy to follow through in terms of transparency, you know.

MR. KENNEDY: To follow up on that a little bit, Allen, two variations on that. I mean the question, Commissioner Jaczko, was could these RCRA facilities easily be licensed by the NRC agreement states to accept the kinds of wastes coming from

decommissioning sites. And there are two parts to that answer.

The first part is if you mean Part 61, probably not easily. I mean if you've seen these reports like the old EPRI report, for example, comparing hazardous waste site criteria versus Part 61, they just don't match up in how risk is managed. Easily licensed under Part 61 for a RCRA facility, I don't think so.

On the other hand, if you take something like the EPA's ideas in the ANPR or WCS's ideas for Texas where there was some regulation being developed specifically for low-activity waste. I think easily might apply there. Whether there's any interest, I guess there is at WCS. Whether there's any interest by disposal facility operators beyond that, I'm not sure. That's another question I think.

MR. GREEVES: Let me just follow that. That is the slice that I was talking about yesterday. It's in between Part 61 and the current RCRA situation. It doesn't exist. Could exist.

MR. KENNEDY: And it is, I might add or should point out, I think higher than or it would enable more waste than is currently processed under 20.2002 and the unimportant quantity exemption to go

to these types of facilities.

Right now, that's a very low end and the rules that were contemplated, yours and Dan's, I think, were both higher concentrations and more of this material going there. I think.

MR. HOUSE: Another segment of LAW that could come out of AEA is the very low NAW like he's talking about with a clearance rule. That's another way to get some of the materials out from under AEA.

MR. GREEVES: You don't have to get -- we've all -- a couple of people have said, it could be AEA. Some of the people made presentations today have both licenses at the same site. They're nested. It's the same piece of real estate.

MR. DORNSIFE: I think that's a very good point that Bill made. I sat through some of the workshops for the clearance rule and it was very clear that people -- everybody was more accepting if the material went to a disposal facility rather than it got released for general use, okay? That was a more acceptable alternative and obviously a RCRA is as best as you can do in terms of disposal.

The other issue was that I heard come out was accountability. You want accountability until the material is finally dispositioned. In other words, it

out to be low-level waste up to the point during transport and all the other steps that it gets released at the facility that it gets disposed. But I think, to me, that was the only option that there was any semblance of acceptance for a clearance role.

VICE CHAIR CROFF: Let me move on to something else. On these RCRA C facilities, what is the end game for these facilities? And by that I mean we talked about, of course, putting waste in them, capping them, 30 years of maintenance, but at what point do you say okay, we're going to close it and not fool around with it any more, no more active maintenance, and how is that accomplished with all the leachate collection systems and this kind of stuff running underneath it?

MR. DORNSIFE: I think that's a good question because nobody has ever done it yet.

VICE CHAIR CROFF: Doesn't anybody have a vision?

MR. DORNSIFE: I think as Dan pointed out, most people anticipate that 30 years isn't going to do it. They're going to be around for a lot longer than 30 years. People aren't going to close up the door at 30 years.

CHAIR RYAN: Whenever they close, there's

a 30-year period after that for active maintenance.

MR. DORNSIFE: That's what I'm talking about.

CHAIR RYAN: If it hasn't happened yet, and the regulations basically don't give you any specification as to what's entailed there, it's an unknown.

MR. DORNSIFE: Right.

CHAIR RYAN: I think everybody can agree that that is an unknown.

The interesting part is is that -- again, Dr. Clarke to my left here is really the expert on the RCRA issues for this Committee is these are constituents that are hazardous and infinite in their lifetime because they don't decay. Heavy metals is an example.

So that's a whole different scheme in something, even with a long half-life still decays away, uranium being the endpoint.

Jim, could you offer any insights here, please?

MEMBER CLARKE: I think what I would offer is at the time these regulations were passed, I think the national emphasis was on getting so-called hazardous waste into engineered facilities and the

emphasis was on what should be the -- how do you determine whether or not a waste is hazardous which is kind of a fairly prescriptive way of -- I wouldn't call it risk-informed, by any stretch of the imagination, but I think the emphasis was we've got a lot of stuff in quarries and holes in the ground and drums sitting behind industrial plants and we need to get it into an engineered, managed facility, whether it's a landfill or incinerator at the time or whatever.

And there was less thought being given to what's the lifetime of these facilities, you know, when can you stop, when are you through, how do you decide that? It would be interesting to see where the 30-years came from. I'm sure there's a way of finding that out. I have my own suspicions.

I really think you have to put it in that kind of perspective, what were we trying to do as a nation at that time --

MR. GREEVES: It was a short-term vision is what it was.

MEMBER CLARKE: It was a short-term program in that sense. And now we're all wrestling with well, if you just look at the cover, we've got 20 years' experience with the currently favored designs

already some of them are showing degradation. Are we really going to monitor these sites in perpetuity? I mean is that practical?

We had a workshop back in last September where I think one of the ways to try to answer these questions is through the performance-assessment process by getting the kind of monitoring into your system that's not just demonstrating regulatory compliance, but it's actually giving you information on how your system is performing and then updating the performance assessment if you have to, but at some point I think we're just going to say we've done the best we can and we think we're okay.

So I mean these are really, really tough issues that we're just really -- I would say it's been less than ten years since we started thinking really long-term about the future of these sites. I don't know if that helps, Mike.

CHAIR RYAN: Sure, thank you.

MR. DORNSIFE: I think the other thing that's important to note is that a waste is not hazardous unless it fails LDR. It has to be leachable.

MEMBER CLARKE: That's one characteristic.

MR. EID: Before it becomes something that

has to be managed in the site. And I think that's a major difference I see between the rad world and the RCRA world. I mean you could potentially say alpha emittors and most beta emittors, if they were in the RCRA world, then they were encapsulated in an irradiated component, they wouldn't be waste that needed to be managed.

MEMBER CLARKE: I would amend that by saying most wastes are determined to be hazardous wastes not through the characteristics, but through the lists.

MR. DORNSIFE: In our case, most of them are characteristic.

MEMBER CLARKE: It's another prescriptive way.

MR. DORNSIFE: Yes. And the stuff that we're disposing are mostly characteristic.

VICE CHAIR CROFF: I'd like to ask, does EPA -- have they thought ahead that far?

MR. SCHULTHEISZ: Well, I can tell you from my conversations with people in the Office of Solid Waste, the 30 years was essentially a compromise. The industry, as you might imagine, wanted a much shorter period of time and that was what was arrived at, was --

MEMBER CLARKE: It's also associated with the financial assurance requirement that happens to be the time in which --

MR. SCHULTHEISZ: That much financial assurance for 100 years or more than that. So there were a number of issues and since those negotiations were done in the early '80s or so, I'm not aware of any real movement towards trying to reevaluate those and revise those, but as I said this morning, our conversations with both state regulators and people in the business, they pretty much see the writing on the wall that -- nobody wants to be the first one to let a site go after 30 years. And many of the companies that are operating these facilities are also resigned to being there in perpetuity as they see it.

MR. ROMANO: There is also the practical matter with RCRA sites that frankly there's an over-capacity of subtitle C disposal capacity. More than is needed. There's 18 more active RCRA sites. A number of those sites are probably not very profitable, but some are probably not profitable at all. Yet, they don't want to close because it frankly invokes this issue and so there are some folks out there who are putting in relatively minor volumes of material because you're in operation and you don't

have to put very much waste in that site to maintain that status. So that isn't a watch that you don't see folks rushing to get into this post-closure phase.

The other comment I'd guess I'd make about the leachate management, I think it relates in your comment of the performance assessment and it's one of the reasons that we're wary of sort of national level regulations to approach this is a performance assessment for a humid region site is going to be different than an arid region site, certainly from the leachate standpoint, the active maintenance standpoint.

We don't generate a heck of a lot of leachate at our desert site in Idaho. We don't generate leachate at our Richland facility of significance. There's no liner system there. In Idaho, we simply don't really generate it. Our company, of course, had the experience in Sheffield and Maxi Flats which was quite different. And I think it's difficult to approach a generalized performance assessment on a national level where I think you wind up with the least common denominator that does not wind up being risk-informed.

CHAIR RYAN: One of the things I'd like to pick up on on that comment, Steve, is that I think I

agree with you that a national prescription for performance assessment isn't exactly the right tag. What we heard from Dr. Esh and his performance assessment team, if the tools were standardized and that is if I went to Idaho or a New England state or Tennessee, wherever it was, and I was using the tool, whatever that ends up to be, that that would gain some credibility.

Now we have Resrad. Some people have mentioned that and that's in wide use, but I'm thinking more of something that is risk-informed that has probability capabilities to look at options and ranges and those kinds of things as an improved version that can look at exposure scenarios or geohydrology or different technology kinds of issues and pick up the ball.

So that's my first comment, that dose standard plus a really good well-established, well-accepted and trained-on and disseminated tool might be a really good start to then begin to tackle the problems and the issues on a case-by-case basis where the case means site, location, co-location of other wastes, all the issues that you've talked about.

Does that make sense to you?

MR. MOBLEY: It makes a lot of sense. It

sets the perspective as a state regulator. You're out there, you're asked to make an assessment of this proposal and you want to make as good an assessment as you can and so what are you doing? You're pulling in all the tools that you possibly can and it's really nice to have a nationally-recognized subset of tools that you can utilize.

In the case of BSFR and what do you look for? Well, Resrad is out there. A lot of people use it for doing a lot of things. Let's take a cut at it. I think in the early days we used the D&D code and I mean anything that was out there, we used it, but you still have this thing of is this the right tool for what I'm doing and you're searching for the support you can to make a decision and if you've got a serious applicant, they're willing to wait while you make all these assessments. These you've got to make that final decision and it's sure nice to have that level of support that this is the national tool that you use.

And let me make a comment about Resrad. Steve noted that Resrad was accepted in an open thing and everything. Well, his comments were totally 180 degrees out of what the NEARS group said about Resrad, that it was secret, it wasn't vetted, blah, blah,

blah, blah, blah, which from my perspective is totally wrong, but that's what they sold the public on.

MR. ANDERSEN: Let me try a simplistic approach to this and to me, this is partially what's embedded in the Commissioner's comments and it's certainly where our thinking has been.

You take a large facility and obviously the one that we pay the most attention to is the nuclear power plant, but let's just say a large facility. And you're going to generate a lot of construction debris and you have available a lot of soil that could be trans-located and has contamination in it. And you do an evaluation and you determine that if you leave it there, you will, in fact, using the approved calculational methods, produce doses less than 25 millirem a year to whatever scenario you finally settle on. Let's just say it's the resident farmer, just for conservatism.

Where the choice lies is whether to move that material to another location. And it is a choice. You can also not move it at all. In the case of Big Rock Point, don't forget, they actually received approval to pulverize the construction debris, mix it with the soil and spread it out on the site. That proposal was actually approved by the NRC.

Correct me if I'm wrong, Jim, if I got that wrong.

So you have alternatives for what, in effect, is on-site dispositions. So my thinking has always been that once should be able to demonstrate that by moving it from Point A to Point B and if Point B is a RCRA site, that the incremental additional risks that's now located in Idaho instead of located in Illinois, is at least somewhat less. And certainly doesn't challenge the risk that was accepted by the state and the communities around the RCRA site when they hosted the RCRA site. I mean I am making an assumption that there is an associated acceptable risk inherent in the permitting of the RCRA site. Maybe look at my EPA and RCRA site-owning colleagues, but I'm assuming there is some presumed level of downstream risk to the public in the future associated with that site being there. It's probably a small number, but am I incorrect in that?

MR. ROMANO: Just to make the comment generally, the RCRA sites we have today are the RCRA sites we had 20 years ago and there's not a bunch of new ones starting up. There's been a very limited number of new ones starting up. It's a bit difficult to reach back in history and know what was understood.

MR. GREEVES: It's a design specification,

not a risk specification.

MR. ROMANO: Right.

MR. GREEVES: I think intuitively the answer is yes.

MR. ANDERSEN: But not quantitatively.

MR. GREEVES: Strictly speaking. Dan, if it's a design specification, it's not a performance specification. They talk about 10^{-4}, 10^{-} risk and I think they believe that's where it is, but that calculation is not done a lot of --

MR. ANDERSEN: Let's take that as a starting point because I'm really intrigued by Allen's question. I guess my logic would be is if your assessment shows that you're not substantively changing that presumed risk that's already inherent in the site, from our perspective, that's the outcome you're looking for, understanding that that implies that you're not going to be able to send Class A waste to a RCRA site if you adopt that philosophy. Because the class A waste that goes to Clive, Utah is presumed not to deliver a dose greater than 25 millirems, 75 millirem to an organ -- you know what I mean? We've already thought through what we mean when we ship it to a Part 61 disposal site. So it would seem to me that if we're going to center an approach that allows

materials to go to a RCRA site, that both politically and even ethically because we're moving risk from point A to point B, that we ought to be implying that we're creating a risk benefit and additionally that we're not substantially loading up risk behind what has already been accepted.

CHAIR RYAN: And again, I come back if you had a dose number that made that transfer possible and a relative structure in which to make that calculation and that evaluation, you could make that determination.

MR. ANDERSEN: Inherently, to me it's patently obvious, but I always think things are and then people point out to me where they're not, but talking about unrestricted release criteria for a nuclear power plant that truly means that you can do whatever you want with it the day NRC terminates that license. So Haddam Neck can now do with that property as they will.

I have to assume that the risk is less if any residual radioactivity there instead were in an engineered facility in Idaho. I just -- at face value, I have to assume that is true because Steve cannot do whatever he wants with that site. He can't invite farmers in to start planting crops on top of --

they probably wouldn't grow in the first place.

MR. ROMANO: There are restrictions. I think it's also important to point out as we talk with the RCRA regime and the Part 61 regime is that certainly the RCRA minimum requirements for design are prescriptive in their engineering design, but as you look at the different RCRA sites that have had extensive amounts of radioactive material, they look pretty good from a Part 61 standpoint. Certainly Bill's site does in West Texas.

Certainly our site in Idaho does and when performance assessments are done as they have been and the NRC staff have reviewed them as they have and there's no credit being taken of the plastic liner systems and for the level of hazard we're talking about, it seems like a pretty reasonable performance assessment approach and indeed it is communicated to the public as these additional materials are taken in.

So I don't really see that this big division between here's a Part 61 site and by gosh there's all these extra protections here and here's a RCRA site and that's just a whole different deal because they have prescriptive design requirements. If you think about the prescriptive design requirements to make sure that you're not creating an

issue which I think again in an arid -- in a humid region site you put in a liner system. It raises some questions and you perhaps don't have to answer for an arid site.

But in practice, I described a little bit about our Idaho site and I think similar statements can be made for some of the other RCRA sites. It's from a party 61 standpoint, while we haven't gone through that whole performance assessment using a standard review plan as the NRC would apply, the basic themes what you're looking for are at that site and whether or not you're requiring there to be some plastic liners under there or not, so long as you're not relying on those and demonstrating your performance assessment, I think you're in the right direction. There's not a big difference.

MR. MOBLEY: I would just note, you're right on the concept of if it's here and it's okay, but if I move it out here where it's in an engineered facility, it's got to be better than just okay. The problem is from here to here, the reality is there's a risk there in that transportation corridor --

MR. ANDERSEN: It's bigger than the disposal risk.

MR. MOBLEY: Yes, that's the problem. If

you really look at it on a straight risk basis, that transportation corridor is pretty tough because the risk is pretty high.

MR. ANDERSEN: What I would suggest is that that isn't the sole decision making criteria. Ultimately, the reason why you would want to move that material away instead of leave it there is because of the envisioned public acceptance for other uses of the land. So there's a lot of nonquantitative benefits that would drive that decision.

I agree with you totally, that if all you're going to do is roll the numbers, all we're talking about -- this was the dilemma in the license combination. Ultimately construction and transportation risk dominated the risk. It almost made the point of hey, really, you ought to just leave the site alone.

MEMBER CLARKE: I just want to throw something in if I could. I think it speaks to what everyone is saying. It doesn't answer all the questions. But on the Superfund side, I think there's some very encouraging things going on, and that's if you look at the site as a sacrifice zone, maybe your Maxi Flats or hazardous waste landfill, or you look at it as a possible redevelopment, reuse project. And

there are several sites -- I'm thinking of the Anaconda Smelter in Montana, where we're dealing with metals that have no half lives. Other sites, chromium sites where those sites have been redeveloped into recreational areas and apparently providing a level of risk that is agreeable.

I think that's your piece, even if you couldn't get to unrestricted release should you take it somewhere or not, that seems to me, that seems to be a piece of this too. Again, I'd be interested in Dan's comments on that.

MR. SCHULTHEISZ: The twist in the CRCLA example is that it's all done with local input, so there's a range, a risk range that EPA wants to hew to, but there are certainly are CRCLA sites that have been completed with a higher risk because that was acceptable to the local public. And it's also dependent on the land use, what scenarios you're applying. So that's a little more individualistic even than maybe what we're talking about here with --

MEMBER CLARKE: But again, going back to what's the long-term -- what the DOE calls endstate. How are we going to monitor? How long are we going to monitor? What are the issues? That's another piece of it.

MR. SCHULTHEISZ: Yes, yes.

MR. DORNSIFE: I know there is some risk on basing something totally on a dose standard and the reason being is there's two different dose standards. There's a dose standard for the public which you can probably live with one millirem per year. And there's a dose standard for the nonradiation worker which depending upon where you set it, your concentrations as, if you look at my -- the thing that I put together for our rulemaking in Texas, some of the exemptions we're using right now go away.

CHAIR RYAN: Bill, I don't understand the nonradiation worker. You mean a worker who is working with radioactive material that's a nonradiation worker?

MR. DORNSIFE: No, a worker at a RCRA site that's not badged.

CHAIR RYAN: So if I badge them they get one? I don't understand that distinction.

MR. DORNSIFE: You have to be working under a radiation safety program and some of these RCRA sites don't have a radiation safety program.

MR. ANDERSEN: In NRC regulations though, and I'm just saying it gives you a benchmark. That's actually -- it is 100 millirem. Every nuclear power

reactor has two sets of --

MR. DORNSIFE: You could argue just as well that the public could be 100 millirem.

CHAIR RYAN: US Ecology report, American Ecology report, they have a radiation protection program for their workers.

MR. GREEVES: Not because they're required to.

MR. ROMANO: No, that's not true. We are required to, under our RCRA permit. Remember, RCRA permits can include NORM. Dose is dose, whether it's from NORM material, TENORM material or Part 61 material. And part of our RCRA permit explicitly requires us to have a dosimetry program. It requires us to report the results of that dosimetry program. It's part of our permit. It's absolutely required.

MR. DORNSIFE: And in order to take credit for that you have to have that as part of your requirement.

CHAIR RYAN: Okay.

MR. DORNSIFE: Not hard to do.

CHAIR RYAN: If you want to take the material, you raise the bar of what's required.

MR. DORNSIFE: Again, in Texas, they wouldn't let us use that.

CHAIR RYAN: I think the issue here is not that the RCRA puzzle has more merit than having a program, it's that you've got an option where you're not allowed to take credit for it, so you've got to figure something else out, but it's clear in these two cases that having a radiation protection program that defines radiation workers and badges them and monitors, is just fine too.

MR. MOBLEY: I'm not sure that, having looked at this from other perspectives, and I don't know what it is in Idaho exactly, but I have heard this concept posed before, except there's no substance to it. You have a radiation control program. There's no Part 20 standard there that says what a radiation control program is that says what your standard of exposure is. It says how you've got to handle your badges and your program and dah, dah, dah, dah, dah. So -- and I'm not saying -- I'm sure that Steve's is adequate or more than adequate. I'm just saying that it's not quite so well, we'll just have a radiation control program because there are standards.

CHAIR RYAN: Do you have a regulation or a basis for your program?

MR. ROMANO: We do. It's in the state regulations. It's in the permit. And this seems to

me to be an area and I'd like Clean Harbors to comment, too. But this seems to be an area where there could perhaps be some value in the NRC and the EPA saying look, this is accepted practice by the folks that are doing this on an active basis today and one of the areas and as a former NRC staffer I'll say this, I remember the old days when I was back here in the mid-'80s and the view was well, by gosh, the NRC is not overseeing it. If we're not regulating the world, it's not being done properly. And it's just not the way it is.

You can look at what's been with NORM that hasn't been regulated by the NRC for a long time and responsible things are being done.

Now to the extent at a national level, these practices can be recognized and called out. That's all good. But I think we need to be careful that we do recognize that there are competent people who have been doing this thing for a long time and not just in the State of Idaho.

MR. ANDERSEN: Let me offer a comment, though. If you're talking about material that is currently regulated under the Atomic Energy Act and that somehow it will end up at a RCRA site, either with some kind of NRC license, I'll call it 10 CFR

61-lite or under a different regulatory authority meaning an extension of RCRA somehow. In either case, I don't see the problem with that transaction including the equivalence of a 10 CFR Part 20 radiation protection program because it is a graded approach -- let me just give you the hypothetical. I can get a license from the NRC and if by prospective evaluation I demonstrate that no one is going to get over 100 millirem, I don't need to badge anybody. In fact, I don't need to badge anybody if no one is going to get over 500 millirem.

MR. ZOLLER: I don't need to train them if they're below 100 millirem. But I do need to do adequate monitoring and surveillance to demonstrate that my evaluation is correct. So I will have some form of monitoring. But the point being there's nothing particularly onerous about signing on to a defined program that's already well covered by regulations as part of that ability.

MR. ANDERSEN: In fact, my limits are 100 millirem for workers.

MR. ZOLLER: The point is you train and monitor them anyway though, right?

MR. ANDERSEN: That's correct. I'm in accordance with the Colorado regs equivalent to 10 CFR

20. So they still go through training, monitoring. We still have environmental monitoring. It's run like a regular site.

MR. MOBLEY: You actually have a license from the Radiation Control Agency, don't you?

MR. ZOLLER: Yes.

MR. ROMANO: And I think it's a good example because as I understand it's basically, and we heard in your presentation, this is for NORM/TENORM to 2000 picocuries a gram and all these controls are in place.

MR. ZOLLER: That's correct.

MR. ROMANO: And there's no Part 61 licensed material that is part of it. It's a perfectly workable system. Different states have different ways of getting at this. It's been done and the concern I have and I'll just lay it on the table is I think there's sometimes a concern that it isn't being done right, that oh my gosh, the NRC is going to step into this and issue new regulations and create requirements for new licenses that don't exist today. And that somehow that's a step forward. I firmly believe it would be a step way backward.

The step forward is to continue using the tools at hand for materials that can be logically

exempted in a process that's working today that the regulations and laws clearly provide for. And the area, perhaps look at doing some new things to the Part 61-lite concept. My idea of the Part 61-lite concept could be is that could the NRC expand its guidance from some of this stuff? Sure. Are there other ways to have some tools that make it easier to go about that? Absolutely, very good positive step in the right direction. But there's nothing in Part 61 and as you pointed out 61.58 sits there.

There's nothing in Part 61 that says that I couldn't decide as a company to come forward and to the NRC and say we're identifying a subset of Part 61 Class A waste that we're going to dispose of and we want to get a license to do that. But I regard that as a level above the exemption level and that's consistent with the guidance that the IAEA has put out. To my mind, you can get to an exemption level, there's a lot that's being done now, a lot more could be done to make use of that and perhaps there's some other areas to go above that where NRC guidance could be used to go ahead and get your Part 61-lite license, if you will.

But again, there's no need to spend Agency resources, time, and all the angst that will

undoubtedly be generated as we all learned from the clearance rule, to try to come up with some national level approach about exactly what a Part 61-lite approach is. I mean let the licensee propose something.

CHAIR RYAN: The other interesting point in 61.58 is it doesn't mean alternate concentrations. It very clearly says alternate systems of waste classification. It doesn't say a different set of tables from 61.58 or .54. It doesn't say different numbers. It says alternate systems.

MR. GREEVES: 61.58 is used for heavy lifting, when you've got something that doesn't --

CHAIR RYAN: It's never been used.

MR. GREEVES: Oh, it's been used.

CHAIR RYAN: Where?

MR. GREEVES: Frankly, the stuff that Dave Esh showed you yesterday.

CHAIR RYAN: No, no, no, where has 61.58 been applied to alternate systems or classifications?

MR. GREEVES: I am not an expert on this, but at Barnwell, several times, when I was a director, questions came up about Class C issues in the State of South Carolina --

CHAIR RYAN: One was alternate

classification of a particular shipment based on concentration and averaging. It wasn't an alternate system in the sense that Steve was talking about. I know because I was there, too.

MR. GREEVES: Okay.

CHAIR RYAN: If would be a new concept to take an alternate system that didn't fundamentally look at a concentration table, but looked at some other basis or some other basis in consummate concentration.

MR. GREEVES: My experience would be it would be an opportunity to use performance assessment techniques to help you answer the question can I dispose of this --

CHAIR RYAN: And again --

MR. GREEVES: That's fundamentally what it is.

CHAIR RYAN: I'll all for that and again, I think we heard some discussion of you know, more advanced tools today that's pretty exciting.

MR. GREEVES: You're really, there's kind of a tension here. Let's get it on the table. There is a tension over a concept of -- people are doing some good things. Steve gave a really impressive description of a well-maintained, well-run site. We

went through about four or five different, and they are different.

And so the tension is are you going to continue with that approach, with these exemptions and ad hoc approach, or is the need, because somebody called about an explosion in the NARM piece years from now, maybe not this decade, but some decade in the future, there's going to be a wave of nuclear power plants that's going to push this envelope, put a lot of heat on this issue.

Is there value now codifying the kinds of things that Steve does at his site? It sounds like it's the right piece. All 20 of these RCRA sites are doing that? No, they aren't. His is, one or two others are, but you have a chance to think about codifying this approach that's being applied, make it consistent across the country and address this need that's coming maybe a decade from now, but now is the time you can think that through.

Or you can continue with this ad hoc exemption approach that frankly has some flaws with it. That's the dilemma that this is going to come down to. I look forward to where you guys comment.

MR. WHARTON: Thank you. Ruth, you've been quiet. I want to give you a chance to jump in.

MEMBER WEINER: Thank you. I was waiting. I have really two questions. One is a real simple one. I keep hearing the biggest risk is from transportation. What is the risk you're talking about, the ordinary risk of traffic accidents --

MR. DORNSIFE: Being run over by a truck, yes.

MEMBER WEINER: Thank you. Exactly. Thank you very much for that.

MR. ANDERSEN: Actually, it's somewhat less than that because commercial drivers, despite the fact that they stay up all night according to 60 Minutes, it's actually you have more accidents.

MEMBER WEINER: I was concerned that what you were thinking about was the --

MR. DORNSIFE: As a matter of fact, Ruth, we actually did a risk assessment as part of our public information of the various risks from a low-level waste disposal facility in Pennsylvania, and the risk from being run over by a truck was about a factor of ten greater than the risk of radioactive material being released in an accident.

MEMBER WEINER: That's what it is for everything.

CHAIR RYAN: And the absolute value of

that risk is pretty low to begin with.

MEMBER WEINER: Yes, it's pretty low.

MR. MOBLEY: And then when you look at it for nuclear shipments, it's actually even lower.

MEMBER WEINER: Yes.

MR. MOBLEY: We did something similar, I'm sure, with the DOE in Oak Ridge, relative to transportation waste.

MEMBER WEINER: My other question is a little bit more complex, and that is listening to all of this, I'm impressed by what is being done right now in the absence of any additional NRC action. Is there anything --

CHAIR RYAN: Cheers.

MEMBER WEINER: You didn't even prompt me for that.

Is there anything that the NRC should do or should we advise the Commissioners leave it alone. It's working fine. For low-activity waste, I'm impressed that the risk assessments have been done, that the risks are similar, not the same order of magnitude, same general amount as the risks from what you put in a RCRA site, so is there anything else that needs to be done or is the system working?

MR. ROMANO: Mike threw out a soft ball,

so I am going to hit it.

(Laughter.)

Tools would be helpful, and frankly, Resrad we chose Resrad because notwithstanding some people not liking it, it is in the public domain. You can go to Argonne and take the course and play with it and you can do site-specific things with it. It's not the most refined tool out there.

We as a company don't spend a lot of time looking at different models that have been used in different applications. We're certainly capable of using those models and to the extent that the Agency could talk about good models to use and different conceptual approaches for looking at performance assessment under risk-based conclusions that are sound, that hopefully will have broad acceptance, a model that's been developed by the NRC, frankly, has more value than one brought to me by my consultants, particularly the proprietary code. We reject those because of the transparency issue. I think that really helps.

I earlier gave credit to the headquarters crew and some of the folks that Jim Kennedy's worked with, as I mentioned earlier. We've had problems in the past where each one of these exemption requests

was a new adventure because there was a different process and one of my real concerns about any of these things is let's be careful that we don't bog down good risk-based decision making with process. You can get processed into Velveta cheese and nothing gets done.

And I think the tools help and being able to have regularized processes so that -- and John's concern about ad hoc exemption reviews. The best way to get away from that, I think, and it's a fair concern is as the Agency develops some common approaches, they do have a common standard. They're using several millirem a year. I don't think there's any broad disagreement that if you're handling several millirem a year, going to a controlled regulated site, sounds like a good way to go.

CHAIR RYAN: So we are back to sort of licensing permanent conditions and then guidance and tools as the way to move the process forward with some regularity.

MR. DORNSIFE: There is some area that's problematic and that's the 2200.02 reviews. That is the way of getting the now non-existed by-product material, 11(e)(1) byproduct material into this category. That's -- and it works. Obviously, it works, but it doesn't work uniformly and one of the

reasons it doesn't work is because the so-called exemption under 20.2002 is kind of wishy-washy. It's not a true exemption.

MR. ZOLLER: I was actually quite surprised to see in yesterday's presentations where there was I think 100 20.2002 exemptions, 60 of which were for on-site.

MR. GREEVES: It's a roll up of 20.302. Those things have to go back 15, 20 years. 20.2002 didn't exist until whenever I was part-time. So this is a concept that started out back in the '70s. It was 20.302 for a time frame. So the bulk of them were actually -- the words are the same, by the way.

MR. DORNSIFE: But that was the problem. The way that exemption is worded under 20.2002, it doesn't really exempt it like Part 40 exemption material.

MR. MOBLEY: It's got the wrong level of compatibility. How do you exempt something? How does the NRC or any other state for that matter, any agreement state, how do you exempt something if you go across the border and it's not exempt? Well, you just put somebody in jeopardy.

CHAIR RYAN: You are hitting on a point that is in an area where I think there is room to

discuss. And that is that there's now 35 Agreement States, am I right?

MR. KENNEDY: Thirty-four.

CHAIR RYAN: Thirty-four, soon to be two more. So 36 in the 50 states. So mid-30 Agreement States, whatever the right number is, and New Jersey is coming along and so forth.

So the point is that many of these things that we're talking about were developed, as has been pointed out decades ago when the NRC had most of the action. Now these states have most of the action. One common thing and I'm sure anybody that works in an Agreement State will raise their hand and say yeah, that's true, is when you go and ask for some kind of a relief or some kind of a waste disposal option, whatever it might be, the first thing you're asked is what does the NRC say about it? What's the federal guidance look like on this?

So the idea that Agreement State typically want to review or at least understand where they're compatible or not compatible with whatever federal guidance is out there, whether it's the authorized status from EPA or the agreement state status from NRC, so there is a relationship between federal guidance and state implementation that's an important

element of whatever comes out of this or any similar discussion is that there has to be some conformance that people aren't doing cross-wise things that, as you point out, when you cross the state line you get a new set of rules. There may be very valid reasons for different elements to be implemented in different ways, water or no water is one that comes to my mind. But we need to think about the consistency, uniformity, and conformance across state lines when we think about these issues.

MR. ANDERSEN: Jim, as you all are pursuing, are you contemplating a standard review plan for 20.2002?

MR. KENNEDY: We are. We are, as a result of the strategic assessment, and all the interests in 20.2002s. We're going to be developing an internal procedure that tells the staff exactly how to do these, kind of a knowledge management approach for the future, and we'll also be developing a standard review plan that will be published as guidance for licensees.

MR. ANDERSEN: Are you envisioning currently that the states will be heavily involved in that development?

MR. KENNEDY: Oh my gosh, yes. That's a key part of it.

MR. ANDERSEN: One other questions --

MR. KENNEDY: Both on the process, well, particularly on the process and the coordination with them and this interface between us releasing it from AEA control and turning it over to the states. That's one of the main things is that that happens smoothly.

MR. ANDERSEN: Legal question. The -- I know the word exemption has been used a lot and I also know that legally 20.2002 is not an exemption. It is an approval of an alternate means of disposal as over the many, many years, even back to 20.302, the OGC was -- told me on numerous occasions.

MR. ROMANO: Which is why in December of 2005, the NRC issued a letter saying that policy going forward would be that a 20.2002 authorization could be simultaneously taken with an exemption related to it.

MR. ANDERSEN: But now the question to both of you, maybe more to you though, Steve, is that actually an additional separate step that NRC takes in your process or is it implicit in their approval --

MR. KENNEDY: It is concurrent and combined -- so that it's combined, it's explicit now. We explicitly say in our authorization under 20.2002 that this is also an exemption being issued to the person who is going to possess this material.

MR. ANDERSEN: So that it is no longer licensed material.

MR. ROMANO: For purposes of disposal.

MR. KENNEDY: We make that very explicit, because it was ambiguous before. And in the US Ecology case, it explicitly has to be exempted under the AEA before it can be accepted under their permit. But that's a new wrinkle. That's just what, two years old? Something like that.

MEMBER WEINER: Can I ask another question?

CHAIR RYAN: Please.

MEMBER WEINER: Totally different topic. All of you have to deal with people on the state and local level which needs your -- right down there -- your stakeholders are where the action is. You're not removed from them.

Have you noticed any change in the public perception of risk with the development of these combined sites in this method of disposing of low activity waste?

Because it used to be that you know, you mention the word radiation and everybody is horrified and things they're immediately going to die or something. And has there been any change in that?

What has been -- what, if anything, has been the change in the public attitude of siting for developing these facilities?

MR. ANDERSEN: Can I speak first to that?

MEMBER WEINER: Anybody.

MR. ANDERSEN: I apologize. I told Mike I'm going to have to leave in a couple of minutes.

MEMBER WEINER: Please.

MR. ANDERSEN: This is actually something we measure all the time, actually spend a whole lot of money to go out and answer that question. The answer, unfortunately, is predictable. In terms of new facilities that are going to provide benefits which even includes proposed GNEP facilities, the attitudes are changing substantially. And a lot of it has to do with a better public understanding of benefits of nuclear technologies, not just senior energy and nuclear power and all that, but medicine and a whole lot of other areas.

Attitudes that don't seem to have changed substantially are on the disposal end. Very locally people consider benefits. I mean you guys have been there with licensing and citing and all that.

MR. DORNSIFE: I think --

MR. ANDERSEN: I think more broadly, it's

not seen as a desirable industry to import.

MR. DORNSIFE: For a lot of these RCRA facilities, I think I'm speaking for probably the folks here that have RCRA facilities and typically, they were cited for a purpose and at least in our case, they were cited in areas where there was a large amount of oil and gas production and people in oil and gas regions uniquely understand risk. So to them, this is nothing, nothing. This is absolutely no risk at all. They understand that. They deal with real risk every day.

MR. ROMANO: I would second that from the standpoint that again we acquired the Idaho site in 2001. We went out and bought it. And one of the reasons we chose that one was was that NORM was in the permit from the very beginning because it was in a part of the country that NORM was material that needed disposal. And I think it is a factor. I think you need to look at the specifics. In general, our finding is that once a site exists and particularly when it has existed for quite some time, there doesn't tend to be a lot of controversy. The controversy was over building a new one.

MEMBER WEINER: This was the impression that I got, that if you take an existing RCRA site,

the whole fight is already over because the RCRA site is there and whether you put other stuff in it is less of a -- is less apparent. The risk is less apparent.

MR. DORNSIFE: It depends on where it is.

MEMBER WEINER: Sure. And who the stakeholders are.

MR. ROMANO: And the condition of the site. I mean there are sites in the eastern United States, you don't see people proposing to put radioactive material in there because they're frankly still dealing with containment of RCRA components.

MEMBER WEINER: Yes.

MR. ZOLLER: We did receive opposition.

MEMBER WEINER: I was going to ask you exactly, because that's not Idaho and not West Texas. Eastern Colorado is a whole different thing.

MR. ZOLLER: We are 70 miles east of Denver. And actually, we're still in litigation right now, but we did receive opposition. Colorado kind of simultaneously also came out with TENORM guidance for water treatment residuals, so there has been quite a bit of public meetings, etcetera, regarding that issue, specifically. And also within the compact also.

MR. DORNSIFE: I think there's one other

issue with this national approach that doesn't necessarily guarantee it's going to be uniformly implemented. I mean typically, if you develop an NRC rule, it takes a couple years to get that rule in place and then you have to go down to the Agreement State level to really get it implemented. And I can't imagine such a rule like this is going to be Division 1 compatibility. So many of the Agreement States want to adopt it. Maybe none will adopt it.

I mean recognize -- remember the mixed waste concept. I mean none of the states that had existing low-level waste disposals when it was decided that a Part 61 could be used for RCRA, none of the states that had a low-level waste disposal authority sought that RCRA -- you know, that authority for exempting that requirement. So that could be used very politically and the states may not adopt the regulations that NRC proposed.

MR. SCHULTHEISZ: I just want to follow up on that. You just said exactly what I was just thinking. The mixed waste rule that the RCRA program issued in May 2001, so it's nearly seven years ago now, the most recent statistics that I saw said that two-thirds of the states had adopted that rule or part of it and that addressed decay in storage, continued

storage, treatment, on-site treatment, nonthermal on-site treatment, transportation, and then disposal.

So only two-thirds of the states had adopted any part of it seven years later. And then we -- I certainly anticipated that the storage aspect would be very attractive to a lot of these -- to most states who have universities or hospitals or whatever, that have some issues. And then they have to go through once they adopt it, they have to ask EPA for authorization to actually implement it. So that's a case in point that I think follows that up. But I wanted to follow up on what Scott said.

I think there's the example of whether people have become more sophisticated about disposal recently is that Button Willow incident where the FUSRAP waste went out there which fit well below the criteria in the permit, but it was not what they had been dealing with. It was this nuclear waste, even though it was a lot of rubble and debris and things like that.

And that created such a firestorm. Somebody referred yesterday to the hearing on Capitol Hill that dragged a lot of people up there. We testified, NRC testified. It was -- and the state got really derailed in paying a lot of attention to that

when they didn't think it was all that important. And that facility now is really hands off for any kind of -- anything that's outside the lines in any way, even if it fits well within the concentration limits in the permit.

MR. ZOLLER: That's correct. The other thing, just to go on Bill's presentation, I think when you said that there's a pretty big gap in the processes, he's absolutely correct on natural radionuclides and unimportant quantities of source materials. You talk to any three of us, five picocuries per gram of radium, we'll all say yes. You go five picocuries of cobalt, you may get three different answers or three different processes of how we're going to get it into the facility and how long that will actually take.

CHAIR RYAN: That's a great point. You know one of the things that we suffer from is the AEA was originally written as source-based definitions of radioactive material and having zero, nothing, to do with safety or health or risk or any of those issues. So we're suffering the pains of those early definitions.

Safety was mentioned four times in the original Atomic Energy Act of '46, three with regard

to dynamite.

(Laughter.)

It wasn't focused on anything to do with risk or hazard from the radioactive material. So it's an interesting problem and I think it's not -- it's important to recognize those origins and as things get addressed or fixed or guidance gets issued, that we tend to shift things back to the health and safety aspects of the material rather than where they came from. My personal favorite is pre- and post-'78 UMTRCA material, where the calendar determines how it's managed instead of the risk which is really relatively silly in my opinion, but just an example.

MR. DORNSIFE: We also have exempt concentrations and exempt quantities that aren't really exempt unless they're produced by an NRC-licensed facility.

Are they exempt or aren't they? I mean, you know.

CHAIR RYAN: Jim, did you have any other questions or comments?

MEMBER CLARKE: No. I guess the only other thing I would throw out is subtitle D came up a few times, apparently, that material did go into a subtitle D facility. The role of the states in the

subtitle D is I think really important. And I would just throw out that in some states, it is hard to really find much of a difference between subtitle D and subtitle C. New York State comes to mind. I think there are varied differences, but I think they're very similar.

That may be an option. I would come back to a performance assessment approach, I guess. I like the things that came out of the discussion with David Esh about looking at it from the other direction and seeing if there is anything that comes out of that, have a facility that has these design features and is in this kind of an environment and what can I put in it, rather than I have a waste that has been classified for whatever reason as this, this, and this. Where can I send it? Not that one is better than the other, but I think there's merit in looking at this from both directions.

MR. ROMANO: It is good you bring up the subtitle D, because asking of this from a, where do we want the process to go going forward is going, Maine Yankee material went to the subtitle D site in New York and Big Rock Point subtitle, Big Rock Point decommissioning material went to a landfill in Northern Michigan, subtitle D. There were reviews.

These facilities do have controls in place. There is performance assessment done.

Do we somehow want to get to a point where there is some national rule that says that shouldn't have been allowed? If we are, on what basis? And is there therefore a suggestion that these two power plants, that were decommissioned in a cost effective measure, with a performance assessment, with regulatory oversight, that that was somehow an improper practice.

I would say it is not. That's again part of the reason I think we need to be careful about deciding whether it has to be new regulations that define exactly how this is going to be done. I see us going backwards.

CHAIR RYAN: Mike, you can go. I'm sorry.

MEMBER CLARKE: Just one other thing. RCRA does have provision called equivalency. If you want to make a change in the design and you can demonstrate that your new design is equivalent to the prescriptive design that it is permissible. It is probably not simple. I've never been through one, but I've seen the results of several. And you know, the acceptability of the evapotranspiration cover has come out of that process for certain environments.

There's another covered design where the capillary barriers, sometimes you see that used in combination of an ET design.

We haven't, and I don't think anyone has challenged the bottom, you know, the leachate collection system, dug a liner and things like that. It strikes me if that system were ever to fail, I don't know what on earth we would do about it. But that's, that provision is in there and I just throw that out there for what it is worth.

CHAIR RYAN: Jim, one interesting point, and I'm sorry, Mike, just a second. One interesting point on a leachate collection system is per, and this isn't an absolute, but a lot of low-level wastes don't generate leachate. They are treated and processed so that they don't have leachate. They're not going to generate leachate, versus bulk RCRA wastes.

MEMBER CLARKE: That comes from the site being opened.

CHAIR RYAN: Well, the site being opened as well, but it's a different world. So if you don't generate leachate, or you don't generate leachate that's in contact with the radioactive material and it is in fact leaching it and if all the waste is packaged properly, you could think about do you need

it. And the answer is that if you have wet radioactive waste your leach factors go way up. I mean data way back from West Valley showed that. So sometimes keeping noise try is not a bad plan. In fact, that's always a good plan, but I always tell students at Georgia Tech I learned to hold an umbrella over my head, not stand in it.

(Laughter.)

Some of the liner is kind of standing in the umbrella. My feet get wet. I don't know. I just wonder if a leachate collection system is really ultimately the best way to go. Now for self-generating waste that generate their own leachates and have relatively high liquid fractions, I can understand that because it's pulling metals or whatever it might be, but I just wonder if we need to broaden our thinking on that a bit.

MEMBER CLARKE: I think those requirements were influenced in large part, by where a lot of the hazardous waste was, in eastern environments, human environments, and the need for something to manage water while the site was operating.

CHAIR RYAN: Mike?

MR. LEE: I just want to turn to the PA or the performance assessment issue for a second. This

has kind of come up in terms of standardizing the risk assessment that you might do for RCRA, low-level, low-activity type of disposal facility.

In the late '90s, the staff put together some recommendations on how to do a low-level waste PA and in that packet -- I forgot the NUREG number, but in the document, sorry, what?

MR. EIDS: 1573.

MR. LEE: 1573, how soon we forget. I forgot and I worked on it.

There was reference to a low-level waste test case which was done in a humid site and that's been published a little bit in the journal, in the literature, but staff never got to document the nuts and bolts of the analysis.

But in developing that NUREG, I recall there was a sensitivity to make sure that the impression wasn't given that for the purposes of a low-level waste performance assessment that you weren't doing a high-level waste, you know, Yucca Mountain, solid Cadillac type of an analysis which led some of the staff to begin to talk about doing something called a simplified performance assessment, and I think what we're beginning to see from the presentation that Dave Esh and Karen Pinkston worked

on that you're coming up, actually the acronym they used was SPAM which is Simplified Performance Assessment Methodology.

I know the staff have given some thought to that, and there have been, I think, a couple of publications, some generated by the Center down at San Antonio that the Dave Esh, Karen Pinkston analysis might form the kernel for some more thought as -- I mean you're really talking about a contaminant fate and transport issue which is not -- forgive me, but I don't think that's something that Resrad is very good about, type of analysis. So this is something I think that maybe could be further developed or studied.

Bobby?

CHAIR RYAN: Please, Bobby.

MR. EIDS: I think the RCRA --

CHAIR RYAN: Just for the record, give your name.

MR. EIDS: My name is Bobby Eids. I'm with the Division of Waste Management. The RCRA analysis could be considered as complex or simple. That code has been developed for some time and currently we have what's called Resrad off-site code as well. And considering the probabilistic approach, I would like to emphasize that the new version of

Resrad code has probabilistic shell in it, it has a probabilistic approach. And there is also the concern of the probabilistic fashion.

Therefore, I would like to emphasize, the reason I would like to make a comment is because it depends how you use the tool, regardless whether it's GoldSim or it is Resrad, it depends on the scenario that you assume. If you assume certain scenario and you use the same tool and the scenarios are different so it will get different results, whether you are using Goldsim or not.

Resrad is a tool available to the public. It has been scrutinized. It has been QA/QCed, so there is nothing wrong with using the tool, but the question is how to use it, how to have the same, the correct assumptions, the correct scenarios, the correct parameters, how you integrate Resrad code with some other tools that we do use called SADA is to assist the source term.

So in terms of performance assessment, it's not really the tool, it is the approach, the methodology, the scenario, and that's where the guidance should come. My recommendation actually would be good to have comparative analysis of the simple tool that everybody is familiar with and use in

the right way compared with other more complex scenarios. Some people call it black box. Try to see what are the differences in this case, based on similar assumptions for the scenario and for the parameters. That's my suggestion.

In order not to go further to complicate the issue, just to make it simple, and if the people get used to using certain tool, it's just to advise them about how to use it in the right fashion and how to use the more advanced tool that we develop for probabilistic approach.

Thank you.

CHAIR RYAN: Thank you, Bobby. Mike Mobley?

MR. MOBLEY: I just want to comment and this is kind of a totally separate issue, but there's a question about the ownership of the property. My experience, having dealt with a piece of property that was contaminated and owned by a bank trying to lease it out to people and people trying to lease it and use it and there were areas where you couldn't dig, areas that you couldn't enter, and it was just an absolute nightmare for about a decade.

Once we obtained ownership of it, it was no longer a nightmare, it was just a problem that we

routinely had to deal with, because we weren't trying to lease it out. We weren't allowing anybody to dig, bore, whatever. Not only did we have dig restrictions, we actually had a court order that said thou shall not dig. But nothing that's written on paper is as concrete as owning it and controlling it.

CHAIR RYAN: Thank you. We've about around I think for a good little bit of time now. We're kind of getting to the end of our allotted time for the round table.

What I'm going to suggest now we do is go around the table with any summary comments or, you know, final observations or things that you might want to say and if I may I will start with John Greeves.

MR. GREEVES: I just draw attention to something that we have all experienced. That's the license termination rule. That was heavy lifting, but there's been payoff in codifying that particular regulation.

So I think the question that's in front of the Committee now is I see this kind of starkly two ways to proceed. Keeping, there are good practices out there. They're not all the same. Do you keep the exemption 20.2002 standard review plan ad hoc approach, or with the knowledge that there is an

increased wave of waste coming at you, do you codify some of those good practices and I agree with many of the speakers that it is not a lot.

So I individually come down on the side as a former regulator, I very much prefer to work from a rule than a standard review plan or guidance. With a wave of waste coming at you down the road, I think the question that is in your lap is now the time to act on that, and it really comes down to that. We've got, this country has got a pattern in the last decade of deferring this. EPA, NRC, I'll pick on both of them. Me too, I was part of that. We deferred this issue.

Are we going to continue to defer it or are we going to codify the good practices that are being done now and help manage that wave of waste coming at us. I've got more notes on that, but I didn't want to take a lot of thing. But I think it's really there. That's the, what's the Committee going to say about those two options? Do you do the ad hoc incremental approach or do you bite the bullet and suggest codifying the good practices that others have presented here? I think they're there.

CHAIR RYAN: Okay, John.

MR. SHRUM: My experience, to go on with what John just said, is that I like the idea that

being codified, this doesn't affect us. But then it will be there on paper. However, once it gets codified at the federal level, it will go to the state level and it will get changed again. There was a way that that could be not mandated, but it would be a little stronger if there could be a way that whatever it happens, it happens at a federal level. That would be nice because it's the states that ultimately do it and they have their biases, like what Dan said earlier.

You know, the opportunity with the mixed waste and not everybody is buying into it. How do you get down to the state level and so do you bring the state in at the same time? That would probably be the best suggestion.

CHAIR RYAN: Thank you.

MR. DORNSIFE: I think the current system is working, obviously. It has solved a lot of problem sites and, you know, I just caution if you do something on the national level, you don't mess with the current system.

Another comment on the dose base system, if you were listening to my presentation, you know, if you strictly go looking at risk assessment for the sites we are talking about here, you could very easily

approve extremely large concentrations of material. You could show that these sites could accept what I would call politically unacceptable levels of low-activity radioactive waste.

You know, in some cases these radionuclides are in limit. There is no limit because they move very slowly and it's a long way to the ground water. So what I found by actually doing this, what you need is a -- some fall back, some generally-acceptable fall back concentration like the DOT transportation rules that are exempt levels or some other existing system, you know, whether it be using the sewer release limits. That's what we proposed in the Texas rules. For all the radionuclides that weren't in the table, you used the sewer release limits expressed in picocuries per gram.

CHAIR RYAN: Thank you. Mike?

MR. MOBLEY: I guess I've said everything that I would need to say other than just the fact that no matter what you do, you've got to deal with the anti-nuclear activists that are out there, that are going to make an issue out of whatever it is. And no matter how safe it is, no matter how much you've analyzed it, demonstrated that it's adequate, that it's cleaner than dirt, they go on and on and on and

if there was anything that could be done and not that I'm against people bringing up issues, but if there's anything that could be done it would sure be nice to see something done where they have to bring pu real issues and they couldn't fabricate stuff. But when you get that done, call me.

(Laughter.)

CHAIR RYAN: Bill?

MR. HOUSE: I've spent a lot of time and effort discussing the large volumes of low activity, low concentration materials and the industry has found a number of ways to manage those and to keep moving forward. Let's not forget about the higher concentration stuff that's going to lose certain aspects of disposal capability, starting July 1.

CHAIR RYAN: Well said. Anything else?

MR. HOUSE: That's enough.

(Laughter.)

CHAIR RYAN: Jim Kennedy?

MR. KENNEDY: I'll beat this drum once again. Just some context. As a staff member working in the low-level waste program is that we did the strategic assessment because we've probably got to about 25 FTE that people would like us to have in the low-level waste program. In fact, we have five. And

so there's a lot more work that could be done that people would like us to do and that we don't have the resources to do. So we did the strategic assessment to figure out what the most important things were.

And that was a pretty good process and I think the priorities we came up with are probably about the right place.

So just keep that in mind. You know, I go to other meetings, for example, where a couple of years ago there was a whole day meeting on use of DOE sites on federal land for developing new disposal sites, because the Low-Level Waste Policy Act hasn't worked. And so there's just a lot of different things that are possible to work on. We did the strategic assessment to see what the best things are that we could work on, given the available resources.

Now that's not to say that the Commission couldn't say that a rulemaking to address RCRA sites and licensing of them, for example, is a worthwhile thing and direct us to do it and provide resources for that, but I just wanted to provide the context of the strategic assessment and why we did that and why we came up with sort of the incrementalist approach that we ended up with on 20.2002 on unimportant quantities.

CHAIR RYAN: Thank you, Jim. Steve?

MR. ROMANO: I think it's great that the Committee had this session and I'm really pleased to be invited and I think hearing from everybody, I think makes it clear that -- and frankly, where you stand depends on where you sit. And you're going to hear different viewpoints here because we all have responsibilities to those we work with and our shareholders and what not and I'm sure the Committee can recognize those things and those undercurrents are here. That's fine and appropriate to have it all out.

I would point out that you've heard about four arid disposal sites in California and Colorado and Idaho and in Texas that have now taken more than four million tons of low-activity radioactive material. That's an accomplishment and that was not a government-driven solution. And I contrast that with the government-driven solution attempted at the Low-Level Waste Policy Act which has, of course, turned out dismally.

And I had my hand in the efforts in both Nebraska and California. It wasn't despite a lot of hard work and a lot of national-level policy and endorsement right on up through the Commission levels for years and years. The government-driven solutions have not provided additional capacity here.

I endorse what the NRC is doing as far as the standard review plans. I think it's a great idea being able to supplement with tools and I think as Bobby very well pointed out, how you apply the tools is indeed where the rubber meets the highway and that's the kind of thing I would presume would be in the kind of standard review plans that the staff would develop and that makes all sorts of sense.

I have to disagree with John. I think that trying to do a national standard sort of going in afterwards and backfitting and saying okay, you're all doing a wonderful thing out there. We love it all, but now let's go ahead and make a rule out of it. I hark back to the clearance rule and what a fiasco that was. And I don't think anybody would want to go through that again for the end result and I really don't see that we've learned anything.

And in answer to your question, Ruth, I don't think that the public perception is suddenly different that a robust performance assessment is going to take away the stakeholder controversy that exists over the clearance rule. The same issues are here today and I think there's a very real chance if we try to go down some national approach level to codify what Bill and my company and Scott's company

are doing that we're going to go ahead and put the red, the Good Housekeeping Seal of Approval on it, that's somehow moving us forward. So that's my perspective.

MR. DORNSIFE: That may make it worse by creating national attention on the issue.

CHAIR RYAN: Thank you, Steve. Next, sir.

MR. ZOLLER: I think you saw the examples of four facilities accepting various amounts of materials pretty well.

Coming from a former D&D remediation contractor, I think if you can improve anything I would particularly would like to see from that end help on the man-made radionuclides. It's totally separate. Once you turn into the man-made by-product material it becomes a separate issue.

CHAIR RYAN: Thank you. Dan?

MR. SCHULTHEISZ: I'll reiterate what I said this morning that we, even though I think the work that we have done has generated a lot of this interest, we don't want to get in the way of things that are being done. People are working within the system. They're finding ways to effectively address the problem. We need to be cognizant of that.

At the same time, when we started this

work, what we wanted to do was address what was perceived to be a large problem of limited number of disposal options and the way to -- the obvious way to start addressing that problem is to see how you can open it up to the widest universe possible and that is, as John suggests, a national sort of a baseline. You set some standards that everybody understands where they're coming from. They're comfortable. They understand where they're coming from. They make some judgments on their own about whether it's in their interest to pursue it, and maybe you get a lot of applications, a lot of people looking forward and maybe they say they want to do this.

At the same time, Steve's point is very valid. We don't want to undercut what has been done, realistically looking at it, how many of these facilities would take this opportunity if there were a national kind of an approach. You're sacrificing certainty for complexity in some cases by allowing site-specific performance assessments.

So as we move forward to kind of pick this up again when we do, we will be looking at all of those perspectives to see where it is that we can best keep progress going in the correct direction and it may be that we develop some guidance as well, work

with NRC on guidance on case studies, on histories, to say this has been done successfully. This is how we would -- a multi-agency kind of an effort as was done for MARSIM or some of the other kinds of things, may be a way to codify those best practices without actually putting them in regulation.

So we have a number of options that are open to us and we'll be exploring all of those.

CHAIR RYAN: Thank you. Jim, any last thoughts, comments?

MEMBER CLARKE: Yes, it's been a great meeting, thank you.

CHAIR RYAN: Ruth?

MEMBER WEINER: I second what Jim said and I want to thank Mike Mobley for identifying the elephant who sat in the middle of the room.

(Laughter.)

CHAIR RYAN: Allen?

VICE CHAIR CROFF: Great meeting.

CHAIR RYAN: I can't tell you I really appreciate everybody's participation and preparation and openness during the meeting. I think we've had probably the national resource of low-level waste management thinking here in the room for a couple of days and I really appreciate your time and willingness

to discuss it. I think you've got a very rich body of information and opinions and views on how to craft a letter and I appreciate Commissioner Jaczko leading us off and giving us his thoughts and ideas on a direction and we'll all put it together and go from there.

I'm going to guess just for your planning we'll probably have a letter drafted and prepared to read out and deal with at our next meeting which will be next month and keep track of our ACNW calendar and we welcome your participation there and that's the schedule we're on at the moment.

So with that I will close the working group, unless there are any other comments.

Mike Lee has a comment.

MR. LEE: Bill Dornsife's report has been made available.

CHAIR RYAN: I mentioned that already.

MR. LEE: Okay.

CHAIR RYAN: So Bill's paper and all the other materials are available at the back of the room from today's session. We appreciate everybody's participation and attendance and we will close the working group meeting.

We are scheduled for a briefing, if I may

just a second, please. We're scheduled for a briefing at 4 o'clock from staff and we will reconvene at 4:00 o'clock for that briefing. Thank you very much.

(Whereupon, at 3:09 p.m., the meeting was concluded.)

CHAIR RYAN: We are on the record now.

MR. McKENNEY: This is your previous one.

STAFFER CAROL: Do you have a new one?

MR. McKENNEY: This is one for Chris McKenney at 4 p.m. that Neil gave me.

STAFFER CAROL: This is what Neil provided me a couple days ago. Do you have a different one?

MR. McKENNEY: I gave one to Neil yesterday.

STAFFER CAROL: He didn't give me one.

CHAIR RYAN: Derek, how about a little help?

MR. WIDMAYER: Okay. I think that's where Neil just went.

STAFFER CAROL: Before you guys leave, because obviously he's going to get a jump drive, can I get a copy too?

MR. COOL: The Committee has paper copies of the presentations so, if you wanted to go ahead and proceed, we can test the electronics.

CHAIR RYAN: Yes, please.

MR. COOL: You have the paper copies.

CHAIR RYAN: Fire away please.

MR. COOL: Chris, why don't you go ahead and proceed?

MR. McKENNEY: Okay. I'm here today to talk about the overview of the draft ICRP report on reference animals and plants. My name's Chris McKenney. I'm senior assistant performance analyst in the division of waste management and environmental protection. The ICRP -- I'm going to talk about the context of what the ICRP report is, talk about what is in the ICRP report, some important observations, and what the next steps are that the staff is going to go through.

From a context point of view, there are basically three questions in deriving whether there needs to be additional areas of environmental protection. If we are going to, what are we going to protect? Are we going to protect on the basis of populations, or are we going to protect on the basis of individuals? What are you protecting for, mortality, morbidity, reproductive success, those sort of questions. And also what dose or dose rates could cause effects that you'd be concerned about in the

first place?

This draft ICRP report is a technical summary of information of research and findings that only talks about really the dose rate question or the doses question. It doesn't talk about -- it doesn't set dose limits, it doesn't set individual versus populations. It doesn't even say which of the outcomes you should be basing your numbers, basically, on. Should it be based on reproductive success or should it be based on mortality and morbidity? Those are being left for either future ICRP documents or are being discussed in other venues, such as in various countries.

There hasn't been any consensus on those issues, and ICRP isn't weighing in at this point on any of those issues.

CHAIR RYAN: Sure they are. I mean, they're putting this out.

MR. McKENNEY: Well, they're putting out the data right now, but they haven't in this report actually laid out what is the issue. It's a product of the ICRP Committee 5, which was created to look at this topic.

CHAIR RYAN: Who's the US representative on 5?

MR. COOL: It is Kathleen Higley from PNL is a member of the committee.

CHAIR RYAN: Okay.

MR. McKENNEY: Page five, slide four. The summary of the impacts and non-impacts from the -- to a wide variety of flora and fauna from both intentional and un-intentional exposures from the accidents that have happened in the past and also research studies. Some of the findings go on to individual -- you know, a lot of the research is on individual animals and stuff like that, while a lot of the after-studies of accidents is on the -- how the ecology was affected by certain concentrations or doses in the environment.

But there's a large, large data pool of studies that you could combine in there. And so the committee split it into a group of reference animals and plants to pretty much represent various types of flora and fauna. And they then discussed the available data for each reference animal and plant in the report. And from that, they looked at where did you start to see impacts from that data. Now, there are a lot of missing data for each of these flora and fauna. There's large ranges of uncertainty here, because a number of endpoints do not have results.

But on slide six, we have a list of the groups of animals that they did. Note that almost all of the species that are selected are not part of the common analysis previously that were human centric. It's mostly wildlife or -- they're not normally involved in --

CHAIR RYAN: I thought it was going to be four animals, four things. Now it's up to what, twelve?

MR. McKENNEY: Yes, and also all the smaller sizes. So if you look at frog, they looked at frog eggs, tadpoles, and frogs.

CHAIR RYAN: I see.

MR. McKENNEY: To see if there's a limiting situation, is the way they're doing the modeling, or the data gathering at this time.

CHAIR RYAN: Okay.

MR. McKENNEY: They haven't selected any of them, necessarily. I mean, they're putting them out there as, this is the data and these are the things. They haven't analyzed --

CHAIR RYAN: What data are they putting out exactly?

MR. McKENNEY: Like Kishtim data, data on Chernobyl.

CHAIR RYAN: I know, but I want to know on the frog/tadpole, what precise information are they putting out as an example? I mean, I don't understand what they're -- is there radio nuclide uptake studies and metabolic studies?

MR. McKENNEY: No, no, these are all -- studies are only about dose rate and did they see deaths or, in the mortality area or morbidity, it would be, these were exposed to this amount of dose and --

CHAIR RYAN: Okay, in the absence of or in addition to, like temperature changes, or --

MR. McKENNEY: They don't actually go into that.

CHAIR RYAN: I see. So no other environmental influence is discussed on any of these things that --

MR. McKENNEY: Some of these could be at the level of toxicity levels, too -- is always one of the points of uncertainty on some of these things.

CHAIR RYAN: And the toxicity levels for all these species are well established?

MR. McKENNEY: No.

CHAIR RYAN: You see where I'm going?

MR. McKENNEY: I know.

MEMBER WEINER: There is a wealth of data from the defense facilities. There are huge numbers of radioactive animals running around Hanford, for example, and they've been studied for half a century. Were these data included? I mean, you have generations of things like rabbits and deer and so on, not just at Hanford, but INL, Savannah River, any one of the defense facilities. My visits to the Hanford Ecological Park, what we were told was, the biggest influence on these animals is human activity. And if you can keep people out, you have great animal habitat. But there is a wealth of data. They have tracked these animals, they know what the doses are.

CHAIR RYAN: I share your passion for your comment and I couldn't agree with you more. I heard a presentation on Chernobyl, and they showed that now that you've taken the people out, it's one of the most robust systems in that part of Europe, or Asia. So I struggle with it myself, but in fairness to Chris, let's don't shoot the messenger.

MEMBER WEINER: I just wondered if they included these data.

MR. COOL: Dr. Weiner, the specific answer to your question is, I don't know at this moment. There are hundreds and hundreds of references that

they have cited in this document that they have tried to draw information from in pulling together information. I must admit, I did not go through those references line by line to see which ones might have been from US defense facilities, other facilities, Chernobyl, and otherwise. They make statements in a number of cases about certain environments, such as Chernobyl and other situations. But I can't sit here and tell you whether or not a particular Hanford study or a particular Savannah River study or a particular Oak Ridge activity is or is not.

This report, unlike some of the others, does depend on information which was published.

MEMBER WEINER: That's nice. Thank you.

MR. McKENNEY: It's pretty much as it appears. That most all of their numbers do at least have a reference associated with it. For the most part, the reports are in doses that I would not -- are listed -- the doses are discussed, and the effects are discussed, or doses above that, which you would have found even in the environmental reports for Hanford, Savannah River, and some other things. I mean, they're -- usually the doses they were discussing were very large.

CHAIR RYAN: What's very large?

MR. McKENNEY: Above ten milligray per day.

CHAIR RYAN: Help me with rem and rads for the rest of the audience.

MR. McKENNEY: That would be a thousand millirads, so that'd be one rad per day.

CHAIR RYAN: That's not a lot. For those species.

MR. McKENNEY: Right.

CHAIR RYAN: Many of them. I mean, we can't forget basic things like the law of Burgoinne and Tribandeau and the sparrow studies on DNA mass and DNA complexity, and chromosome number, and radiosensitivity. I mean, there's no evidence whatsoever in this -- or at least in the previous versions -- to say that those basic principles of radiation biology are now out the window. Nowhere has anybody shown me that publication, that invalidates those basic studies. Is there anything in there on those?

MR. McKENNEY: They don't go into, again, the --

CHAIR RYAN: I'll bet you that radiation biology doesn't go back to the forties or fifties or sixties.

MR. McKENNEY: They don't have anything

really on the biology of any of the species, to the large extent of, you know, anything on how uptakes work or how biological half-lifes, or anything that would be of -- how transient materials would be or what the uptake rates would be if a contaminated environment was there.

CHAIR RYAN: Okay.

MR. COOL: I think I should try to reinforce for you something that Chris said a little bit earlier. This report actually is a very narrow ethical analysis of some information which is available, which is, what is available out there from the variety of sources over some period of time, about doses and dose rates to various animals at various stages of their life, and what is or isn't known or sort of observable about certain types of effects. Mortality, morbidity, to the extent that that may be derived. This report did not attempt to model how that radioactive material might have gotten into, back out of, etcetera, any particular one of these reference plants and animals.

And it does not attempt in the least to try and suggest how you would take that and then move it onto model some other organism that you might be more interested in or in any way give you at this

moment a suggestion of how you would specifically factor that in to either say that it proves or disproves the fundamental question of whether the environment is being protected. It is a model data set.

CHAIR RYAN: A model of what, though? That's the real question.

MR. COOL: Dose rate and dose effects.

CHAIR RYAN: That's not a model, it's just giving a bunch of numbers. Here are the doses, here are the dose rates. That's fine.

MR. COOL: Right.

CHAIR RYAN: So it's a huge compilation of doses and dose rates for species yet to be determined to conditions, certainly not controlled ones.

MR. COOL: Under a wide variety of conditions.

CHAIR RYAN: Ah.

MR. COOL: Any and all data that was available that they could try to grab and pull in was summarized. So you have wide variety of things, from lots of rat data, which of course some of it is very well controlled, to --

CHAIR RYAN: But the slides said they looked at mortality, morbidity, reduced reproduction

systems --

MR. McKENNEY: They tried to find the data that went to that. For most species -- like, the only species on chromosome damage is, I think, some rat --

CHAIR RYAN: Like fruit flies.

MR. McKENNEY: Right, basically, there's almost no data on that. Similarly, even while it says that they tried to categorize the data into these four categories, it doesn't say that they had data or even good data for any specific one for any specific species. For several of the ones they picked --

CHAIR RYAN: So if this was a peer reviewed publication, based on that premise, it would be rejected.

MR. McKENNEY: Large data sets, they'd say, "This has no data."

MR. COOL: If we give Chris a couple minutes to get through some observations, one of the observations you will find is an interesting compilation which shows that there are enormous holes in what we know.

CHAIR RYAN: Okay.

MR. McKENNEY: Okay, from that, they, again, took the data they had and culled it down to where were studies that they had that said they were

seeing no effects, or everything else. And it ranged, depending on the species, from .1 milligrays per day to 100 milligrays per day, which would be multiplied by one hundred to change into rads, and so it would be 10 millirads to 10,000 millirads.

MR. COOL: A lot of ranges.

MR. McKENNEY: Yes, a lot of range. And that's just the lower edge of -- with all these studies of -- that studies above them are saying maybe there was an effect, and everything else. These are -- then they did include some basic calculations, which are basically just putting a mass in an external field. But the mass for each animal was basically just an oblong sphere that's about the size of the animal. So very, very simple, back of the envelope, basic calculations of what dose rate would you get from a set -- from a unit concentration of whatever radio nuclide -- cobalt-60, or anything like that.

So you'd take -- like a deer -- and you make it just -- all of it is just a big oblong sphere.

CHAIR RYAN: Nice.

AC: A cylindrical cow.

MR. McKENNEY: Exactly. Well, everything's an egg, basically. Everything's an egg in this study. Again, there's no intake, there's no exit. There's

nothing coming in and nothing going out. So they did both an external field dose, so you just have a tabulation of external field numbers, to these obloids. Then you have internal doses that are similar. That if sphere were contaminated a certain amount, what would be the absorbed dose on a microgray per day basis, per becquerel per kilogram. And so they have those --

CHAIR RYAN: I assume everybody has the same density.

MR. McKENNEY: Yes, that's what they're assuming.

CHAIR RYAN: So basically this is a geometry problem that sophomore in health physics could calculate.

MR. McKENNEY: Right, for that part of it, which is why we were like -- why we would say that this is nowhere near a dosimetry system whatsoever in this document, because of the fact that this is so simple, it has nothing to do with the species. Pretty much in the end --

CHAIR RYAN: I mean, is it water, is that the assumption, that everything has the interaction properties of water?

MR. McKENNEY: Pretty much, but I can't

remember exactly --

CHAIR RYAN: So all the reference species does is --

MR. McKENNEY: Basically when you look at the internal dose factors, the only differential is did the energy get in or out of the sphere.

CHAIR RYAN: Man oh man.

MR. McKENNEY: Because if they're big enough so that all the energy absorbed in the sphere, the internal dose numbers don't change.

CHAIR RYAN: Thank you. We probably just ought to press on, Chris.

MR. McKENNEY: Okay.

CHAIR RYAN: And that's where a derived consideration level is, the dose --

MR. McKENNEY: No, no, not that calculation. The derived consideration levels were the dose rate per day, based on all that end-loaded data. Then they included these tabulated exposure factors, in a way. Which aren't really exposure factors. Which is why some people might think that there was a dosimetry system in there, when in actuality it's a very simple --

CHAIR RYAN: Well, it is a dosimetry system, it's just a very bad one and a crude one.

MR. McKENNEY: Very crude one.

CHAIR RYAN: It has no attachment to the realities of these or any other species, as best you can describe.

MR. McKENNEY: Right.

CHAIR RYAN: Okay.

MR. McKENNEY: The -- and even going into that approach, into that, they do state that they're just making an assumption because they have no real basis to state whether there is an -- if an individual animal or plant in a population received a dose, and to have what may have an effect from the research, that that would correlate to an effect on the population. They assume that an individual receiving reproductive -- problems with reproductive success would cause -- a similar dose to the population would cause a reproductive problem.

CHAIR RYAN: Just out of curiosity, do we have detailed assessments of and uncertainties related to the reproductive rates of these species?

MR. McKENNEY: No, not really.

CHAIR RYAN: Okay, so we --

MR. McKENNEY: Some of the studies do have comparable analyses from different years. There is some data over the years on Kishtim, and some other

ones where they have done -- like the deer populations -- at different times and different dose rates, how the populations was changing and some other stuff.

CHAIR RYAN: But they have uncertainty analysis?

MR. McKENNEY: Not completely.

CHAIR RYAN: From Kishtin to Kansas to Canada.

MR. McKENNEY: They don't have that for a representative --

CHAIR RYAN: Pine tree, for example. There's a lot of different kinds of pine trees. I imagine they have different rates of survival and death.

MR. McKENNEY: Right. Again, yes, that would have to be --

CHAIR RYAN: Okay.

MR. McKENNEY: There's a lot of work -- to go into true representative animals or plants, they were way at the long end of a very long road that they'd have to get a lot more data in all regards.

MEMBER WEINER: Did they have any data on confounding factors, other environmental influences on these animals?

MR. McKENNEY: It was not discussed in the

report. In derived consideration levels that they listed are supposed to be where you'd do more specific analysis, is what they suggest, is what they were saying that you would look at it more closely for your example. It does state in the report multiple times -- the report recognizes -- it states that everything is very preliminary, that they have -- that they're not certain how this could be transferred to specific sites or how you would -- you know, it's not verified and validated for different types of species that are not representative, not on the representative ones.

Now, radiation is only one of many stresses that a practice puts in, and isn't necessarily going to be the controlling one. In lots of cases, you know, we already do analysis of a lot of other stresses, like heat-related ones and other things like that, or power plant releases. There is no international consensus on whether you should be protecting the environment by population basis or individuals, or by morbidity or mortality. That just really hasn't gelled together on the international scope yet. If there were situations where the animals were being exposed to really high rates, what would be the end points we would use to make decisions.

And yes, one of the biggest things that is

really easily observable after going through their data is that there are very large information gaps, even just in dose rates versus the animals for various endpoints. Not even to go into the data, the level of uncertainty, the level of confounding factors, the level of controlled versus uncontrolled. What are the -- for quite a few of these areas, there wasn't that much data on -- prior to the incidences in the first place to say how stable the population was beforehand.

CHAIR RYAN: No baselines.

MR. McKENNEY: And so that all leads to these huge levels of uncertainty in the whole thing. As we said previously, we -- there's no discussion really on how you could extrapolate to non-reference species, or how representative any of these is to a category in the first place. Which, you know, if you're looking at small mammals, is a rat the right thing? If we were actually really interested in what the exposure was to a endangered vole, how representative would be using any of the information on rats be to voles? And that's definitely something that would need to be there before you could actually say that the information was practical, in a situation to be used in practical applications.

A list of simple models, which are -- they

are what they are, with the crude models. You can do back calculation, which of course anybody would probably want to just do.

CHAIR RYAN: Somewhere, Chris, we've got to draw a line. Crappy data doesn't serve a model. Just draw a line and say until there's a framework and data that's substantive, why calculate anything? Because it's just not right. Where's the line here? That's what I'm asking. I haven't seen a line that tells me this needs any real attention yet.

MR. McKENNEY: Well, the uncertainty is huge.

CHAIR RYAN: Well, see, that's where I draw the line. If the uncertainties are huge, then you're really in this -- as we were talking on the other issue -- in an indeterminate space.

MR. McKENNEY: Right.

CHAIR RYAN: Calculation is just so much fun with numbers.

MR. McKENNEY: Right.

CHAIR RYAN: And the idea that you'd have something called a derived consideration level, I mean, that gives it credence that just doesn't exist, in my opinion. You know, I noticed there are no domestic species on here of interest. Dogs, cats,

birds, chickens, pigs, cows, farm animals. I mean, this is -- whose opinion is this? The opinion of the committee of what species are more important to track than others. I just don't see the scientific framework for this moving forward.

MR. McKENNEY: I think for a lot of it was to get the view off of domestic species, is why they were mostly not picked.

CHAIR RYAN: And why?

MR. McKENNEY: Argument of eco-centric versus human-centric.

CHAIR RYAN: Sounds great. But it doesn't mean much. Let me turn your attention to your last slide, if we could. I mean, I think that's really where the rubber meets the road for the committee on your path forward. Would you mind telling us a little about this one?

MR. McKENNEY: Yes. We'll just watch this, and also any other future efforts, whether it would make us change anything in our current position that our current approach, through use of NEPA and through use of human dose analysis, that we're protecting the environment already. And I would say that not only just this report, but anything in the future too.

CHAIR RYAN: I'd be very careful about one

and two. If your answer to one is, this is not substantive or developed or useful or scientifically sound, then you stop right there.

MR. McKENNEY: Right, right.

CHAIR RYAN: You don't even need to answer the questions two through five. I mean, the second question.

MR. McKENNEY: Yes.

CHAIR RYAN: Until -- and how you would use it in a NEPA process would determine whether you use it.

MR. McKENNEY: Right.

CHAIR RYAN: So I frankly think that even considering something about the NEPA process at that stage should be off the table. Because you have nothing really to consider for NEPA.

MR. McKENNEY: Right.

CHAIR RYAN: So I'd cross that one out. I'd make that -- it's not useful for anything at this point, based on its primitive state. End of story.

MR. COOL: I would note that you've made an observation based on having looked at it.

CHAIR RYAN: Yes.

MR. COOL: What we attempted to do was say, "What's in here? Let's take a look at it, let's

analyze it." We needed to look at it from the standpoint of, "At this moment, is there anything in here which might be useful in the process?" You've answered this question essentially the same way we were coming after the question, which is, given that all the uncertainty gaps, all this other information, at the moment, does it have any usefulness, can it really be plugged in any useful way to the process? Not at this moment, not in this form. But that's a conclusion reached based on observing the things that we've just observed.

CHAIR RYAN: Sure.

MR. COOL: So we had to look at it from that standpoint.

CHAIR RYAN: And Don, I don't challenge that at all. I'm sure you did a very thorough, excellent job of looking at it. And we're not criticizing your review process. Please don't misunderstand. We're really sharing with you, I think, our frustrations. At least mine, and I think Ruth's, that this is not good work to even have to consider. If we've got to consider it, I appreciate that. Don't misunderstand. I just think we need to at least advise the commission that if there's no information in here that says, "We controvert the

principle that if we're protecting man and if we're protecting the environment and everything in it, that's where we stop."

Now, we have an obligation that you as committee members and participants on the international forum have to observe and participate and attend meetings and all that, we sure understand that too. To be aware and be advised and be informed of how this develops. In terms of a technical construct, this -- frankly, I think it's not logical, it's illogical.

MR. COOL: Step one in the process, whether we agree fundamentally on what the endpoint is, what do we know, or what can we pull together of information, and what does that tell us? This is an attempt to pull together some information that's out there. One of the things you immediately conclude is that there is a whole bunch that we do not know. There are lots of pieces of information. There are lots of things that would be important in constructing any sort of logical relationships, which are not yet available.

CHAIR RYAN: But that kind of flies in the face of a research question. Lots of people have been studying lots of species the planet over since the

late forties on the effects of radiation, radioactive material. Well understood by the literature. It's on the basis of that literature that the statement still stands that if you protect man you protect the environment and everything in it. That statement is not without foundation. It has forty years of radiation biology.

Now, I don't understand what the premise of this. Information gathering for the sake of information gathering is all well and good, but what's the principle here that we're trying to establish? What's the research premise? And I see none.

MR. COOL: All right, I understand that from your viewpoint you don't see anything at the moment. Whether or not you choose to accept the validity of some of the questions, not so much here in the United States, because I think the committee is aware in many other places, in Europe and otherwise, there is an increasing focus on demonstrating, separate from the analysis that we typically do, that some measure of protection is being provided. In other words -- just let me run through this argument for a second with you -- in other words, while they may agree that the end point is true that there has been protection, they do not enjoy and do not wish to

have that demonstration be an analysis which ran through a calculation and got you back to man.

They have a different set of values. If you then wish to provide them with some other mechanism on which they might do an evaluation, you need to establish some analysis base with whatever information may, or at the moment, may not be available, in order to conduct that analysis. This effort, rightly or wrongly -- and there will be individual opinions -- clearly you've already articulated yours -- is a question of, "Is there some information out there, and does it give us even the faintest inkling of the kinds of doses and dose rates that would be necessary to really have an impact on some population out there."

The first finger in the air, almost guess, based on the little bit of information they've been able to distill out here, gave a set of derived consideration levels which are orders of magnitude greater than that which you would see in the environment around any facility, licensed and authorized and under the controls that we have associated with controlling sources and practices. Now I could say that more bluntly another way, QED, that protection which has been afforded over the last

forty years is providing environmental protection.

CHAIR RYAN: Touchdown.

MR. COOL: Now, I can draw that conclusion here, but I'm drawing that conclusion based on very, very rough, very, very scanty, no data at all in other places. No uncertainty levels provided, many, many huge confounding factors. But it is one small step in a process that might, someday, with continued work and saying, "Okay, we actually need some research focused in this area, people have been doing their own thing from various places, it would be nice to have some kind of controlled studies, whatever it might be," which might lead you to be able to say, if you were addressing CNN out on the plaza here, "Not only have we had these analyses and we do it this way, but if you want to do it, look at from this other standpoint."

CHAIR RYAN: I don't disagree with you --

MR. COOL: You can reach that conclusion.

CHAIR RYAN: I don't disagree with the fact this could be an area of serious scientific research. I don't disagree with that at all. I do disagree that collecting this information by the International Commission on Radiological Protection, which is a recommending body that recommends standards for

protection, is the right forum to develop a long range, thirty or forty year research program on these topics.

MR. COOL: That's a very different statement --

CHAIR RYAN: Now if countries want to get organized and study all this forever, that's fine -- on hypothesis driven research. But to gather up information and then cobble it together where you're already proposing derived consideration levels, which has -- looks like, smells like, and sounds like a standard, kind of construct, I think is horribly premature. So I don't disagree with the science of doing these kinds of investigations as a fundamental principle, but I sure don't see the ICRP being the research organization that's going to get the fundamental work done in a very time consuming and consuming fashion over decades to now have a firm foundation to stand on.

It seems to me like the ICPR's already got their minds made up, this is going to be a recommended standard. At some point soon. And that's why I think that, you know, we should be called into question on the science.

MEMBER WEINER: First of all, I'm not even

throwing one tomato at the messenger. You guys did a very good job, thank you. I have a couple of concerns. One of them is a straightforward question. You implied that the European focus on the ICRP was eco-centric rather than centered on people. Is the United States an outlier in this question? Or is Kathleen Higley also eco-centric? In other words, what's the spectrum of approaches?

MR. COOL: Well, what I was intending to convey by that statement was that in the political realm, and the pressures that are brought by intervening groups and other organizations, we see a much greater pressure in Europe, particularly in Scandinavia, for demonstrations which are completely independent of any connection to the presence or absence of the human. We do not necessarily see those pressures here in the United States. It's not to say that they are not raised. Not withstanding where the next administration may be, we do not have a green party in power.

MEMBER WEINER: Okay.

MR. COOL: Such as you have in some of those countries, such that you have the ministers of environment otherwise demanding this sort of analysis.

MEMBER WEINER: Okay. That answers the

question. But we are not -- the United States representatives on this committee out there all by themselves being concerned about people.

CHAIR RYAN: There is only one.

MEMBER WEINER: Well, yes, the one. She's not out there all by herself and everybody else is eco-centric? That's the question.

MR. COOL: No. I'm not attempting to suggest a particular orientation of a particular individual committee member.

MEMBER WEINER: Okay. That's one question. And the second thing is, I firmly believe that we need to remain engaged with this. Because once we're out, we're out. And I commend you for remaining engaged with this process. I think that that's very important. And it is important to continue to bring to this committee the view that we've already expressed at the NRC has, that if you protect people you're okay. That's -- I think just we've got to keep our voice in there. That's the point I wanted to make.

MR. COOL: Thank you. Let me offer one suggestion to the statement.

MEMBER WEINER: Yes.

MR. COOL: Not that I disagree. The

protections that have been provided, when we have been able to apply appropriate controls to sources and effluence in dose rates, have been constructed based on a model of protecting man. Those controls, standards, effluence controls, limitations, etcetera, have, and continue to provide protection in the environment. It's not because it was a human-centric analysis or a bio-centric analysis or any other sort of analysis. One of the issues which we have pushed, and continue to push, is that there has not been any and there continues to be no demonstrated need for any separate standards related to protection of the environment.

This report actually doesn't directly even get to that question. But there are many who wish to take this sort of information, even in its very preliminary, very uncertain stage, and say, "Oh, shouldn't we write some standards?" And we will continue to express a viewpoint that you need to be able to answer the three fundamental questions we gave you at the beginning of the slides. And then you need to tell me, on what basis you would offer a change to the effluent controls for plant X or plant Y or proposal. And what this would do to change that and what mechanism. Because at this moment, this material

doesn't give you a basis to go in and change an appendix B criteria or a tech spec appendix I criteria for any sort of facility.

In the end, the standard has to be for this facility and this proposal. How much radioactive material is acceptable if it gets off site, what kind of dose rates are acceptable at the facility boundary, or on the top of the ISFSI trade up, or whatever it might be. There are already controls in place on those items. At this point, this material doesn't provide anything that would suggest that any additional changes need to be made to the sets of controls that are already put in place.

Further, I would note that in many places, there is no such thing as NEPA, the National Environmental Policy Act. The United States has already become accustomed to the fact that we have to do an assessment of environmental impacts. Many, many environmental impacts. This is one very narrow little slice of what would be considered in any environmental assessment. But if you were to look at the existing international basic safety standards of the IAEA today, that which exists published in 1996, and you were to go through that document and look to see what it says about doing an assessment of the environment,

or protections associated with that, you would find nothing.

Contrary to our standard practice of needing to this, there is no international sort of standard that would suggest even doing an assessment. So there is a wide gap yet to be bridged.

MEMBER WEINER: Thank you.

CHAIR RYAN: Jim, you have any questions?

MEMBER CLARKE: Just a comment. I clearly share everyone's concern. I guess what I just start thinking about when I hear all of this is that the Superfund sites have a risk assessment process that has to be conducted, and that includes an ecological risk assessment, and I kind of wonder where the EPA is on all this. Are we going to be in the future looking at radiation as a component of an ecological risk assessment? I know it's kind of hard to answer that now. I just kind of want to put it on your screen.

MR. McKENNEY: They've got their reports. They've been aware of the involvement. We haven't received any comments from them on what their comments are.

MR. COOL: To get back to bullet three of the next steps, we have assembled our comments over the last several weeks. The next step in the process,

in fact, started with a conference call with EPA's -- with the interagency steering committee on radiation standards, is to try and get a group that can get the views that we have done, and hopefully comments that may have been generated by DOE and EPA and others to see what views they may have and try and draw some interagency consensus about what may be said. We have not heard anything from the other federal agencies yet. I cannot represent their views.

CHAIR RYAN: Okay.

MR. McKENNEY: They have been involved in previous versions of --

MEMBER CLARKE: I have obvious concerns about getting into that process and even --

CHAIR RYAN: Thank you guys. I know this is a tough problem and long range, long term sort of thing you're going to have to wrestle with. So I appreciate your patience with our enthusiasm for diving into the details with you. It's certainly not meant to imply that we're not thrilled that you guys are involved with it.

MR. COOL: I certainly hope we haven't left you with the suggestion that we think this is just ducky.

MEMBER WEINER: No.

CHAIR RYAN: With that, still on the record folks, so please let's conclude here. With that I think we'll end today's record. We are going to go to the letter writing. So with that, we'll close today's record.

(Whereupon, the above-entitled matter was concluded at 4:52 p.m.)