UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

***

RELEASE OF RADIOACTIVE MATERIAL WORKSHOP

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Palmer House Hilton
State Ballroom
17 East Monroe Street
Chicago, Illinois
Wednesday, December 9, 1999

The Workshop commenced, pursuant to notice, at 8:37 a.m.

PROCEEDINGS

[8:37 a.m.]

STINSON: Glad you could make it back. We have adjusted the table slightly. Let me just say a little bit about our approach to today.

First of all, be forewarned that all the excitement is not over even though this is the last of the series of four meetings. I do believe we might end with a bit of a splash. I understand there might be some environmental organizations that show up later in the meeting, perhaps with banners or some such accoutrements and also statements read and again, just so everybody is apprised of the situation there, I believe that the boycott of these meetings that was pursued by the environmental community proceeds in some fashion even through this meeting so some group of folks are continuing to express their concerns about these issues through a boycott and so we may have a letter that restates some of the issues that they are concerned about.

I want to start this morning by welcoming Rob Leib to the table. He made some comments during the public comment period yesterday and was interested in joining the discussion and so Rob, would you just mention your name and affiliation and how your responsibilities relate to these issues -- to the microphone.

LEIB: Okay.

STINSON: Now you, too, can be hollered at about the microphone --

LEIB: Okay. Rob Leib. I am with First Energy. I am a Certified Health Physicist and my job at First Energy is to protect the workers and the environment from the harmful effects of radiation while allowing its use for the benefit of mankind. As such, I am concerned about proceeding with some rulemaking so that we can have some reasonable release of materials.

I would like to state categorically that there is a level and that I understand from listening to all the conversation yesterday that there is an awful lot of public concern and probably not as much really concern about the technical aspects -- that really is a level of non-concern from people familiar with the issues.

STINSON: Okay, great. Thank you.

Yesterday we had the opportunity to talk through a range of issues in a more general approach and I think we got a lot of good information on the record for the NRC. They have expressed that. In fact, there was a lot of good information registered and it was helpful to initiate the discussion material by starting with aluminum.

What we would like to do is continue in that vein, going material by material, and we won't be able to follow the schedule that is laid out here exactly because we have added a few materials, as you may recall -- nickel, lead, and perhaps medical devices, although we don't really have someone, I believe, from the medical industry that can really speak to those issues so it would be incorporated into the -- am I wrong about that? -- incorporated into the record for NRC to consider further, but perhaps we wouldn't delve into it too much today. Kristin?

ERICKSON: Kristin Erickson, Michigan State University. I can try to speak to that. We have a small amount of medical, nuclear med, veterinary nuclear med, but also I interact greatly and often with the 150 RSOs in our group and I will relay the need for them to comment, even written, to you after this meeting.

STINSON: Okay, great. I was thinking of you when I said that. Any questions? Opening comments? Mike, are you passing now? Go ahead.

MATTIA: Just as a follow up on your opening comments about the environmental representatives, I just wanted to note for the record at the Rockville meeting a representative from the Environmental Resource Defense Council did participate in the entire meeting and was I think of great assistance, so I wouldn't characterize --

STINSON: And Western States Legal Foundation.

MATTIA: Pardon?

STINSON: And Western States Legal Foundation.

MATTIA: So I think that there are entities that have boycotted but there are others who have participated, and I think it is important to note.

STINSON: Yes. That is the way that I meant to state it, by saying that the groups -- that there is a boycott that some have chosen to participate in and express their views through that boycott, but not everyone, and we also understand that a lot of folks will be submitting written comments boycott or no, so Tony?

LaMASTRA: Tony LaMastra, AISI. Just wanted to make a couple comments on some comments that were made yesterday towards the end, not so much for the elucidation of the NRC, because I think we have made them in the past, but perhaps some of the people at the table who haven't been to the other meetings and one was, what I heard expressed was again this idea that steel was inherently radioactive, and it really isn't.

I guess if you want to start counting atoms and down to, you know, 10 to the third, 10 to the fourth picacuries per gram, but from data that we have looked at the basic steel as it is made is very difficult to find any radioactivity in it.

STINSON: Why don't we try to take that up specifically when we get into a discussion on steel today?

LaMASTRA: Okay.

STINSON: Because we have heard varying viewpoints on that point in these meetings.

LaMASTRA: All right. The other I guess is a general idea, and it bothers me that in a sense the nuclear industry and also the NRC kind of go along with the idea that using the term "non-detectable" when in fact you are really meaning something less than 5,000 DPM per hundred square centimeters. As a Health Physicist, that is detectable. I don't care if it is less than 5,000, less than 4,000, less than 2,500 DPM, it is detectable. A good surveyor with a proper instrument can see a definite increase above background, and I think we ought to stop using this concept that we are releasing stuff that is not detectable because you are.

When you look at what is possibly being released either under 1.86 or under -- if you take the guidelines in NUREG-1640, many of the gamma emitters released at those levels in relatively small quantities a couple tons in a load of scrap, will be detectable using today's modern scrap detectors, so if you are under this idea that releasing it at whatever -- 3,000, 2,000 -- is something that is not going to be detected by the industry, please be advised that it will be and it will cause alarms and it will cause rejections.

STINSON: It looks to me like folks want to pursue this topic just a little bit, so Paul, do you want to follow, and then Kristin?

GENOA: Yes, good morning. I am Paul Genoa, Nuclear Energy Institute, and Tony's comments go to the heart of one element of the issue, which is detection of gamma emitters, which is a pretty straightforward process, but it ignores the vast majority of radioisotopes that are not gamma emitters.

You are not going to see Carbon-14. You are not going to see tritium. You are not going to see Iron-55. You are not going to see any of those isotopes under that technology, so the technology that is being used by the steel industry to protect them from orphan sources is one issue, but the release of materials from facilities that may be clean and need a standard to verify or to use for sorting is another issue. I would like to talk more about that issue sometime today.

STINSON: Kristin?

ERICKSON: Kristin Erickson, Michigan State University.

I appreciate the comments but I respectfully disagree with both of what they have just said. That may be true for some facilities, some technology, but Michigan State and at most institutions of our type, we are going down to background or less than background on the proper calibrated instrument.

To release ash, for example, we are going to the MPC program, which is 10 to the minus fifth levels even for Carbon-14, and you can detect those with a good Ludlam Geiger counter. You can calibrate for that. You get about 5 percent efficiency. You correct for your DPMs, geometry, et cetera.

You look at the attenuation of the volume -- as I said, about a drum of metal, we have gamma spectroscopy for those gammas and we can detect extremely low things because we have to. Same for even releasing a pipettor or our lead that I went through a couple of weeks ago, tons and tons of lead, right down to the background, looking at within the statistical standard error or the means for the background. On some of those cases we have to go far beneath that -- Iodine-125 ash we are looking for less than 2 DPM. We prove, we see it with NIST certified standards, spiking the ash, et cetera. We have got procedures for that.

So those technologies with common instruments are capable -- are available to be done, although it is a misperception in many institutions that you can't see C-14 or P-33 or some of the lower energy isotopes. Tritium you don't see with a Geiger counter but we use liquid scintillation techniques, again getting very, very low like that. Thank you.

STINSON: Okay. This is helpful -- bringing information forward in terms of your experience and the materials that you work with and equipment that you work with is I think very helpful to the NRC -- part of what they are looking for. Tony and then Mike.

LaMASTRA: Just as a followup -- Tony LaMastra -- as a followup to Paul's comment. I think the metals industry is well aware of the fact that it is very difficult to detect beta alpha emitters and they definitely don't make any pretense that they are doing that, but I think what we have a problem with is the use of the term "non-detectable" and when good science shows that it is detectable and the continuing using of that term makes it sound like you are releasing stuff like the materials licensees down to some, you know, really non-detectable level.

STINSON: Tony, do you have any solutions for that? Do you have any alternative terminology acceptable to the industry? Not that we are going to try to turn over the terminology in the industry right now but --

LaMASTRA: Yes, basically state that you are less than some DPM per 100 square centimeters. Admit that you are releasing something that is detectable. If it is a standard, if it is acceptable, fine, but, you know --

STINSON: Okay. We are going to take about another five minutes on this topic. I am seeing Steve Klementowicz standing. Do you want to come up here, Steve, and take a seat with us, if you will -- we have your card here somewhere.

KLEMENTOWICZ: Steve Klementowicz, NRC. I would like to respond to Tony's comments.

Regarding the use of the term "no detectable" we essentially have to use that in the power reactor space because there are no release limits. This is something that has been put forward in the absence of release limits since 1981. We have a circular that addresses how hard you have to look and it essentially equates to the 5,000 DPM, but again since there are no release limits we tell licensees how hard you have to look and therefore it becomes "no detectable" -- if you look that hard and do not see anything.

We realize with the scientific technology you can look lower and lower and lower, but in the absence of a rule we have no release limits, so until we have a national standard, be it zero or whatever value, we are locked into this, otherwise we would be establish a limit without going through a rulemaking process.

STINSON: That is helpful.

KLEMENTOWICZ: So we are kind of stuck.

STINSON: That is helpful, hopefully illuminating some of the struggle with this issue. Mike, and then I am going to jump to Steve, if you don't mind, Paul, just to let him weigh in here.

MATTIA: I would like to take the opportunity and ask Kristin, because I could use the education, other than medical waste, what kind of material that still has some residual radioactivity is being released from health care or research facilities that is what you would consider recyclable or reusable?

ERICKSON: Well, the common thing would be lead shielding. We get the materials inside of a lead container of some sort or the shielding itself inside of a scintillation counter. We also have a lot of inherited lead waste, those ancient, huge three inch thick lead boxes and so forth -- that is one category -- and then we have, well, let's see -- were you talking medical only, were you asking? Any academic? Okay.

Well, we have an accelerator and our accelerator activates materials, so even the Geiger counter that they left in the vault one time came out radioactive for a few days, so everything from tools to the beam lines to any parts that are in there, screws, nuts, bolts, all of that stuff we have controlled in a room where there are drawers and they can't even take a screw out of there without checking it with our instruments -- so that is another kind of waste.

Then there is a typical what I call biomedical R&D, research and development, type of waste out of our research labs which contain typically paper, plastic gloves but can also contain glass stock bottles and lead containers for those, sometimes small pieces of metal.

We have one lab there that has soil because that is what they do the research on, so it can really range a little bit of everything and a lot of some things in a big university like ours.

STINSON: Any substantial amount of copper?

ERICKSON: Well, right now I have several tons of copper that I am going to free release on Friday, hopefully.

STINSON: Good. Well we will turn immediately to you --

ERICKSON: They sent it to us as storage material and it probably is not hot. It was part of a cyclotron that they took apart and it is a one-time thing but it is tons, really tons of copper, so we have a lot of odd things in our institution. Thank you.

STINSON: Okay. Steve Collins.

COLLINS: Steve Collins, from the Illinois Department of Nuclear Safety -- mostly in agreement with the comments made about the use of the term non-detectable. Any time we use that, and we do occasionally use "non-detectable" or "not statistically different from background" we always when we use that make sure that we have defined the instrumentation used and the confidence limits with which are talking -- otherwise it is so vague that you can't tell what you are talking about.

STINSON: Paul and then Tony.

GENOA: Paul Genoa, NEI -- and I just wanted to correct a misimpression.

What I was saying is that a portal monitor based system at a steel yard is not going to see those other things, but as Kristin was saying, we do have the technology to detect very small amounts of radioactive material, but the difficulty and the resources needed to check lower and lower and lower, closer and closer to zero becomes exponentially higher and that is the same idea that I was trying to convey with the idea of going through the airport metal detector.

You know, we are all willing to sit there for 30 seconds or a minute or a couple minutes to protect the safety, but if it gets into days and weeks to prove that you don't have metal on you, it is just not an effective tool anymore and the industry goes away.

You can spend an inordinate amount of resource trying to get to those levels, you know. The detection is based on the instrumentation. It is based on the volume of the material, and it is based on the length of time you count so you can count infinitely long if you need to. Obviously that is not practical, so a clear, consistent standard would help define exactly what conditions you have to impose on the counting of various materials.

LAMASTRA: Tony Lamastra. I guess what bothers me is the concept of the double standard.

The NRC is saying that they don't have guidelines for the nuclear power industry, and that, therefore, the nuclear power industry has a certain effort that they have to put forth to find something.

If a reactor releases a piece of metal that has, let's say 2,000 dpm per 100 square centimeters on it, and it sets off an alarm at a mill, it goes back, and there's nothing really done about it.

If Kristin releases some absorbent towels with 2,000 dpm, it goes to a landfill, it gets discovered, she gets fined.

To me, that doesn't make any sense.

STINSON: And I think you're getting at an issue that is a little bit at the heart of some of the misunderstandings, or at least ways in which people are crossways on this issue.

I have heard differences of view on this that reflect Tony's and others. Do you all want to pursue this a little bit? Is it valuable to understand?

LAMASTRA: We have to clear up a misperception.

STINSON: We can do that. I just want to be sure that you all are all behind pursuing this discussion a little bit, and then getting on with the material-by-material.

We'll give you guys a chance to clarify Ton's point.

Kelly, do you have something related to this, or are you going to take us in a wholly different direction?

CROOKS: No, it's related. Kelly Crooks, U.S. Army. Dave and I have kind of stayed out of the discussion so far, just because it's pretty much all centered in metals and we just don't generate a whole lot of contaminated metal.

In our real-world experience with at least surface-contaminated metals, we found, at least for our typical waste streams, that it's not worth the effort to decontaminate the metals and then verify that they're clean.

It's cheaper just to go ahead and dispose of them. And some of the thoughts I had, listening to the very good discussions from yesterday -- but I really wondered, when you're talking a limit of one millirem per year, you know, what would that equate to in terms of the concentration limit?

I'm guessing it would be fractions of a picocurie per gram. Again, getting back to the real-world scenario, I'm thinking that at a typical Army installation, how would we grab a representative sample of the material?

Who could we send that sample to, to have it read to verify that we've met that fraction of a picocurie per gram limit? How long would it take; what would it cost to do that kind of sophisticated sample analysis?

Then, of course, at the very end is, is it worth it, versus just disposing of it right from the get-go?

So that's just kind of our perspective from an institution that has a lot of generators spread out over hundreds of installation that maybe don't have big volume waste streams at any one, but have a lot of little ones.

STINSON: Okay, thanks, Bill, for letting him jump in there.

LIPTON: Bill Lipton, Detroit Edison. I want to build on what Susan said yesterday. There is a big difference between undetectable with an LLD of like 5,000 dpm or so many microcuries per gram, and saying less than 5,000 dpm or less than so many microcuries per gram.

If you -- that LLD is the 95 percent -- generally taken as a 95-percent probability, meaning if it's less than that LLD, you know, maybe you only have an 90-percent change or an 80-percent chance, but you're still likely to detect it.

And if you detect it, then it doesn't get released.

The second thing is that we use a system similar to what Susan described as used at Commonwealth Edison, and I have found, in general, one thing is that we only evaluate for free-release materials which we would presume to be clean, which have by their history of use, have not come into contact with contamination, but have been in our restricted area.

And we're just confirming the absence of material. I find, generally, that you find very few borderline cases.

If we detect something, generally it's way above any detection limit. It's very rarely that you find activity that's right at the detection limit or just above it. If we find something, there is usually no doubt about it.

So I find the materials that are being evaluated are not really a continuum, but it's more a dichotomy. You have the clean materials, and then you have the materials which generally are contaminated way above the established detection limits.

STINSON: Tom, and then Steve. You need the microphone.

CIVIC: Tom Civic from AISI. I wanted to respond to Paul Genoa's comment regarding the backlog at the x-ray machines at airports.

And mainly because I think this issue of passing on the detection to the downstream user is not an acceptable solution, either. It does take time to run every piece of steel through a scrap monitor.

You can go see the trucks and the rail cars backed up, running them through detectors to ensure that the radioactive materials are not present.

If the steel industry can do, then it ought be done with that same degree of proficiency at the sources as well in terms of backlog, at least for certain materials.

STINSON: Steve?

MR. KLEMENTOWICZ: Steve Klementowicz, addressing the no-detectable issue: This no-detectable issue, as we can see, is very complicated and complex.

But let me clarify that the NRC does have guidance, and that's Circular 81-07, and the followup information notice, 85-92.

In Circular 8107, it specifically uses the value of 5,000 dpm per 100 centimeters squared, which over our discussions here, is equivalent to what is in Regulatory Guide 1.86.

But again, for power reactors, since they do not have release limits in their license, other materials licensees do have Reg Guide 1.86 values as release limits; however reactors never got that option.

There was always some hope that the NRC would develop a release standard, and that's never happened. So what we're left with is this no-detectable. We establish how hard you have to look, we call that no-detectable below that, and there is a liability.

If a licensee releases a material using that survey and says it's no-detectable, and it's released, if that licensed material is found by someone else using more sophisticated instrumentation, the licensee that released the material is cited. That is a violation against Part 20.

Licensed radioactive material was not controlled, it was inappropriately released. There are no release limits in Part 20, so we go through this vicious circle. So it drives the detection.

What it is doing is driving the detection capabilities lower for the reactor industry. So what you may hear from some power reactors is that they are doing better surveys using more sophisticated instrumentation than the old guidance said that you should do.

So what we have is the technology-based standard. So when I say no-detectable, that could be all over the place from 5,000 dpm down to people using gamma spec systems to extremely low levels.

But again, if someone comes in with a more sensitive instrument and does a survey, the licensee that released the material is cited against Part 20. And this has happened many times, many, many times.

And that's a problem. It's a technology-based standard right now with no lower threshold, and that's the gap.

STINSON: And from what I understand it's a lot of the reason why this rulemaking is under consideration, right there.

I know that we have a couple people that want to make comments. If you don't mind, Kristin, let's wind this subject up, and let Paul and Peter make a couple comments.

Paul? You're on this issue, right?

GENOA: Yes. And, again, we fully believe -- Paul Genoa, NEI. We fully believe that we need to monitor at the source. We do monitor at the source, and our detection capabilities exceed yours, because of the geometry that we use. So we're not expecting you to catch our mistakes.

And the truth is that you're not monitoring because of us; you're monitoring of non-licensed users of radioactive material sources that have let them escape.

They didn't come from the nuclear industry, generally. So we do take the responsibility to sort our materials. We have very rigid standards, very systematically -- and we have intense oversight by a regulator. They live on our property.

STINSON: Peter and then Robb.

HERNANDEZ: Peter Hernandez, AISI. I believe that the point Tony was making is that from a practical standpoint, the 5,000 dpm, even though it may be part of a regulatory paradigm, is not going to be -- is not going to prevent the material from being rejected at metal melting facilities.

The detection equipment, and that the real detection levels are about half that in these mills. The detection equipment was put in place, as Paul indicated, to try to detect these orphan sources, but they also are used to reject NORM and any other material that is above the detection limit of these instruments.

That includes materials that may have come from any facility that may be contaminated above the background level. The other thing that we've learned is that -- well, I'll hold the rest of my comments till the steel segment.

STINSON: Okay, that would be great, thanks. Robb?

LIEB: Robb Lieb, First Energy. I have a couple of things, one technical, one on perspective. I keep getting back to this perspective issue. I think it's the most difficult thing that I see for the rest of my career to deal with.

At nuclear power plants, we not only monitor materials and equipment to the detection limit of 5,000 dpm per 100 centimeters squared, but we also monitor personnel to that level.

To date, we have had no deaths in the commercial nuclear power industry from contamination, from exposures to external dose, or any other radiological reasons.

On the other hand, for perspective -- and we need to get a reality check here on perspective. There over 800 deaths per week in traffic accidents in this country.

Now, I'd appreciate some suggestions on how to get the public to understand the risks we're really talking about here. We're really not talking about significant risk from radiation when we release items at the detection levels of the current guidance.

On the other hand, I think that the question Tony and Peter were talking about with detection levels, we need to address what the monitors are set for as far as capability for detection.

I don't really understand why they are set the way they are. Maybe separately we could talk about that.

STINSON: Okay, Frank, you wanted to reflect on something that Tom said. Do you still want to?

CARDILE: Yes, it just had a quick clarification. If we were to go back to the -- you made the point about -- and I think the point has been made a couple of times about NRC trying to pass the problem down to the steel industry, or the steel industry having to do their own reviews, et cetera.

If you go back to the slide that we put up yesterday with the flow diagram, no material, as Steve just talked about, and I think Paul also talked about, no material leaves.

If NRC put out a rule about what the standard -- say, for example, a millirem -- no material would leave the NRC licensed facility without the survey at that point to verify that the material had met this standard.

So the idea is that -- so they would have surveyed that material to make sure that it met the standard, and not pass it on to the steel industry.

Now, the point was made, kind of interestingly, here a moment ago, that while the steel industry has its detectors in there to look for orphan sources, and it rejects a variety of things at very low levels, I guess my question, perhaps, back to the steel industry would be, if NRC had a standard, if we put out this standard, and if there was a survey when the stuff left the site at a level like a millirem, which is still a millirem above background, you know, would the detectors at the steel industry go off, and would the steel industry reject that material that NRC had said, okay, this is safe? It meets our standard.

STINSON: Frank, if you don't mind, at this point, since you offered, Peter, to take this discussion into the steel session, I'm going to ask us to hold that question. That's a great way to initiate the steel discussion.

And just to be sure that we don't again focus exclusively on steel during one of these meetings, I'm going to ask us to take a breath here and shift to copper. Is that okay with you?

There are a number of good issues that have been t'd up for further discussion on steel, an Peter has one he's going to raise as well.

CARDILE: Although, Barbara, I would ask, as we discuss all the materials, including trash that goes to the landfill, the same question holds. If NRC said, all right, this trash is okay at a millirem, and it went to a landfill, would the landfill detectors say, please see it, it's above background, get it out of here, send it back?

STINSON: Yes, that's a good point.

LAMASTRA: Could I just make a comment on that, in general? Tony Lamastra.

Frank, the capability of today's scrap monitors, which is also transferred over into disposal site monitors, landfills, incinerators, although they tend to use smaller volumes of detectors, have extremely low capability -- low sensitive -- not low sensitivity, high sensitivity.

And, again, just forget the fact that they can detect beta and alpha. At the concentration levels in NUREG 1640, assuming about five tons of material that's contaminated not at 5,000, but at 4,000 dpm per 100 square centimeters, or at a lower level in the volumetric.

You're looking at Sodium-22, Potassium-40, Manganese-54, Cobalt-60, Molybdenum-93, Niobian-93M, 94, Silver-108M, Antimony-125, Barium-133, Cesium-134, 137, the three Europeans in NUREG 1640, Radium-226, and its daughters, 228 --

STINSON: How long is your list, Tony?

LAMASTRA: Just one more. Practinium.

STINSON: We really wanted to reserve the steel discussion for later.

LAMASTRA: No, this isn't steel.

STINSON: Well, I understand, but you're also focusing on your own volumes, et cetera. Do you want -- I mean, do you mind if we save this part of this?

LAMASTRA: Basically, you're looking at a detection system that has the capability of finding material at that one millirem per year. So, yes, to answer your question, yes.

CARDILE: You would send it back?

LAMASTRA: Oh, definitely, if it alarms. No -- very few people are rooting through the loads, and it would go back, yes.

STINSON: Detecting all of those materials that you just listed.

LAMASTRA: Whatever it is that causes the alarm, the plant is not going to try and find out what it was. It caused an alarm; it's going back.

STINSON: Bob, you have a card up here if you want to come join us. Charles are you on this point, or do you want to take us into copper?

WILK: Before we go into copper, this is a question concerning procedures. I should have asked this perhaps yesterday.

This is Charles Wilk from Portland Cement Association. The comments that you're taking into, that you're recording and transcribing in the past two days, do these become part of the administrative record?

And if they do, do they become responded to in a response to comments in proposed rulemaking, or the final rule that comes out? Are the questions and responses to the questions published in the Federal Register?

COOL: You really have to swallow this one. I hope you don't have a cold, Barbara. The answer to both of those questions is yes, if we get to the point where we have a Federal Register.

First of all, these are being transcribed, and these documents will be public and part of the administrative record. Part of what my next step is -- and we are going to talk about this a little bit later -- is to provide all of this information to the Commissioners so that they can consider what the next step should be.

We will certainly characterize these comments to the Commission as part of that. We will not attempt, on a comment-by-comment basis, to try and provide a response in preparing that document for the Commissioners.

That would be something that we really wouldn't be able to do in the timeframe that we have. However, they continue to be part of the record, and should the Commission direct us to move forward, then we would, at least in general terms, category-by-category, topic-by-topic, need to look at this information in preparing our Federal Register notice.

So if you're looking to the specific answer to the specific question raised by X-participant in meeting number 3, no, I'm probably not going to be able to show you a specific line item in a Federal Register that enumerates it in that detail.

However, it would be our intention to try and deal with all of the types of comments and the assertions made as part of a Register, if we get to that point in the process.

WILK: So, I understand, what you mean by dealing with these questions, would you -- I understand that process that you would want to group questions that are similar.

What I'm asking is, within the Federal Register -- if there is eventually a Federal Register notice that's published about the plans, would there be responses from the NRC to each of the specific -- the generalized questions, or the groups of questions?

STINSON: Yes, so there would be general groups of issues raised by participants that led the NRC to make the decision that they make in this, so there will be the answers to those that hopefully form a logic train.

WILK: And then the NRC would say why they found those comments persuasive, or why they were not persuasive. Okay, thank you.

STINSON: Bob, we're going to ask you to hold, if you're going to make further comments on Tony's and Frank's discussion. We're going to ask you to hold that to the steel.

Is it something else? I'm going to ask first that you wait.

MECK: That's not the nature of the comment. I have an overarching thing that may help the discussion across all materials.

STINSON: Okay, great.

But first we'll turn and let you -- can you --

CARDWELL: This is a response to Frank's -- Cindy Cardwell, State of Texas OAS.

And it's a response to your question, Frank, and it does cross all lines. It's not just the metals. It's going to apply to soil, trash, construction debris.

From a state perspective, the answer to the question is will they reject it, and they being landfills, scrap yards, steel mills; the answer is yes.

And that is not only when those hits occur will the locations reject it, but typically a state inspector will respond in some form or fashion.

So you're looking at state regulatory resources being used for those hits, and that experience goes for materials that are contaminated above background, because that's typically where the detectors are set, and I'll point to those states -- and there are many of them that have NORM standards in place right now.

They're also looking, in addition to those generally licensed gauges, orphan sources that are out there, they're looking for NORM. So they are set at background, and even though our NORM limits in most of the states are above that at some level, they will reject the loads.

It is rare for them to sort through a load.

CARDILE: Just for clarification, if NRC -- Frank Cardile, NRC.

If NRC proceeded and did a rulemaking and had a level at a level slightly above background like a NORM, there is a potential that material that was released from the licensed facilities would be rejected at these various locations?

CARDWELL: That's a very good potential, based on our experience in the states. I will speak for Texas now. We consistently get phone calls from companies and facilities that have released NORM materials, in particular, because we do have levels for NORM that are definitely above background.

And they say that we've done all the tests, they meet your exemption levels, the facility -- it set their alarm off, and they won't take it, and we have to tell them that that is their right to reject it.

STINSON: Thank you. Bob, and then Robb.

MECK: Bob Meck, Nuclear Regulatory Commission. A distinction of roles, I think may help the overall discussion here.

If you consider the role of the Nuclear Regulatory Commission to be protecting, providing protection, adequate protection for public health and the environment, then the question about alarms and other considerations may fall into more the economic and marketplace consideration.

And a construct that may be helpful in this is that the NRC needs to, in considering alternatives, regulatory alternatives, take into account, economics into the cost/benefit analysis.

So there is an overlap between economics and the regulatory role of the NRC. On the other hand, I don't believe it's the NRC's role to drive economics, and the marketplace should sort that out.

So, the circumstance could be that the NRC would find and promulgate a regulation that is protective of the public and the environment, and yet those levels that are protective may well set off alarms.

And the question is then, is this an economic concern and a specification of feedstock specification for industry that the NRC should not be investigating? Thank you.

STINSON: Robb?

MR. LEIB: Robb Leib, First Energy. This is directed toward Cindy. In your experience, have the alarm limits at the scrap yards been set at a reasonable level? Is there a program that helps the scrap yards to determine what the detection levels should be set at?

STINSON: You said they're set at background.

CARDWELL: Our experience is that they set them at background, and typically it's the company from which they buy their detection equipment that comes in and does their calibration and sets their machines for them.

And we -- I can only speak for Texas now because I don't know the answer to the question for the other states that I'm here representing today. We don't necessarily give them any guidance as to what levels they should set their detection equipment at.

STINSON: That was Cindy Cardwell. Cards are just going up. Let's give a couple others chances to respond.

Steve, and then Alice.

COLLINS: Okay, the question specifically was about detection limits and the settings at scrap yards. Our experience in Illinois is that a lot of the scrap yards have them set at a small percent of the variation in the local background, not something equal to background.

If the background just varies, so every time it rains in northern Illinois, the alarms start going on because of the radon perking out of the soil at some of the places. They'll get a hit on a truck going by, and they have to go back and recheck that.

STINSON: Just move that mike a little bit closer.

COLLINS: They have to go back and recheck that vehicle two or three times to make sure that there really might be something in the load.

And then if we get called like we hope we do, then we have to go up and figure out exactly what's in that load and about how much.

And if they want some assistance in getting it sorted, we even assist in doing that.

STINSON: Alice? That was Steve Collins.

ROGERS: Alice Rogers, Texas Natural Resources Conservation Commission.

Several of our commercial hazardous waste disposal facilities, both incinerators and landfills, have in their waste analysis plan that's incorporated into their regular permits, that those detection monitors are set at twice background.

STINSON: Okay, good, that's helpful. We have the attention of the steel and scrap industry, I think.

Mike, Tony, and then Tom.

MATTIA: If I could look in the crystal ball at what's going to be happening in terms of detection, specifically at scrap recycling facilities, I think we can see that even the concept of background is going to go by the wayside.

We've had a number of instances where a scrap yard that maybe has a background of, let's say, hypothetically, 20-30-40, is shipping to a mill whose background is half that. And so something gets missed at the yard, it goes to the steel mill and gets rejected.

What we're seeing, number one, is a move, and because of pressure from the industry to the manufacturers of the equipment, is to start to isolate the area around, in many cases, the scale, so you in essence have background almost neutralized within that zone where the truck moves through, so that they're actually detecting exactly what's coming out of the vehicle.

We're also now seeing that there's a grapple that gets the detector almost on top of the material, and we're going to soon, I understand, going to have a magnet that's going to have the detector built in that will even get the detecting surface closer to the material.

Detectors are being put even closer on the conveyor lines so that even the concept of background is starting slowly to fade away, and we're detecting exactly what's coming out of the material or out of the truck that's shielding the material.

STINSON: Tony?

LAMASTRA: Tony Lamastra. In a sense, speaking as a consultant Health Physicist, one, to answer Robb's questions, why so low?

Paul kind of indicated, Paul Genoa, indicated why. And that's because of the sealed source threat that can essentially shut down a mill, cost it many millions of dollars to clean up.

But to answer your question of how, in a sense, what they can detect, how they work, the better systems, first, are large volume plastic. They have no spectral capability.

As a vehicle approaches the monitoring station, you'll see about a 30-percent reduction in ambient background. Most of the systems today have the capability of setting an alarm point at somewhere.

If you really want to push it, you can get to about three percent above background, above that suppressed background. But typically you're looking at somewhere in the range of six, eight percent above the suppressed background.

What you have to realize, from an instrumentation viewpoint, is that the false alarm, the real false alarm read is extremely low, to the point where I can think of maybe -- in one facility, I can think of maybe two false alarms in five years, two real false alarms.

What you will see is NORM in the bottom of the vehicle setting it off, a poor distribution of the load where you have a void, let's say, in the center. All the instrument is doing is recording counts per, in some cases, a tenth of a second.

And as it hits that void, the background goes up, the background hits the other hump, the background goes down, the instrument says, ah-hah, I've found radiation.

So, that, to me, would be a real false alarm. But, yes, the equipment has the ability, easily six to eight percent above background with, like I said, an extremely low false alarm rate.

STINSON: Okay, thank you. Let's wind this discussion up and move on to copper before we run out of time to get through all our materials.

Tom, real quick?

CIVIC: Tom Civic from AISI. Tony Lamastra covered one of the main points that I wanted to discuss about the reason why the monitors are set so low.

However, the other issue that we need to be aware of in dealing with responses to alarms at these sites, whether they're downstream users of landfills or steel plants, we are not sophisticated Health Physicists that have to respond to these alarms.

The survey techniques to isolate and separate materials that could be potentially hazardous to employees that have to deal with it, is a real problem.

So, the response to send materials back to where it came from, is very real, and it's not done for selfish reasons. We just can't take the risk of screwing up and exposing individuals. That's not their strength. Their job is to handle materials and process materials. That's what they're there to do, and not to guard against radiation hazards.

So that's a very important point, I think, that the NRC needs to keep in mind.

The other point, again, we have to keep going over and over and over and emphasizing is that the metals industry does not want the material. And most of the people around the table are saying there is no economic benefit to them to release the materials to be recycled where it can get into consumer products.

So, let's just keep that in mind in any type of rulemaking that's going on, and consider the economics as a very strong driving force here in addition to the health and safety that's could be affected downstream, not necessarily because it's a released material, but you jeopardize the measures that are in place by putting all these materials out there that are just going to cause more confusion.

STINSON: Okay. Trish, as a quick follow-on and then we're going to

HOLAHAN: Trish Holahan, NRC. I just want to clarify -- or ask Tom to follow up on that. And perhaps as we walk through the table, if there are some materials, that there is perhaps a benefit, in terms of costs or economics and in terms of recycling, and I'll use copper as an example, is perhaps on those and, as we walk through the table, if we could look at unique impacts or benefits from certain materials.

I think we've heard that from the steel industry, that perhaps there may not be for steel. But, I guess I'm asking the question: are there some that perhaps there may be, in terms of recycling, for other metals.

STINSON: Rob, we're going to let you wind up this discussion. Where we're going to move next, just to prime people for our -- the rest of our morning discussion, is to talk about copper, in particular. So, if you have any specific experience with a volume of copper, such as what Kristin raised -- what we'll do is you can see we're starting a table for each item and Giorgio is diligently trying to record the general topics and discussion that go on for each of the major materials. And what we want to talk first about is getting some experience with controlling the material currently, what our folks -- what kind of detectors are they using; what kind of volumes are they experiencing; is it mixed; it is pure; where does it go, etc. So, be thinking about that.

We'll let Rob make his final comments and then move to that discussion.

LEIB: Thank you. Rob Leib, First Energy. Tom, there's two points that you raised. First, I used to be -- before I got into learning about radiation, I was very antinuclear and your point about -- you know, raises a thing about perception again, that you guys don't want this recycled materials --

STINSON: Stay close to your mic, Rob, sorry.

LEIB: You just don't want the recycled materials from nuclear facilities and there's no economic benefit. One of the things I learned, as I study more and more about radiation, when I was working for an anthropologist, doing studies of fetal alcohol syndrome, radiation is a huge benefit to society.

And then just to switch over to something that might benefit you is that 20 percent of electricity in this country comes from nuclear -- commercial nuclear power plants. And when we can't get rid of our materials, that drives up the cost and reduces the potential for us to continue operating, which would eventually make you rely on electricity from the remaining 80 percent of the suppliers. And as you can see, your costs for arc machines and so forth are going to go up. So, there is a direct benefit, I believe, to the metals industry of supporting getting rid of materials from nuclear facilities that do not cause any harm to your employees or the public.

STINSON: Okay. Let's move to our discussion on copper. Kristin, maybe you can kick us off with some further description of your several tons of copper that you are now dealing with.

ERICKSON: Yes. Kristin Erickson, Michigan State University. Although copper is a really uncommon waste in typical academic --

STINSON: Can we keep the discussion focused at the table, please, gentlemen? Thanks.

ERICKSON: It's typically not a big problem at most academic and medical institutions. But, because we have a huge accelerator, in fact, the biggest cyclotron of its type in the world and now we're getting bigger, we have this waste. The history is they built one machine they call the K-50 and then there was the K-500, then the K-1200, and now we're putting them together to make a K-1900. We're talking major energies. And when they do that, some of the old machines, which are huge amounts of copper -- because these are superconducting cyclotron, they use winding copper coils and it's literally tons and tons of this big huge equipment with up to a 12- or 15-foot diameter.

The copper that we have to deal with is from the cyclotron, not from our typical research labs. And it's two types: one is the type that I mentioned, the big part of the machine; the other type is copper in electronic parts, which is a more common problem for any place such as perhaps the Army or other places where they're taking things and buildings and so forth apart or machines.

The copper, in itself, as an activated product, is not really a problem and I don't think it should be for anyone, because these are short half-life materials. With copper, you can do storage for decay fairly easy and fairly rapidly. And, in fact, our big huge hunk of copper I said would be, with confidence I can tell you now, free released, because we are required and do survey anything before it goes anywhere from where it sits on our university, if it's in the radiation use area. In this case, it was a machine and they surveyed the whole entire thing with very sensitive equipment by hand; found a year-and-a-half -- or two years ago, rather, one spot of 8,000 dpm, which translates to 800 cpm on our machine -- on our instrument.

That will be decayed by the time we check it. This was a tiny spot of about a centimeter and our plan will be simply to survey again. If we still find any detectable radiation at all, we will cut that apart and the part -- the one little spot will be shipped or decayed further and the rest will be able to be released as not radioactive.

Now, I just like to add some experience that we have, because talking about activated products, rather by reactor or accelerator or whatever, metals and so forth, we have a lot of experience, because of this cyclotron. And this has been what we call a kingdom of its own for many years, until about

10 years ago.

People wouldn't survey. They wouldn't put a number. They wouldn't label, which we're supposed to do with isotope, date, and radioactivity and dpms or micro curries. And the reason they wouldn't and couldn't is because if you take electronic parts or tool or part of a machine, anything, even another bolt, it's typically not a pure metal; some are, but most are not. So, your activation products can be, well, what is this; what radioisotope shall I call it; what efficiency would you like me to use. It's very difficult to do that.

But, I said, well, hey, I used to come out of research, so we can handle this. And what we did is we took representations of all the different kinds of things we encounter, whether it's an electronic part or a -- actually a neon or a fluorescent light bulb or everything you can think of that you run into in a building, and we gamma spec'd them and surveyed them with beta analysis and gamma analysis and, also, alphas, to determine what materials were in there; what radioisotopes. And then we determined deficiencies for those with our NIST-certified standards. And then we made guides for all of the operators and users in that building -- they may be an electronics person, not a rad person -- and a very easy to use cheat sheet, so they can pick up an instrument, survey their part as they dismantle: this goes in the hot drum, this one is not, with very good confidence. And this is something that's been in effect for a number of years now, has tremendously changed the mentality at that facility and has tremendously changed the risk downwards, and has concurrently empowered and raised the knowledge and the ability of the common person over there, who is not a radiation health physicist person, the everyday worker, the electronics tech or whoever.

That's the kind of process that I would like to see as part of an eventual law, just the same as it is with our routine lab surveys. This is something that is not rocket science. I train firefighters to be able to do this. And I know that at any institution, whether you are a reactor industry or even if you are not a licensee, it is possible to have proper instruments easily used and well used to certify and show that things are safe, before they hit the release spot, whether it's the lead recycler, or the hazardous waste facility or the steel or copper facility.

Thank you.

STINSON: Okay. And Kristin, if you could just give a little thought -- not to respond now, but just give a little thought to how you would see that working into a regulation of some format. That would probably be helpful.

Mike and then Jud?

MATTIA: Just to talk about markets, focusing on copper, but just to sort of give an overview of the values of materials, in terms of recycling, material like iron and steel, which we've talked about, is the most voluminously produced scrap; yet, when you look at a value per pound, it is the least expensive scrap or let's say the least profitable, because it sells at a fraction of a penny per pound. It's usually dollars per ton. Large values are produced, because there's a large volume demand, and it's one of the most expensive materials to scrap, because it takes a tremendous amount of equipment and manpower and expensive equipment to create the type of ferrous scrap that is in demand by the steel industry.

When you go to the non-ferrous materials, of which copper is a good example, where as iron and steel will sell for fractions of a cent per pound, things such as copper can sell for dollars per pound. So, it is pound per pound more valuable, because how much there is to be scrapped; how much it costs to produce the new ore, so it's more productive to create the scrap; and it's not -- you don't require as much processing in the scrap facility to produce copper scrap. Oftentimes, it's a case of just sorting and knowing what type of coppers goes in what bins and how you will sell it to what maker.

When you talk about scrap, I think the Cadillac of scrap, in terms of value per pound, would be nickel, probably one of the -- it's the gold of scrap, that and maybe below it would be things like stainless. But, these non-ferrous materials have a market value per pound in the dollars and takes a smaller amount of effort, in terms of investment, to produce. And so what you will have is the margins of profitability for, let's say, iron and steel, will be very, very small. Once you've produced and once you've shipped it, you're making a small margin; whereas the margins start to expand when you're doing the non-ferrous metals, because you're getting more for it per pound and you're -- what you have to do to it is less expensive than how you have to process the iron and steel.

So, if you're looking at the scrap industry, you could put the 600,000 pounds of ferrous material on the table and say, you know, that's here, and you're not going to see a whole lot of salivating over it. But, if you start putting tons of copper and tons of nickel on the table, tons of stainless, which is a very, very profitable metal -- it has a marketability worldwide; it's easy to ship -- there is, in terms of the scrap market, a tremendous interest. Now, granted, when you start dealing with the contamination, it becomes a problem, because just like the ferrous industry has been monitoring, so has the aluminum and the copper and the nickel industry, realizing that there's problems there, as well.

But, in terms of markets, in terms of profitability, the non-ferrous metals, just on a market basis, are those that -- you get attention with small quantities, where it takes huge quantities of ferrous and non-problematic quantities to really get the attention. That's why we've heard at the table, you know, the 600,000 tons of iron and steel, when you've got a heap, which is 100 tons, and you do -- you can have a facility that does a couple of those a day and there's a tremendous amount of ferrous out there, it doesn't turn heads. But, if you start talking tons of non-ferrous material, it starts to get people's attention.

STINSON: Okay; thank you. Jud?

LILLY: This is Judson Lilly and I have a question for Kristin and then, also, some DOE experience with the copper. The copper from your accelerator was activated?

ERICKSON: Yes.

LILLY: And the question I have was: what was the -- in more detail, how did you go about releasing that, as activated material?

ERICKSON: We did a funny thing at our accelerator, since our accelerator fell through the regulatory cracks totally. We decided, when I took over as RSO at the university, and it was a bad kingdom at that time, we decided to do it completely under NRC. Because we have many licensed sources and because there was not another regulation in place from our State, who was doing nothing, we decided that's the consistent easy way to do it. And so, we took that as our whole program.

What we do, actually, is -- the process is we analyze with gamma spec. For example, this copper would be one category or the electronic part, to determine exactly what isotopes are there and exactly what percentages are there. Then, we, also, looked at, with our standards, what efficiencies we have for these relative isotopes. For example, our activated steel is primarily going to be some very, very short half-life isotopes that go away quickly and what remains will be cobalt 60 and sodium 22. And we know approximately what percentages, about a 10 to 1 ratio cobalt to sodium. And then, we can either gamma spec it or use a Geiger counter contact, depending on the depth and the volume and the geometry, to determine exactly how much radioactivity is in that.

In this case, with copper, it was -- it's really quite thin, an inch or two, and it is massive, big slabs. Actually, they look like slabs -- pieces of a circle. And we just survey the entire thing by hand, found the one little tiny hot spot that's less than a centimeter in dimension, and labeled the whole thing, brought it out there for storage. They thought they were going to take it back and use it for another machine someday, which isn't going to happen. So, now, it's going to be waste. And the process is simply going to be our team goes out there with our Geiger counters. We use beta pancake, low energy gamma, high energy gamma, one-by-one gamma. We have all three. Alpha detection, we use those, as well. If it is any chance of teridium, we're doing wipes for that, or taking -- grinding samples, in some cases, and then we analyze.

Our limits that we use for release are always less than the twice background rule for the proper calibrated instrument, and that's under -- what we call under the NRC regulations. And the way we do it -- the proper calibrated instrument means I can meet the detection limit of 200 dpms per hundred square centimeters. In our case, we go lower, 200 dpms period. Whether it's a micron or whether it's larger, we calculate up for areas. In other cases, depending on what we're releasing and how we're doing it, we look at the MPC. We use that. So, if the maximum progressible concentration for unrestricted release for air and water -- and that's what I do with ash, I'm licensed to use the water limit for ash, which is another foolish thing and another reason why we'd like to see solid material numbers. Ash and water aren't the same density, but we can use that and we do, because that's the only licensed way we can get to that.

So, that is our process and it works very well. It just took some time, some preliminary effort on our rads staff's part to identify the groups of materials; analyze those very, very carefully and repeatedly, to get some good data; and then come up with some efficiencies and then write the guide, train the people, post the guides all over the cyclotron. That's what we did.

STINSON: Given the experience that Kristin is relating and the dollar figures of the value -- the potential value of copper in the marketplace, I'm wondering if there are any particular alternatives for control that make more sense for copper, than, perhaps, other materials. And I want to make sure that people get those ideas out on the table, you know, express your views on alternatives. And we need to understand if there are more potential health and environmental and cost impacts that you'd like to see the NRC consider, if they move forward with the rulemaking, get those on the table, as well.

Is that it for you, Jud?

LILLY: NO, I wanted to -- this is Judson Lilly, again, with the Department of Energy. I wanted to follow up. We've had similar experience to Kristin. We have accelerator facilities, where the copper has been activated. There's a facility in California, where we released activated copper at very low levels. We coordinated that with the State of California and, also, under the DOE Order 5400.5, which I've discussed, which does have a volumetric procedure. There are additional accelerator facilities, also, in California, that will be doing future releases. And then, finally, there's some copper at Frenold, that's on the table to be released, also, following the same procedure.

So, I think Mike was correct that this is a material, where the value is such that it warrants the extra attention, because of the price it commands. But, there is some experience on our side of the house, where we've been able to do this.

STINSON: Great; thank you. Paul?

GENOA: Paul Genoa, NEI. And, of course, with my experience with nuclear electric utilities, copper is a key component. We don't routinely see a lot of copper coming out during operations; but when equipment is changed out, there will be lots of cooper available.

But before I get into listing the types of copper and sources, I wanted to talk about another control element, to kind of follow on Kristin's thought. And this covers all materials and is required as part of the evaluation of a survey on all materials. And that's because at a power plant, we deal with a whole spectrum of isotopes from -- potential isotopes from the reactor and from the fuel. So, we don't have the luxury of saying, well, there's only carbon 14 here or there's only cobalt 60 or there's only cesium. In fact, there can be a wide spectrum, and the only way for us to be able to know is from process knowledge and experience and through sampling and analysis. Not only do we have to do the surveys, the gamma spectroscopy that you discussed; but we, also, have to think about those hard to detect isotopes, often in very trace quantities.

And it is a challenge. The detection limits for many of these things are very, very -- the limits are high; the detection limits and the concentration that's potentially there are very, very low. So, in many times, even when we send samples off for very expensive and detailed chemical separations, concentrations, and analysis at off-site labs, the answer comes back non-detectable. But, nonetheless, we assume that there is material up to that level, if necessary, and to develop what we call scaling factors or ratios between those hard to detect isotopes and the isotopes that we can see routinely; sort of like fingerprints for a certain part of our facility. And so when you can measure cobalt or cesium, which are very easy to measure with routine instruments, we, then, apportion an assumption that there are these other isotopes along with them, because they could be, and then our detection capability has to factor those things in, as well.

And that's, also, how we would characterize material for waste shipments. This really is designed for waste shipments; but it is, also, practice. Facilities in Tennessee that receive material from us, the Greenest Clean Program, material we think is clean, but we want to send it to a facility that's dedicated at survey and release, they will actually take that fingerprint analysis, build it into their computer algorithm, to determine their detection sensitivity and counting criteria. So, that's sort of an overview, and maybe that's a discussion of another control approach or monitoring approach.

But, as to the copper, itself -- and I really have just started thinking about this, so I don't have, you know, quantitative numbers for you. But the truth is, the NRC has done a lot of work on referenced PWRs and BWRs and virtually knows every piece in those power plants.

STINSON: Say what PWRs and --

GENOA: Pressurized water reactors and boiling water reactors. So, there are several new regs that I can refer you to that go piece by piece of what's in there, so they should know that material.

But, every power plant has a turbine generator system and the generator is a giant electric motor, completely wrapped in copper. Those are always going to be clean, unless some very bizarre thing has happened. There is, obviously, electrical cabling and very large electrical cabling, all over the power plant. All of that material insulated with very high integrity installation to last in a safety related capacity, over the life of the facility. And the experiences today, internationally and nationally, is that that material, even if the cabling installation is contaminated, when it's stripped off, the metal inside is clean. There are just small motors and pumps everywhere that have small electric motors, that have windings, those have the potential to have some surface contamination, depending on where they are; many won't.

There are electronics of all types that have copper components in them, that could be salvaged and recycled. It's unlikely that they would be contaminated, but it's possible. There are large transformers, huge electrically transformers that are loaded with copper; very unlikely that they're contaminated at all. But, again, I don't know where this rule is going, so we have to assume that everything has to be removed.

So, I would guess that -- and some of the motors, like our reactor coolant pumps that actually move the cooling liquid through the reactor, there's usually two to four of those and they're about 12,000 horsepower each, so they're very big engines -- very big motors, rather, and loaded with copper. And those have -- the reactor coolant pumps, themselves, have the potential to have some surface contamination. But, we've got real creative people out there that clean these things all the time and refurbish them, so I'm quite sure that they can be cleaned to some level, if it's established, and allowed back into the marketplace.

So, I think there is a valuable resource there. The bulk of it probably won't be available until decommissioning of these facilities, although there's probably a small stream routinely released.

STINSON: Okay, thank you. Dan Szwed, you've been waiting.

SZWED: Dan Szwed, speaking on behalf of the Metals Industry Recycling Coalition. To some of Mike's comments and Paul's comments, they're correct in their assessment that copper and stainless and nickel have cost values of dollars per pound. However, the industry is not interested in accepting any of that, unless it's clean. The risks to our products, many of those which go into consumer applications, is just too great and the business isn't going to accept it, regardless of what the price is. So the burden is going to have to be if stainless or nickel or copper is going to be released, it's going to have to be below a background number, it's going to have to be below a dose number, and it's going to have to be below numbers, where there are rigorous, accurate, and very low detection methods used to establish those levels. Just passing an instrument across and saying it looks like it's clean won't cut it in the marketplace for the ultimate customer, which is going to be the copper smelter or the nickel smelter or the steel smelter. There's just -- we pay too much money for that material to demand anything less than clean material.

STINSON: Because of consumer -- potential consumer reuse of this material, if it was to be released, are there any particular health and environmental impacts that you would recommend NRC pursuing, studying in an EIS format, as they go that route?

SZWED: Well, let's take the copper. I'm not a copper expert, but I have copper plumbing in my house and I think with the move away from lead-based solders -- I mean, there was an environmental impact, whether they were real or imagined, created elimination of lead-based solder in copper drinking water pipes. It has opened up new markets for alternatives to copper for drinking water pipes. So, anything in the way of an environmental impact, whether it's the chemical makeup or any radioactivity contamination, has to be considered and it has to go all the way down to the consumer.

That's the exact perception issue we were talking about yesterday. You may not think you can quantify it, but you have to. You have to use some of the assumptions from the experts in this audience. And I think Peter Hernandez brought up an excellent one yesterday, where he said, let's just assume one percent of the steel market goes away because of this. There's a man that's an expert in the steel business. Why isn't his opinion valued when he says one percent? Maybe that wasn't the most rigorous research done, but it's coming from an industry expert, so it ought to be acknowledged and that ought to be factored into it. And that's how you value the perception issues.

STINSON: Yeah. And I don't think there's any indication that, you know, any statements here are not being valued. I think the effort is to try -- I mean, people are repeating certain issues, not, I think, because they're being ignored, but to reiterate them and make sure that they're in the record and to put different twists on them and that's helpful.

SZWED: I'm just reiterating, as well.

STINSON: Yes, sir? Did you have a question about copper specifically?

BARNETTE: Jack Barnette, EPA, Chicago. Every year, several thousand -- tens of thousands of people are killed in automobile accidents in this country; about 400,000 people die from tobacco-related illnesses in America; and about two people die from shark attack each year. But, if you go to a crowded beach and yell, "shark," everybody will run out of the water and about half of them will get into their cars and light up a cigarette.

People understand cigarettes and they understand cars. They don't understand sharks and so they have a great fear of the unknown. I think the same is true of this discussion that we're having today. People have a great fear of what they can't control and what they don't know. And I think the people in the industry, who deal with the reprocessing of these metals, have stated it very clearly: people have an enormous fear of what they don't understand.

STINSON: Can you get to your point about copper?

BARNETTE: I'm going to get to my point. Some of the folks, who are the professionals in the health physics area, from a very scientific point of view, can point out that there probably aren't greater risks possibly from these things. But, I think the general public and the elected officials aren't going to understand that. If we want to reuse these metals, which is a good resource and it's a good way to save energy, it's a good environmental benefit, let's recycle them within the industry, itself, rather than have a free release. Free release jeopardizes the integrity of everybody at this table and it raises concerns with the public that can't be addressed either by NRC, EPA, or the industry, in general. So, I would say that if we want to do this and we see some environmental and economic benefits to the country, let's consider doing this within the industry, itself, as opposed to some other alternative.

STINSON: Okay; good. I wanted to -- I thought maybe you had a specific question. I wanted to allow that into our discussion. If members of the audience want to make general comments and offer their input, we're welcoming that and looking forward to that and we'll do that at the close of each metal discussion or each material that we discuss; so, just for future reference.

Let's see, I think we have Paul and then Susan -- I mean, Mike and then Susan. Paul?

MATTIA: Again, I'm going to ask Kristin to give me a little bit of an education. Your copper, for example, from your cyclotron, when that is offered for sale, how will it be presented? I'm assuming you are offering it for sale for recycling purposes. How is it -- how will it be presented? The individuals, who are asking to purchase it or bidding on it, what will they be told and what type of documentation is being presented for that material?

ERICKSON: That's a good question and, boy, we run into that often. We release things at MSU to salvage yard all the time. Our refrigerator goes there, an instrument. So, those things coming out of labs are an almost everyday thing. And we finally developed a process, working together with salvage yard, our campus, and ourselves, and that is when somebody wants to release anything, whether it's a refrigerator or this stuff from us, we have to do a complete and thorough survey for very single thing that could have ever been on it, according to the use it was.

And then, we have -- we've developed a form, called the "Equipment Release Form," and it was a simple piece of paper that we worked together with our physical plant people, who do the ventilation and all sorts of repairs, they were worried. And it simply says, this is what this material is; here's where it came from; and this is what was used; and here's what we looked for; we did not find anything at all and here's who you can talk to. We sign our name and date, so it traces right back to us even.

In the refrigerator case, it may be the lab releasing it. But, they don't trust them as much, so they actually have us check it, too, and we put our name on it. So, our office, which is Office of Radiation, Chemical, and Biological Safety, long name, ORCBS assigns that and says we certify it, too. That's how it's done. So, we release it as not radioactive, together with that form.

MATTIA: Just as a follow up, when you release it, are you releasing it according to Reg Guide 1.86?

ERICKSON: No, we don't use that at all.

MATTIA: Is it safe to say that there is some level of contamination possible in this material?

ERICKSON: No, there would be none. And this is part of our ALARA program. Ours, in MSU, is so aggressive. I've talked about the cement floor. That little chunk of carbon 14, I think anybody in this room might know how to find it. When we had an incident and we were surveying carbon 14, difficult to detect out for that incident at our cyclotron, we were finding things that the State did not find and the NRC did not fine. We're so picky and we go down to nothing. Things that the reg say we can release, we do not. Contamination on the bench in the lab that is permitted under the law, we don't permit. We cite it as a violation and make them clean it up, because that's our program. And when we release something, I, honestly -- we do it to such a degree, that I could defy anyone, anywhere, to come and try to find some radiation with any method they want. So --

STINSON: So, it sounds like your facility is diligent.

ERICKSON: We build in the most conservative --

STINSON: Right.

ERICKSON: -- lowest -- we find the way to do the lower load number technology. We make ways and we document that with certified standards.

STINSON: Susan and then we're going to ask if there are any comments out in the audience or questions that folks would like to raise. And Giorgio has a question, as well, I think. Susan, go ahead.

LANDAHL: Susan Landahl, Comm Ed. I just want to build on what Paul had mentioned, and one my concern, listening to the conversation, is that if the -- I'm always going to the practical implementation of any potential rulemaking. And as far as releasing material from the power plant, it would be very difficult for us to implement different standards for different materials, just because what we're releasing is things like motors that maybe has some copper, some aluminum, some plastic.

And while I understand the difference when you get to the end point, because if we're talking about reintroducing it into, you know, the population, it takes different forms when we do that. We need to have some way to actually survey, you know, these complex items when they come out. As Paul said, it would be very unusual for us to have a large volume of a particular metal, you know, like copper, maybe. When we replace a generator, then there could be something specific. But, I wouldn't want to ask health physics technician to be making a judgment on what the instrument should read, based on him having to know what material is in the item. Cable was another great example. You know, we can't -- we can't strip the cable before we release it and count the insulation to one level and the copper, you know, within it to another. So, just from a practical standpoint, I'd ask you to take that into account.

STINSON: That's an important point registered under the potential for alternative control measures. Giorgio?

GNUGNOLI: This is Giorgio Gnugnoli from NRC. I just had a clarification question for Kristin. Earlier, you said something about using twice background for copper and then you said you're so clean, that's below, you know, the normal affectability for other entities. I just wanted to clarify those two things. Maybe, I got the wrong thing written down, that's all.

ERICKSON: Okay. We use a variety of instruments. I want to first comment that we don't use one millirem or anything. We have microrem ion chambers, so we know our background is 10 or 20 microrem or 100 or 200, depending on where we are. And we are at that level. We use an ion chamber. We use a beta pancake detector, which sees between 30 and 100 counts per minute background of radiation, which translates 10^{-5} micro curies per gram for carbon 14. So, we see that level. For low energy gamma, we get a background of one to two hundred counts per minute. For a one-by-one gamma, we get eight hundred to fifteen hundred. To use a high energy gamma background detector, which I believe that's what a lot of the waste scrap metal places are using, you can see three and five-thousand counts a minute background.

That's why this twice background thing is critical and I don't think it should be used. You know, a generic twice background number, our State has that. Twice background could be a wide range.

GNUGNOLI: So, you don't use it, though, is what you're saying?

ERICKSON: We use it on certain parts of it, if we're screening. Okay, if I'm screening lab benches twice background; but, then, when I release something, I use every instrument possible to get down to the MPC numbers. Thank you.

STINSON: Okay. Thank you for that clarification. Frank, you have a question, also? No. Rob, then, we're going to move on in our discussion.

LEIB: Rob Leib, First Energy. Mike's question about can you really say that there's no contamination, the way I view it is that there's really no way that you can guarantee that there's not a few atoms of this and a few atoms of that. All you can say is within the statistical ability of your instrumentation, that we cannot detect any difference from the background, with the parameters that you set. I just want -- I don't want you to be disillusioned and hear that, you know, yeah, there could be a few atoms.

STINSON: Is that current, Mike? Very quick.

MATTIA: Just two issues. One, I agree that the concept of zero is a very difficult issue. And that goes back to the comments we've made in the past on numerous occasion, that if -- as we talked about perception, people understand zero and people understand anything above zero of radioactivity could be a problem. That's why there is a need for -- in the industries and the scientists to come to some kind of an understanding that zero isn't the ultimate; maybe that something above zero is livable with, even if we're talking -- because no one can say that it's at zero.

The other issue in dealing with copper, for example, and this doesn't go just to the scrap recyclers, but it goes to the people who own the material, the steel mills or the industry, if you've got some copper and in order to sell the copper for two dollars a pound, it's going to cost five dollars a pound to clean it; now, you're going to be in a quandary, because the industry may not want to make money selling this material to scrap, but they certainly don't want to take a bah on it.

And so, the concept of at what level will it be acceptable to industry and at what levels are considered clean is a tremendously important issue, as is decontamination, because, you know, maybe you don't want to strip the insulation from the copper cable. Maybe there are industries that will do that and buy it for x amount or you strip it and then you sell it for a higher amount.

But, again, these are issues that need to be addressed and some conclusions reached, before you start to create rulemaking, because then you've got the industries agreeing on how this material will flow within parameters, and then you can create the rulemaking. Just dumping it out there, I think, it's going to -- on large levels, it's just going to cause a great deal of chaos.

STINSON: Okay. Paul, did you need to follow up on that?

GENOA: Paul Genoa, NEI. As a point of clarification, and following along Mike's thought train, the truth is nuclear power plants are in the business of making electricity. That's what we do and that's what we're focused on. The materials management issue is a collateral activity that's required. It's the cost of doing business.

We learned a long time ago that in many cases, it's more profitable, it's more effective, to allow market-based solutions to handle some of our problems. And so in the Oak Ridge area, for instance, there is -- developed a whole series of industries that are vendor oriented industries, to serve some of our unique needs. And those unique needs are things like the processing of material, as you mentioned.

We would not take an electric generator or a reactor coolant pump and strip it about at our facility. We would transfer that piece of equipment, probably under license conditions to a license vendor, who is in the business of doing that. And that person, who does nothing other than take apart those kinds of pieces of equipment and subject them to radiation survey and release, or constant decontamination, concentrating the activity in one place and disposing of it and isolating it safely, while releasing the clean material for reuse. So, we fully envision that if a standard is -- if a reasonable practice safe standard is developed, that the existing industries out there will continue to do what they're doing and new industries will evolve to address those solutions for us.

But, just so you understand, we don't go to a great deal of trouble. We don't take a computer terminal apart and strip out the copper parts and do something with them. We release a computer terminal or we throw it away. It's just physically impractical.

STINSON: Or you send it to a licensed -- another licensed vendor.

LEIB: Right, or -- yes. Someone says, hah, I can set up a business by taking computers from all over and subjecting them to this type of recycling. And that's what I'm saying, it would be very difficult for you to anticipate who could do what under what conditions. But, if you set a standard, then the market will respond, if there's a market.

STINSON: Okay. Two cards have gone up. I want to shift our conversation to concrete, or else we're never going to get there. So, if you guys can live with that or fold in your comments elsewhere, Peter, that would be great. Are people okay if we proceed into concrete and get that discussion going, before we take a break? Anybody dying?

[No response.]

STINSON: Okay. We're going to look to you quite a bit, Charles, on this particular issue. Again, you know the questions before us and if you can just speak a little bit to the experience that you may have or know of, regarding the nature of the recycling of concrete, how it's used, etc., and how introduction of additional or particular types of radioactive material would impact your industry, that would be helpful.

WILK: Thank you. I'd like to start out first of all to say I'm Charles Wilk with the Portland Cement Association. The Portland Cement Association is an industry association of the cement manufacturers in the U.S. About 94 percent of the cement that's manufactured in the U.S. comes from our member companies.

There is a distinction between cement and concrete, and it's important that people keep that in mind. We often use, including at this table sometimes, the term cement --

STINSON: Just now in my comments.

WILK: -- and concrete. Cement is a manufactured material. It makes up 12 percent -- generally, 12 percent of concrete. Concrete is 12 percent Portland Cement, usually. There's aggregate sand and water that's part of that, to make up the very familiar material that we see. Concrete is used in -- obviously, in paving, in buildings and structures. You'll see a lot of it in high rises. It's finding an increasing use in residential housing. Most people from -- in many part of the country have concrete foundations and basements. We're, also, seeing an increasing use of concrete in above-grade residential walls in construction. And I think that's important to the discussion here, as far as risk, because you may with to base whatever your calculations, as far as safety, on people sleeping their entire -- sleeping, living in a surrounded by concrete. And, of course, while they're at the workplace, they're surrounded by concrete. So, their exposure -- their everyday exposure to concrete is probably greater than most of the materials we've talked about so far.

You, also, have to realize that concrete is used for drinking water reservoirs. In tanks, it's used for conveying drinking water. It's, also, used perhaps -- and we'll get back to it here when we talk about uses of pre-owned concrete, that concrete -- there are reservoirs that are lined with riprap, which could be recycled concrete.

As to the different uses for concrete that's been recovered from other facilities, first of all, it's important to note that concrete is not used in the manufacturer or cement. Cement is manufactured from quarried and mined materials. It's not -- the use -- you don't grind up concrete and put it back into a cement kiln to produce new cement. However, concrete -- used concrete might find its way back into new concrete as an aggregate. There, also, a great use of used concrete as a paving base. People from Chicago here might know that the Eden Expressway was previously used -- was previously constructed of concrete. The old concrete layer was ground up and used as a base in place for the new concrete that was placed over it. Used concrete can be used as fill. Some of that fill goes into residential housing and some of it into industrial uses. I mentioned before that used concrete might go as riprap that would line reservoirs.

Another point I wanted to make is concerning costs, and earlier statements were made, as to the relative values of different metals or alloys in the marketplace. I, personally, do not have a dollar value for what used concrete might be valued at. I can tell you that Virgin Aggregate, which is probably the closest material to perhaps recycled concrete, although I think Virgin materials are probably worth more, Virgin Aggregate is worth around eight dollars a ton. So, it is very -- the value of used concrete would be significantly less than that and -- which brings us to something concerning economics.

I don't really see -- well, let's go back. In our industry, when people make -- in the concrete industry, which would, I guess, in a way include the cement manufacturing industry, you have the cement manufacturer, you have the people who create concrete, which would be the Readymix -- the Readymix folks, they would be, then, in turn, stockpiling aggregate, and cement and water. And then, of course, you have the cement basins that would use this material everyday.

The -- we discussed the detection, as I understand, and I think that the scrap industry is probably further along in this than the Ready Mix industry, in that in the scrap industry, people use detectors for each load of material that comes in. I'm not aware of any Readymix guys -- or Readymix companies that screen demolition concrete with radiation detectors. There might be some out there. It's quite a diverse -- it's quite a diverse bunch of people, as far education and business practices. So, there may be some out there that do screen this material, but I would suspect there are a significant number that do not.

I think that's important, in terms of economics, to understand, because if the concrete industry and the Readymix industry learns that there's a possibility of them receiving material with some level of radiation, they would probably be very, very interested in now buying equipment and training people. I understand that it's not rocket science. I think it's probably nuclear physicists science, as to the detection of that. And there would be quite a significant outlay in capital for the equipment detection and in training of the people who would be conducting the surveys of that material.

We had a comment earlier today concerning the cost to power generation, as to increased cost of disposal. It would seem that if the NRC allows the unrestricted use of material, even at some level of radioactive contamination, that what the NRC is doing is actually moving the cost of disposal from the power generating industry to other industries. And I don't know whether the emotional part of this issue would then cause the industries that were receiving these materials higher costs, higher dollar values than would have originally be incurred by the power generations or the people with this material in their disposal costs. Perhaps if the rates were raised commensurate to include the disposal costs, people may use less electricity, and there's obvious environmental and economic savings in the use of less electricity.

That's pretty much the end of my formal presentation. Thank you.

STINSON: That's helpful. And it would be helpful to hear from the industry a bit, and maybe that's why Paul's card is up. What kind of material, what amount of material would be coming from -- potentially from different facilities, you know, and where might you see it sort of going from there and where does it go, you know, if it is, in fact, through decommissioning instead of release, at this point?

Peter, did you want to address this issue or -- okay, go ahead.

HERNANDEZ: Thanks. Peter Hernandez. I wanted to ask: what is the current recycling rate for concrete and do you see that as increasing, staying the same, or decreasing over a period of time? That's the first question. And then the second: does it include highways and bridges?

WILK: Okay. The current recycling rate of concrete in the manufacture of Portland Cement is zero. As I stated before, I'm with the Portland Cement Association and that's what we do. We, obviously, have associations with other industries, including the people that produce concrete, and a very close association, because we -- obviously, our industries are closely tied.

The -- I have not researched that question to give you an answer. One of the factors of recycling concrete, because of its value is so low, you don't transport that material very great distances. And as an example of the Eden Expressway, the material is ground and used in place. I would imagine, again, the value is very low and so the risks posed to a Readymix company, as far as public opinion fallout from possibly radioactive foundations and so forth, is quite high, compared to the benefits to that industry.

HERNANDEZ: Thanks. The reason I asked is I was in Denver recently and I saw them recycling a highway and some bridges. What happens to the steel that's in that material, if you're grinding up and reusing the concrete --

WILK: You're talking about the --

HERNANDEZ: -- the cement.

STINSON: -- the reenforcing steel that would be embedded in the concrete?

WILK: There are plans that can separate the rebar out of the concrete. And I'm not certain of this, I would assume that that steel just goes back as scrap steel. I don't really know the metallurgy of rebar to know whether that's just common steel. Perhaps people here from the scrap industry know. So, I don't really know the value and how much effort is placed into separating and segregating that material.

STINSON: It seems like a real relevant piece of information, at some point, to find out what the answer to your first question, what really is the rate of recycle of concrete and how does it get used? How big is the industry, etc.? And we appreciate you trying to speak as much as you can at these issues, recognizing it's not really directly your business.

Steve? And we'll just let you know that the comments for concrete we're going to take at the end, so I don't want -- you can stand if you want to, but I don't want you to have to stand the whole time. Steve?

COLLINS: Steve Collins from Illinois. Questions again for the Portland Cement representative to educate me. The cement comes from quarrying what? And then after you answer that, at what part in the process of making concrete or other use of Portland Cement does fly ash get added a lot of times?

WILK: Okay. Cement is made by quarrying shales, clays, limestones. They are fired into large industrial furnaces that exist on the earth, to 1400 degrees to 1800 degrees centigrade. The use of fly ash has increased in concrete. Fly ash is used in two ways. There are such things called -- it's called blended cements, which are blends of cement and fly ash, which those bends are made at the cement manufacturing facilities. There are, also, -- there is, also, fly ash that is introduced into concrete at the Readymix plant. The federal government mandates some level of fly ash, to be used in all federally-funded projects.

COLLINS: Okay, that's very helpful. So, everything that goes into your process, unless steel or some of the others, is a naturally occurring material from the earth, so it has naturally occuring radioactive materials in it, including the fly ash that you add to it. So, it would appear that maybe your industry might be more receptive to accepting some slight increase of some radio nuclides and still using that? Or is that not an accurate statement?

WILK: So, you're asking if our industry would be willing to accept additional radiation in their product?

COLLINS: In other words, is recycled --

STINSON: Given the level of background, it might already exist.

COLLINS: Is recycle more of a potential on yours than some of the other metals industries want to --

WILK: Well, I really don't know the answer to that and I think the way to discover that answer is for the NRC to conduct a perception study, as to people's willingness to accept greater activity in their basement foundation and their above-grade residential walls and in their office buildings.

STINSON: Okay. Let's keep this discussion moving. See if there are thoughts that you all have on methods for control. If anybody knows about the use of detection equipment regarding -- for concrete or for cement, that would be helpful, trying to bring some of those issues out.

I was going to go to Jas and then Mike.

DEVGUN: Jas Devgun. I think my first question of the day for Charles. I think you spoke very well, with respect to the overview of the concrete industry as such. But, do you see any resource value, not only in terms of the concrete, whether we recycle or how cheap it is, but in terms of what else we do with it? Like, if we dispose of it in landfills -- industrial landfills, we are taking up a lot of space there, too. And that's a resource in itself -- the landfill space is a resource. So, there must be some kind of balance in the value to the society, the net benefit.

And then maybe, areas, for example, where you, obviously, don't want to put it in people's basements and they probably would not -- from perception alone point of view, would not like to have a basement, which shows any licensed activity there at all. But, in terms of the highways, for example, which use very large quantities, may not be as high. Do you see any value with respect to those two issues: the resource and conserving the disposal space and, also, in terms of using it on highways?

WILK: I understand that it costs money to run a landfill. I'm not well enough versed in this to know whether or not the radioactive contaminated concrete is -- goes to a sanitary landfill or a hazardous waste landfill or does it go into a demolition degree landfill. There's probably differences in the costs between all those different disposal scenarios.

From a scientific sense, I can see that conservation resources is important. But, the economic reality will be that people will not want to purchase concrete that has a higher radioactivity or a potential for a higher radioactivity, than was done before people started recycling this into commerce. And those costs would -- I would suspect, outweigh the additional disposal costs, based by the people who generated and profited from the use of that material.

STINSON: Okay. Mike and then Kristin? Steve Collins, is that current? That's current.

MATTIA: I guess the question for anyone: where -- and let's say, facilities that would have radiation, that would be recycling material, where do you see concrete being used and the potential for that concrete to be demolished or potentially recycled and what's the potential for the contamination and for decontamination?

STINSON: Kristin and then Paul.

ERICKSON: I'll answer that one first, because I was going to comment that anyway. In the academic and medical institutions, it's not a common problem; but as years wear on, we encounter it more and more. The comment about the building, we totally -- we gutted it right down to the bricks and then rebuild, cement floors, walls, ventillation. So, we encountered some there. As years go on, though, and we do begin to tear down more buildings -- our science buildings, we may, again, encounter it.

Now, the potential for contamination is essentially none, very, very little. In fact, that whole huge building, Anthony Hall, four floors, big, big, building, we found one spot, less than one square centimeter, of 200 counts per minutes, which is barely above background, and that's all we found in the whole building. So, I don't think it's a big problem for us. I think the surveying of it is easy, because it's likely to be surface contamination, if anything at all.

And release of it, well that's pretty easy, too. You find a spot. You either decontaminate it and treat that as radioactive waste, whatever the materials are, or you just chunk it out and treat that as rad waste, which is what we did with that spot.

I have two other comments related to and to respond on the fly ash and the cement, in general. Thinking of the mining of shale and what it does, I've seen them smash mountains in Colorado and I'm not a really big activist in Greener, but I do care about the earth a lot. That's how I got into this business. I think we all did get into for that reason; otherwise, why would we be such masochists?

At any rate, that's one thing to think about. If you mine all that shale and knock down those hills and those mountains or create those gullies and take chunks of the earth out to build roads or bridges or homes, this can be minimized by reusing concrete. Overall, I think concrete is an easier and more likely candidate for reuse, because of the ease. It's porous. It crumbles apart. If I had a chunk, I could actually just analyze it by dissolving it and doing some very sophisticated wet lab things, easy to do. So, I think that's one thing to think about.

The other thing to think about and keep in mind for Charles, your fly ash has higher radiation than most of anything we could ever release. I cannot use fly ash or wood ash or coal ash or anything else in my analysis of our ash. It cannot be used for control ash, because there is so much radiation in it, that it's much higher than anything I measure.

STINSON: That was part of Steve's point, I think, in raising it.

ERICKSON: Yeah. The radiation in there is enough, that you would have trouble measuring low, low levels already. Just a comment.

MATTIA: I think it's alpha and beta.

STINSON: Thank you.

ERICKSON: Alpha and betas, yes; that's right.

STINSON: Sure, go ahead.

WILK: As I mentioned, the content of --

STINSON: Mention your name, I'm sorry.

WILK: My name is Charles Wilk with the Portland Cement Association. The use of fly ash, as I mentioned before, is mandated by the federal government and I think -- I don't really know the regulatory history as to that. I would suspect that the reason why they were interested in incorporating fly ash into concrete is to find a way to manage the waste stream from cold fire air -- cold fired electric facilities. So, fly ash -- I think we would probably be more interested, as a cement manufacturing industry, to produce more cement, than to substitute it with fly ash. It's not as part of our choice that we're introducing possibly radioactive material.

And the prospect of adding additional radioactivity to a product associated with cement industry, as I mentioned before, I don't really know the answer to that, but I would suspect that some study could be done to ask the public would they be interested in living and surrounded with more highly radioactive concrete.

STINSON: I have to apologize. I mentioned that I would be taking the public comment on copper and I thought I would ask for that at that moment and I think I didn't really ask for it.

There may be comments that you want to make on copper. We will certainly do that for concrete also, so if you do have those comments you are not passed by and we will take both of those at the same time when we complete the concrete and cement discussion, which we may accomplish before the break but probably not given the number of cards that are up, so be ready to make comments on both at the conclusion of this discussion, and we will go Paul and then Steve and possibly take a break.

GENOA: Paul Genoa with NEI. I wanted to focus on a couple of comments made, to reinforce them, and that is that concrete is very heavy and its recycle value is very small, so it is unlikely that facilities are going to transport the concrete a very long distance because the transportation costs will outweigh the benefit.

The second point is that nuclear facilities generally, because of th stout nature of their construction, the benefits of the shielding and the containment offered by concrete, particularly in power reactors, we have huge volumes of concrete.

Our concrete mats at the bottom are 10 feet thick. The side walls are three to five feet thick of our containments. Tens of millions of pounds of concrete in a facility. Most of the material stays in the facility until the facility is decommissioned. You could envision sidewalks, parking lots, incidental materials, perhaps shielding block and so forth that might be released during the operation of the facility.

Concrete itself is a porous material, so there is the potential that if contamination -- if it is directly contaminated that it could soak into the material some distance. Power plants learned this lesson early-on and the inside surfaces first are generally covered in steel but in other cases are covered with epoxy coatings and so forth.

Our recent experience in power plants is that potential contamination within the containment structures, the most highly contaminated parts of the plant, are limited to one or two millimeters thick surface contamination.

During the decommissioning of these facilities that material is scrabbled off with aggressive grinding type tools, also hydrolasing and so forth, so if you can vision a four foot thick concrete structure with two millimeters removed from the outside, the rest of it is clean.

There is some potential that in close to the reactor itself there is activation in the bioshield. Those areas are put there to protect the workers should they have to enter. Those areas probably are not ever suitable for recycling or reuse and most likely will be disposed of at a facility.

The rest of the concrete really makes most sense to either leave it standing, demolish it and bury it onsite, a concept known recently as "rubblization" -- but it is nothing different than is done in many other industrial facilities essentially using it as beneficial fill within the site and taking allowance for any potential activity there in the model that is required under the license termination plan or releasing the concrete to a local industrial landfill or releasing the demolished concrete to a vendor who wants to use it as aggregate in nonstructural applications or perhaps in rip-wrap and things that Charles mentioned.

The 1640 document indicates the typical endproducts for recycled concrete include base for roads, stabilizer for asphalt, and aggregate for nonstructural materials. The references here indicate that recycled concrete is not used as aggregate in structural concrete such as used in houses or buildings.

The rebar issue -- generally if the material is demolished or recycled or even just demolished for disposal, rebar would be separated out and experience is that scrap dealers would tend to take that rebar unless again it came from in close to the reactor or it was activated and then it couldn't be released. It would have to be disposed of.

I have recent experience coming back from Germany last month at a clearance symposium, international. We went to a decommissioned German reactor. We watched them go through a very meticulous implementation of their 10 microsievert or 1 millirem per year clearance standard. They not only -- they cut out with diamond saws the chunks of concrete including the rebar. They surface frisked all surfaces. They put it into a calibrated box counter. If it passes those tests it moves through into another calibrated box counter that is operated by the state inspectors and if it passes that then application is asked for for it to be released.

Once it is granted it is released. At that point the radiological considerations are done. A dealer comes in, grinds it all up into aggregate. The rebar is released for scrap. The aggregate is released for road bed construction in the vicinity of the facility and that is how it is managed.

A final comment on the fly ash. It is important to understand that I think you are absolutely right in what the motivation was to take care of this issue. It is a resource conservation issue, but it is hard for us not to acknowledge the fact that the levels there that were found acceptable and do not appear to have impacted the sale of that material are ten times higher than the levels being talked about internationally, so the fly ash is roughly 10 millirem per year, 10 times the clearance levels that the international community is talking about -- for perspective.

STINSON: Okay, Tony, we will let you go ahead, since we queued you up, and take a break.

LaMASTRA: Just an anecdotal comment on recycling of concrete. Several years ago when New Jersey was cleaning up the Montclair and Glen Ridge communities that had the residue from the old radium days, they tried to ship out the material -- essentially dig out underneath the houses, which was dirt, not concrete, but ship it out to a disposal site out West, and most of the states in between objected to it. The Governor of New Jersey suggested that they take the dirt and use it as fill for Interstate 78 in an area in Union County which required building up about 100 feet in elevation of road bed. The idea was to lay the contaminated material in the middle of this 100 foot elevation fill.

Several groups in that area essentially picketed, so here you have people essentially reacting to putting something in the middle of a 100 feet of dirt in a road. Again, whatever you do, I think you have to take into consideration the perception issue.

STINSON: Okay, thank you. I have ten to 11:00. We will come back at 11:05 and continue with this discussion and move on to our next material, which is soil.

[Recess.]

STINSON: Okay. We have a couple of things to cover here. The first is we have a member of the public, an environmental community representative, I think, who is prepared to read a written statement. Is there someone who would like to do that -- we'll go ahead and accommodate schedules here and ask you to go ahead and read your statement at this time, if that is what you are prepared to do, and then we will continue a discussion of concrete with Steve and then Jud and then take -- if you still have a comment, Jud -- Is that Jud's card? -- and Rob and those cards that are up, and then find out if there are any additional comments on copper or concrete.

Go ahead. Mention your name and affiliation.

BALCH: Okay. Is it me you wanted to speak now?

STINSON: Yes.

BALCH: I am Jeff Balch. The term "BRC" -- the term "below regulatory concern" is not used these days, but I believe it is still what is at issue here.

My disagreement with the Commission is fundamental. The Commission is looking for safe ways to direct radwaste, and I just feel that more effort -- all effort should be placed on eliminating radwaste and not trying to find waste to introduce it into the public waste stream.

My statement is a parody. This is the way that I prefer to express my feelings about this policy. I entitle it "Below Regulatory Concern." It will just take me a minute and a half to read it to you, and I have extra copies for anybody who wants them.

I was walking to the soda shop to get me a malt when I got mugged and robbed, got my head stepped on. There was a cop on the corner. He witnessed the assault. He walked on over when the thieves were gone. He had a big old gun. His shades were black. He was tall and taciturn. He said, "I would have jumped in, but it looked like this attack was below regulatory concern."

I asked him what he meant. He said "You hurt real bad? " I said, "Some bruises and my head feels strange." He said, "And how much stuff did you lose?" I answered, "My credit cards, five bucks and some change." He said, "We have got a new mugging policy now. It may seem a little bit stern but if the injuries are minor and the theft is small, it is below regulatory concern."

So I walked along and passed a kid who whacked me in the knee with a baseball bat. His dad was standing just a couple feet away. I said, "You are just going to let him get away with that?" The dad said, "Hey, the kid's still young. Give him some time. He'll learn. But for now, since he has not killed anybody, he is below regulatory concern."

So I limped back home and from the end of the lane I saw flames shooting out of my house. There was a fireman there. He asked, "Who is inside?" I cried, "My two kids and my spouse." The fireman said, "I'm sorry, pal. We're going to have to let the thing burn because with less than one spouse, four kids and two pets it is below regulatory concern."

Now we are gathered today to discuss deregulation of some kinds of nuclear trash. The NRC says the deaths will be few and that BRC will save some cash. Well, I think we ought to answer very clearly before we all adjourn that nothing that causes people to die is below regulatory concern. Those are my feelings in this matter.

STINSON: Thank you. Thank you for taking the time to come. Let's see. Steve, did you still have a comment you wanted to make?

COLLINS: I took care of it at the break.

STINSON: Okay, good job. Jud?

LILLY: I wanted to -- this is Jud Lilly from the Department of Energy. I wanted to just for informational purposes second the remarks that Paul had about the commercial nuclear industry's dealing with concrete and the quantity issues. There are significant quantities of concrete.

The thing that hasn't been brought up explicitly -- I believe the NRC is aware of this though -- is the benefits, the market value of concrete for recycle is not very high but the disposal cost for the concrete are enormous, so it is the quantities and the disposal costs of this as low level waste would be the driving part of this equation. I just wanted to add that to the formal record here.

STINSON: Thank you, Jud. Rob.

LEIB: Rob Leib, First Energy. This is kind of a question for Charles. I think you may have part of an answer for us -- the fly ash issue and its reuse in concrete.

It is also reused in other consumer products. We know for a fact that it has increased levels of natural radiation that have been concentrated by the processes that go into creating fly ash. Has there been an economic impact to any industry where this increased use of fly ash has occurred? Has there been a public outcry? Has there been a loss of jobs or money or whatever?

WILK: I don't have the statistics to --

STINSON: Would you just mention your name?

WILK: Oh, I'm sorry, I'm Charles Wilk, with the Portland Cement Association.

I understand your point on the fly ash issue. The use of fly ash again was required for Federal funded projects. I don't really know if at the time when that was mandated whether the public was told or whether it was considered that the fly ash had some radioactivity to it.

SPEAKER: It was.

WILK: And I wonder if in today's -- now if people were to come up with the same argument whether the result would be the same, whether the public would be interested in purchasing concrete that has some level of radioactivity that is attributed to the fly ash or would they just go with a natural material.

I wanted to say to everyone here that I am not really debating your science. I understand that. What I am trying to convey is that there is science and there is also a lot of other factors that go into the economy.

There is a third point, and I don't know if this is the appropriate time, but we had talked about -- Paul, you had mentioned that demolition of concrete is used sometimes for aggregate in nonstructural concrete. I think yesterday we discussed about perhaps using used material as part of the packaging for higher level radioactive waste that was destined for disposal, going to the mountain of course at Yucca Mountain or maybe at WIPP.

The concrete that -- those kinds of facilities that they are destined for -- for Yucca Mountain they last for thousands of years -- the concrete that I would imagine that would go into the packaging or structures at Yucca Mountain would be probably the best concrete that Man has ever made -- you would think, right? -- because actually the Pantheon has been around for centuries but Yucca Mountain is going to be there longer.

I am wondering whether or not, because right now the concrete, used concrete is used for nonstructural things, that Yucca Mountain would probably be the most highly -- the durability of that would be longer than anything Man has made so far I would think of the structural concrete.

DOE and NRC might want to consider that.

STINSON: Okay, good. I just want to ask sort of a final question on the concrete cement area material, concrete especially, and that is are there suggestions for particular alternatives as a result of this conversation or because of your own thinking prior to this meeting, alternatives that folks would come forward with? Prohibition, unrestricted release, restricted release only to road beds, restricted release to landfills -- how would you suggest managing this particular material?

That is not assuming that all materials would be treated differently, but just to illuminate for this material -- any particular thoughts?

WILK: Yesterday didn't we talk about --

STINSON: Charles, go ahead.

WILK: Oh, I'm sorry.

STINSON: No, Charles, go ahead. Just mention your name.

WILK: Okay. It is Charles Wilk from the Portland Cement Association.

Yesterday didn't we mention that restricted use eventually becomes an unrestricted use at some time?

STINSON: Yes, we definitely talked about that in some depth.

WILK: Okay, so --

STINSON: I just wanted to see if there's anything further that you might want to say on alternatives, which is the third column up there, and we did talk about it yesterday. We just haven't talked about it much today.

We talked about it in general terms, not specific to concrete. Paul?

GENOA: Paul Genoa, NEI. I am just throwing this out to answer your question, because I think concrete is unique among the materials we have talked about today.

The economic value associated with its recycle is limited. The costs of transporting the bulk and weight and mass are high. It has other environmental impacts. So perhaps a different strategy for the material or perhaps the realistic uses of the material are limited and so could be reflected in some kind of control scheme, but as I point out, it is envisioned that the bulk of the material should be decontaminated to the extent possible and should be used in its location. You don't want to transport it across the country.

Now for certain specific material, as I talked about bioshields, other areas where the activity is high, you are going to have to take care of it that way, and that is how it has been taken care of in the past, but for the bulk of the material you are going to be able to reduce any activity associated with it down to extremely low levels and the material could safety stay at the site, could be used perhaps for roadbed, rip wrap, other direct reuse applications in the local vicinity of the facility or disposed of in industrial landfill somewhere in the location of the facility. I mean those are sort of the logical outcomes.

STINSON: Okay, great. Let's move to the audience and see if anyone has any comments that they would like to make. Two folks -- we will take the gentleman on the right. You have been waiting quite awhile, I believe, and then in the back.

NECHVATAL: I am Mike Nechvatal from the Illinois EPA. We have dealt with concrete demolition from many, many sources for many years, in Illinois at least, northern Illinois. It has no value. It is a negative value even when taken to recyclers. They pay the recycler to take it.

In fact, those recyclers in most cases would not be there were it not for state grants that buy them the equipment to crush rocks and such. Even with that in its place, the amount of illegally disposed construction and demolition concrete waste is very high in northern Illinois and Chicago itself had some examples of extreme disposal, like 40 feet high of square city block. I am not kidding.

There were several of those. How do they get cleaned up? Most of them had public funds used to take them to quarries where they were disposed of as clean construction. It was just concrete. It was not concrete and other kinds of construction material. It wasn't contaminated in any way.

My point is that there is no market for this material. Certainly if you have to take it any distance at all there is actually no market in terms of geography below Chicago. In central Illinois and more rural areas of Illinois there is not even a market for recycling whatsoever so it is taken to either landfills -- actually landfills kind of like the stuff. They build roads out of it a lot, so to some degree they like construction demolition waste, or it is taken to landfills solely for its construction concrete disposal or a lot of it is simply just discarded on the side of the road, and that is really bad.

So the idea that there is an actual market for this -- this is actually recycling -- is kind of tenuous at best. It is just another disposal method.

One option -- many industries dispose of inert waste on their own property. The stuff could be left, I suppose, if it is inert and clean, it could be left on site.

STINSON: That's certainly part of what Paul is suggesting I think might be most practical. In the back? Come forward and just state your name and affiliation if you have one.

QUASEY: My name is Kathy Quasey. I belong to several different groups, interfaith groups and peace and social justice groups and some environmental groups, but today I want to thank you for the opportunity to at least offer the option to talk to you. I come to talk to you today as an individual, as a human being.

I am a writer and a marketing person. I have a Master's in Business. I understand the whole marketing opportunity of this industry nationwide and what it represents in a number of industries. As a writer I have researched this for over three years now, so I come with some knowledge of what we are talking about.

But all of that aside, I just wanted to provide some testimony today regarding some of the personal experiences I had this year.

This spring I met a woman who is from Russia. She is a very professional person. She was at a resort outside of Belarus when the Chernobyl accident happened. She and her husband had very professional jobs.

A few months later she miscarried terribly malformed twins. A few months after that when she was pregnant again she aborted terribly malformed triplets. Her daughter has a very bad kidney ailment, and as a result they fled the area. They came to the States. She is now working a two-bit job and her husband is working driving a cab in the city.

This summer I met some more children of Chernobyl. Many of these children were 10, 13 years old now -- how long ago was it? '86, right? -- and I tell you just as an individual if you can just open your hearts and think about your own children or the children that you can see, and you see this one little girl who is about 10 years old and she had a very severe vision defect and she had as a result very timid steps. She was hunkered down. She was beautiful and she was paralyzed at the same time in her relationship with the world around here.

What we know of radioactivity we can't claim any innocence of youth anymore. My father worked in this industry as did a lot of the parents of my friends growing up. They were all wonderful men, good family people. They had great intentions. They thought they were solving one of the world's great problems. But here we are many decades later and we know that we have invented something that we don't have solutions for and at this time no matter how we treat it or recycle it the truth is at this time we cannot contain it. We have invented something that will last well beyond us, beyond the Romans and the Greeks and Henry VIII and President Reagan and President Clinton and well into the future, so what we are encountering is actually if you can consider that the exposure and the way it is being presented at this time the multiple exposures with no control within a household, within the frames of households.

We have some testimony from indigenous people who live in radioactive, contaminated houses. They have high rates of cancer, and we are talking about exposing our unborn children as well as our living relatives, and I ask all of you to think about yourselves before you got your titles, think of yourselves as human beings before you had positions of authority, and to contemplate what it means when you look at these children who essentially are causing the extinction of their own family trees and in Russia we are looking at a very high death rate now.

So I feel for you. I have a lot of empathy because I understand there is an urgency to do something, and we are Americans. It is a big part of our culture to do something, but maybe at this time we may need to think about -- with humility what we have done and to recognize that we don't have all the answers right now, and until we can guarantee it that perhaps the best thing we can do is do nothing. Thank you very much.

STINSON: Thank you for your time. Are there other comments from the audience on particular issues we have been talking around, concrete or copper? Have we missed anybody in that comment period?

[No response.]

STINSON: Okay. Thank you. We are going to move on to soil and try to cover soil and trash before we take a break for lunch. I am not sure how that is going to go. Obviously that means it is a later lunch, if people are willing.

Are there any -- I believe trash comes from a suggestion from the power industry that there is an array of materials that are in common trash that must be dealt with. I think that it would be helpful to have -- I'm doing soil. I am looking up there and so the soil issue actually came up early in the processing and NRC has initiated a study to examine soil in a similar format to the materials examined under NUREG-1640, and we heard a presentation on that yesterday.

Are there any folks here that have particular experience with potential uses and disposal of soil from facilities that would be able to talk a little bit about -- in a similar vein that we have done so far? Okay. Kristin and then Paul.

ERICKSON: Academic and medical institutions, as I said, you can find a little of everything there and a lot of some things. Here we have some soil as waste that we get from researchers who are doing research with soil, either the main area we have are the people who are doing environmental remediation studies -- in other words, does a biological organism eat up the methanol or the dioxin or whatever chemical contaminant or not, and the way that they do that is to analyze sometimes with radioactive tracers labelled to the methanol or the dioxin or whatever it is.

What we typically have done with this is fairly straight-forward as far as our program is concerned. It is a little out of the routine. We do a little more analysis. We get this soil. We have them label it with what they know, they put in there, and then we always verify -- in fact, every bit of waste -- we get in liquid waste -- we analyze it in my own lab, again to see what is in there as far as isotopes and concentrations and chemicals.

The soil is something we just do a variety of wet methods with. You can do a dry meter reading on grams, or minigrams, and general screening of big volumes which is done and then also some wet methods to detect other isotopes that can't be detected with a portable Geiger counter instrument and is how we release it.

I don't think that soil is a huge problem for us, but once again when you look at the decommissioning of areas and buildings in future years -- let's say at the point where we decommission our cyclotron -- the soil underneath that machine will likely be activated to some degree. We have very thick concrete underneath to shield that and calculated for that, and we have in fact drilled corings down through, prior to onset of new machines and in our building phase.

We have analyzed that soil and found nothing. With this big, huge more powerful machine that we will commission next year we expect to see something so it will be an ongoing monitoring.

At that point you are talking about very low levels, looking at environmental level measurements that we would have to do. That's it.

LESNICK: Kristin, may I ask you, is it your sense that for similar, for other research institutions that the largest volume then we'll be associated with with our large facilities eventually decommissioned, is that where you see the largest soil implication?

ERICKSON: I don't think so. I don't think in routine -- that's the abnormal, the cyclotron.

LESNICK: Right.

ERICKSON: Or power reactor, if they have a research reactor it might be a problem there. We did decommission a research reactor, by the way, and found nothing in the soil. We had so much concrete around it -- it was a very small reactor, however, so the larger ones may see some, just like our larger cyclotron might, but routine research and develop, biological research, we don't even see it on the surfaces of the benches because we are so -- I neglect to call it -- so "Nazis" -- "radiation radbusters" -- we make them keep it so clean, the chance of it being in soil is essentially nil.

CARDILE: So, Kristin, may I ask you if NRC was to try to do something from a dose, what would you look to NRC to do if it were to try to do something from a dose-based standard in the future, thinking about these alternatives we were talking about yesterday.

That was Frank Cardile, just for the record.

ERICKSON: Okay. Kristin Erickson, Michigan State University again. I am talking "big picture," overarching, what I would like to see as far as regulations, rulemaking. I would like to see the development of a standard and education and guidance for, first of all, the radioactive things that people and institutions and facilities will encounter -- what do they encounter, what isotopes will they encounter there, what instruments should be used properly and what can those instruments do and then having those instruments calibrated according to the isotope.

Now that is already in the rulemaking in Part 20. Many people don't adhere to it, but it is there. You must have your instrument calibrated for the isotope to be measured and know these deficiencies with certified standards or traceable standards.

Finally, what I would like to see is not a dose standard such as one millirem for the entire piece of equipment, although that could be a secondary guidance, I would prefer to see something like we have for air and water where it is a flat concentration, so many microcuries per cc of material, which is in fact ultimately a dose-based standard. It relates to the dose and considers the pathways, the radiotoxicity of the isotopes, the forms of the isotopes, et cetera.

That would be the easiest way -- in fact, it goes totally hand-in-hand with what is already existing. It is known. It is usable. It is easy to measure, easy to train, easy to document, and it is very, very conservative, so I would like to see that happen for all of these materials including soil or whatever.

LESNICK: Thank you. Could we go next door to Susan and then we will come down to you, Paul.

LANDAHL: Susan Landahl, Commonwealth Edison.

My experience with soil has to do with my previous position, which was at a licensee in Unit 1, excuse me, Region I, so I am not 100 percent sure that this is uniformly applied across all the NRC regions but I will throw it out at least as something in Region I.

We had the issue of free release, which I think we have talked about or release for unrestricted use, but particularly with soil at least a boiling water reactors there is measurable contamination over time at very, very low levels all over the site.

In this particular case the bind that we are in is even simple demolition, or say we are replacing asphalt or we are laying new pipe for something. There is some quantity of soil that is very, very slightly contaminated and technically we can't even distribute that at a low-lying part, another part of our site, if you follow me, so we can't release it from the site except as radioactive waste. We can't even use it to fill in the low spots somewhere else because -- without applying for a particular 2002 Part 20 exemption because we don't have a license to bury waste, which technically is what we are going if we move that dirt from one point to another.

So from a practical standpoint it is just -- that one really doesn't make any sense to me I guess is what I am saying and I just want to throw that out as another issue in addition to just the unrestricted release of the material. Thank you.

LESNICK: Let's come down to Paul and then Charles -- again, comments about soil, please, how it is being dealt with now, suggestions you have got, particular aspects around this material that NRC ought to be thinking about. Paul?

GENOA: I am Paul Genoa, NEI. Yes, the soil, to expand the types of soil materials that might be of concern at least at utilities, you know, I think you just heard that fundamentally there are currently not only EPA but NRC criteria for the releases of materials in air and water. There are effluents from power plants.

These effluents result in small amounts of material distributed around the power plant site. If you were to go and be required to dredge a discharge canal because it had silted in or filled in, you would need to get an alternate disposal request processed to allow you to do that and to do anything with the material because in fact if you monitored it you would see activity.

Frankly, if you monitor it, you see activity anywhere, and of course in our environmental monitoring -- and that is the level that we need to go to for detection -- we can find activity anywhere, anywhere, on our site, off our site, in your homes, whatever, so it makes it very difficult when we have to move material for whatever purpose, to show that that material is not our licensed material or if it is our licensed material to do something with it.

I gave you the example of dredging a canal. There's also cooling towers that you see that people mistake for reactors, but those cooling towers are there to cool the cooling water. If they pull the cooling water from the discharge canal or the vicinity of the discharge canal, they could pick up some of the liquid effluents that are released over time and they concentrate it just like you would concentrate in a tea kettle when you are boiling it down. You get that residue.

Well, they actually in many cases concentrate naturally-occurring activity or activity from other sources or activity upriver from another facility. It makes it very difficult to determine what the appropriate -- what you are allowed to do with that material.

Other examples are you could envision that even if you used the best monitors available to check personnel, people, equipment, moving out the facility, there are trace amounts, extremely small, that will move in and out of the facility. There are concentration mechanisms -- your feet, your shoes, walking across the clean part of the turbine hall. Every night someone comes in and cleans the turbine hall with a mop and a bucket. They pour the mop and the bucket-water down the drain. Over time, there can be detectable activity, extremely low, but detectable activity that would concentrate in the sludge and sediment in the septic tank. For that matter, if any of your workers had a medical treatment, you would also find that activity in the sewage system treatment and that sediment and sludge needs to be pumped out routinely and dispersed, and we have guidance on how to do that, but it is relatively inconsistent.

There are just yard drains for stormwater runoff. If you have effluents around the plant and you have people walking in and out of the plant over time, 20 years, 30 years, 40 years of operation, there is a potential for that material to exist out in the environment. When it rains it goes down the storm drains and it concentrates in sediment and soils around the drains.

Fortunately all these materials are anticipated, found, dealt with during decommissioning.

but sometimes they have to be dealt with during operation so in operational conditions we need to have some standards to determine what we can and can't do with the material.

Again, soil is very similar to concrete. There is not a significant economic value associated with the soil and the material needs to be dealt with, but there is a high disposal cost and transportation cost for soil if it has to go across the country to deal with risks that are in the same range as the soil in anyone's back yard -- so it seems a little bit difficult to deal with.

There are also opportunities to clean soil in certain cases. There are technologies available to do soil washing and remediation that would allow that soil then to be released to be used for clean fill or left onsite, but again you need standards to assess whether the cleaning operation was done properly or not.

We do have a useful tool -- 2002 Alternate Disposal Requests have been used by the industry. We hope that they will continue to be allowed to be used by the industry and they can allow us to deal with some of the situations, I have personally dealt with them, that allow for state-approved disposal in a local landfill or onsite or whatever, but they are cumbersome, they are expensive, they are difficult, and all of the analysis associated with them would not have to be reinvented if a standard was determined.

It would make it more pro forma, easier to manage, and the disposal type options, as I mentioned, could be disposal onsite, disposal offsite. They could be land-farmed. They could be used for beneficial fill in low-lying areas, et cetera.

LESNICK: I know we have got a question from Tony and I will remind people -- there are some folks coming and going -- after we discuss each material, there will be opportunity for public comment and so we are in the middle of a discussion about soil but after that we will have public comment. Tony.

HUFFERT: This is a follow-up. Tony Huffert, NRC.

Paul, you mentioned not only soil, but I think sludge, from cooling towers or septic tanks, for example.

We are making a differentiation between soil and sludge in our analysis. We are not currently going to be doing sludge. Do you think this is a material that should be added to our list that we should be taking on right now?

GENOA: I do, for two reasons. One, that material is probably more problematic in day to day operations, and two, the analysis for the materials should be very similar.

I can see differences for sewage sludge, but you are already doing some analysis for that because other generators are allowed to use sewage disposal intentionally, but the end-products are similar enough to soil that I think it might simplify your consideration.

I would also include sediments from settling ponds and so forth. There are power plants and other facilities that do have settling ponds. Actually, many of them are settling ponds for fossil facilities, but there are because of effluents and because of other situations, there are opportunities for concentration there, from storm water runoff or whatever, to levels that are detectable using sophisticated instruments.

Given that, there ought to be a way to evaluate what the appropriate disposition pathways should be for those materials.

LESNICK: Charles, you have waited patiently.

WILK: Yes.

LESNICK: Do you have some comments about soil?

WILK: Yes, I do. Susan Landahl -- is that the correct pronunciation? -- you talked about having to -- the problems of moving soil, contaminated soil, and using it as fill at the facility, and Paul mentioned 2002. I am not familiar with that, but I am familiar with under the EPA Superfund Program they have sort of a problem, too, for cleanups. There was something -- how CIRCLA related to the Resource Conservation and Recovery Act, and they came up with an idea called a CAMU. I was wondering if the NRC might want to look at how that is done, which in theory exempts a Superfund action when they pick up waste.

It used to be that when they picked up that waste it would become under RCRA jurisdiction if it was managed within the facility and a Corrective Action Management Unit would exempt that, so you wouldn't have to deal with getting a RCRA permit to put that material back down at the facility.

I am not familiar with 2002 and I don't know how that relates but NRC might want to look at how the EPA handles that situation.

LESNICK: May I ask Kelly or David, anything you would care to comment about from the Department of Defense perspective about soil, your experience, your advice for the agency on this?

CROOKS: Sure. Kelly Crooks, U.S. Army.

Yes, we do deal with a lot of soil cleanups, but typically they are for decommissioning activities, either decommissioning of a license or of a part of a license, and maybe that would be one question I would have to the Commission is how would what we are talking about here tie in with the decommissioning requirements and the 25 millirem per year standard there.

One of the issues that we have, you know, that I have mentioned that of course we have installations in every state and you are dealing with every waste compact, is at the start of any remediation project one of the big issues is developing the release criteria for that particular site. We typically deal with the NRC and also EPA and the state the installation is located in, and to get buy-in from all of those regulators to agree amongst themselves in negotiations with us as a generator typically takes months if not in excess of a year, which can wreak havoc with trying to manage a budget and trying to schedule activities.

Of course, a lot of times we will end up doing a cleanup in, say, Vermont in February, which doesn't work real well, trying to get the trucks out and across the country to Utah, so one of my questions -- I know Mr. Collins had mentioned yesterday that the states will reserve the right to determine their own standards, no matter what the NRC decides to do here, and another question I would have for the Commission is what kind of buy-in are you getting from the states in terms of whether they will agree to go along with any standards you would set if they would accept that at face value for approval for release criteria within their state.

LESNICK: What was the first question you had? Was it for Steve?

CROOKS: I had a question. I had mentioned that when we typically do soil remediations it is in conjunction with decommissioning --

LESNICK: Yes.

CROOKS: Decommissioning is the term for license termination, and you can either terminate an entire license or you can terminate a portion of your license if that particular site is mentioned in the license, so to me we have decommissioning rules --

LESNICK: You want to know the relationship between this and that?

CROOKS: Yes.

LESNICK: Thank you. Good. Appreciate the clarification. Anyone from NRC first care to comment?

MS. HOLAHAN: All right. Patricia Holahan, NRC. A license termination addresses decommissioning a facility and what is left onsite. What we are discussing here is what can be -- we are considering a standard for what could be released during normal operations offsite, either in the form of possibly a restricted release or unrestricted release and, as I said, at this point we haven't set a standard or looked at a specific option, and that is where we are still exploring how to deal with material that is onsite that licensees may be looking to release and move offsite.

Tony, do you want to address specifically the soil?

HUFFERT: Tony Huffert, NRC. When it comes to soil, I guess an example might help.

If you had some soil that was near a down-spout, as Paul Genoa mentioned, or if you had a spill that was near the foundation of the building that was readily cleaned up, that would be something that would be done during operations, but if you had to go underneath the foundation of a building during decommissioning that is probably where you would be generating more volumes.

Now it is unclear right now whether or not the licensee would be able to release that material under this initiative or if it would be done at the time of decommissioning as part of the decommissioning plan.

We have not worked that out yet, but what we are envisioning right now is relatively small amounts of soil that would be released under this initiative.

LESNICK: Okay, and then -- go ahead, Kelly. Do you want to quickly respond?

CROOKS: Yes. Just one other comment. That is kind of what I figured. I was just also going to mention that with soils this is an area where the restricted use or restricted release I think has I think some applicability, at least for us in the military where you have an enclosed facility that has I think ample security associated with it to keep out intruders and ongoing operations that may not be rad operations but may be done in the same area that the rad operations were that contaminated the soils.

Specifically for us I know we are dealing with some of our outdoor firing ranges where we had shot depleted uranium ammunition. Some of those we pretty much restrict test firing now to indoor ranges, but those outdoor ranges still fire other ammunition that doesn't contain depleted uranium and so we are facing the prospect of having to clean up the DU from the firing range, knowing that the day it is cleaned up we are going to start shooting other ammo that contain heavy metals onto the same areas we just cleaned up.

In essence, you know, we would be looking at cleaning up the same area twice, which doesn't make much sense, so in that case I think that is a perfect scenario for a restricted release scenario and would hope that the NRC would seriously consider options like that.

LESNICK: Thanks, Kelly. Let me take the comments of the cards that are up on soil, public comment, and then try and start of trash and ask NRC Staff is there anything in particular regarding soil you would like to pose to the group also. Susan.

LANDAHL: Susan Landahl, CommEd. I just want to go back to Tony's point on sludge and another angle that if the NRC is going to include that into the rulemaking there's really kind of three components.

There's the semisolid sludge -- I am talking about sewage treatment facilities and some licensees have some form of sewage treatment onsite. There's semisolid, sludge, there's a liquid, and then what some folks are doing is they take the solids and they form into a truly dried solid brick which is then released and that introduces just another variable into the required sampling, you know.

Do you take the pre-dried material and put it on a gamma spec and count it to some environmental lower limit of detection or do you take the solid brick that remains and count it with your surface or your box monitor or whatever? If we are going to go that way, you probably need to address both aspects of the potential release path.

LESNICK: Thanks, Susan. Why don't we just swing next door to Steve before we come down.

COLLINS: I was just curious whether or not the Army representative had ever asked the appropriate NRC region or headquarters for an exception to that timeliness in decommissioning requirement when the reuse there is for heavy metals but basically required to be cleaned up again later anyway, because certainly most of the states would use common sense and say we will waive the timeliness requirement and you commit that you will clean it up when you are through using it, because you are going to have to clean it up again anyway.

We would certainly consider that a valid reason not to clean it up and then start reusing it again the next day for recontamination by some other heavy metal that would have to be cleaned up.

LESNICK: Sounds like something you might want to have particular conversations with later.

CROOKS: The short answer is yes, we have.

LESNICK: Can we move to Paul and Charles and then Jaz.

GENOA: Paul Genoa, NEI. Just a reflection on the issue that you raised about decommissioning at a 25 millirem plus ALARA for unrestricted release of a facility, and carry that discussion just a little bit further.

The fact is that, as was pointed out, that is for residual activity that may be associated with structures and soils at a facility but the conundrum you get into is the day after, and that material can be as high as 25 millirem if it meets ALARA criteria or less if that is appropriate.

The conundrum is that the next day a nonlicensed facility, it is unrestricted. That soil can go anywhere for any purpose, and it probably won't and it has already been evaluated that if it did it would be safe, but there's a regulatory dichotomy there between what you can do day one and what you can do day two, so I think there is a need to address that.

The second thing, and this relates, Kelly, also to your point of the use of soil, and let me tie it also back to concrete, because I forgot. Last week there was a IAEA international symposium in Virginia with people from all over as well as EPA, NRC, DOE and folks from around the world.

There were some very excellent examples of approaches that you could view as restricted release for some of these materials and I think it was actually at DOE so -- don't hold me to it, but the concept was that there was already a cleanup going on in a facility, in a community and the level of activity associated with the material was low but it needed to be controlled.

The decision ultimately was that that community wanted to upgrade their airport and were very interested in having the land associated with the facility for an enhanced airport facility and that the soils associated would not need to be cleaned beyond a certain level if, in fact, they were covered with runways and buildings and everything else, so in effect it ended up like a restricted release scenario where the public gained benefit and the Government reduced costs and everybody seemed to be happy.

So, you know, there are innovative ways to deal with this, but you do have to set some basic -- you know, what's safe -- kind of standards before you can do that.

LESNICK: Last comment on soils.

DEVGUN: I think Paul already made the point. I will elaborate on that a little bit, because I think I would be really concerned about the dichotomy of applying whatever criteria we come up with here for soil which would be based on pretty well close to 1 millirem, whether we accept that right now as a target or not and the license termination rule.

It took many, many years of effort for the Commission to come out with the LTR and have it out on the street in 1998 as 25 millirem, and the way it is applied is to survey at the site under MARSIM, the final status survey, which means deriving the DCGLs, deriving the concentration guideline levels in soil, mostly in soil. The NRC can include the structures, so I mean that itself tells you that we have already something for soil as a standard to clear and nothing stops -- like Paul said after you have terminated the license you can do what you wish to do with that site including the soil, so that dichotomy is a real one and it should be looked into.

The other thing I would mention is like the Department of Energy I had some experience working through Argonne National Laboratory for many years on DOE, RESRAD and other programs. We typically derived these soil concentration guidelines, and they were based on a certain dose level and then you derive where we had the levels which are already codified through DOE orders or what-not as, say, 5 picocuries per gram for Radium-226 and 15 below a certain level in soil, but where we did not have, for example, for uranium isotopes, we derived them based on a pathways analysis method, so whatever we do here should not come in conflict with what is existing already, otherwise we will be revisiting a lot of these soil issues again and again.

LESNICK: Thank you, Jas. Let's take some time for a public comment. As you know, after each discussion of material we have opened it up for comment, particularly about the material we just discussed. In some cases people make broader comments, so let's see if anyone would like to take advantage of this time for public comment. We do? Okay -- if you wouldn't mind identifying yourself.

FOUSHEE: My name is Lea Fouchee. I am Cherokee and Opinny Chief. I have talked with Barbara Stinson before about being here. I would like to thank you for allowing us to have this opportunity. We probably would have come and taken it anyway, but thank you.

As an indigenous woman it is my responsibility to think and then act for seven generations into the future using the wisdom and the knowledge of my ancestors for seven generations from the past. This process does not do that. It does not protect our Mother Earth. It puts us in a situation where we are threatened for geological time.

We now have cancer as the number two cause of death in Native American lands in North America, both women and men -- it is the leading cause of death over the age of 45, and it is not just Native people. How many of you in this room have had a loved one die of cancer? Raise your hand. How many of you?

[Show of hands.]

FOUSHEE: Everybody, raise your hand. We know what causes it. The Federal Government and the nuclear industry have long been in bed together and now you want us all to be in bed with the nuclear industry. That is not right. We will not allow you to do that to the future generations.

I would like to commend the steel industry. They are the backbone of this Western civilization. Without the steel industry this civilization would fall. You are threatening the steel industry with things they do not want. They have told you that. They have told us that. This cannot be done.

Just because your idea of regulation is burning or burying or dilution does not mean that it solves the problem. If you destroy the foundation upon which we stand as a civilization, our Mother Earth, our sacred land, our children, you ignore your ancestors and you ignore the very foundation of your corporate Reich, your civilization will fall and anarchy will prevail, and you are seeing that on the rise, and we do not want that. We want to work for a future for our children. I thank you for your time.

LESNICK: Thank you, Lea. Anyone else?

If you don't mind, please identify yourself.

BENCHELOW: My name is Carrie Benchelow.

LESNICK: You could pull that up closer to you, Carrie.

BENCHELOW: Sure.

LESNICK: Just make sure you are close to the mike so that people can hear you and it goes on the transcript.

BENCHELOW: Is that better?

LESNICK: Yes, that's much better.

BENCHELOW: Okay. As I said, my name is Carrie Benchelow. I am a member of the Board of Directors for the Nuclear Energy Information Service --

LESNICK: Even a little closer. I'm sorry to interrupt.

BENCHELOW: -- based in Evanston, Illinois.

[Pause.]

BENCHELOW: Thank you. I would like to read a statement on behalf of the following organizations, and those organizations are: Friends of the Earth, US and UK; Physicians for Social Responsibility; Alliance for Nuclear Accountability; Low Level Radiation Campaign, UK; US Public Interest Research Group; Project on Government Oversight; North American Water Office; Illinois Public Interest Research Group; Citizens for a Healthy Planet; BOND; Coalition for a Safe Environment; Help the Environment; AWARE; Don't Waste Ohio; Ohio Citizen Action; Environmental Coalition on Nuclear Power; Central Pennsylvania Citizens for Survival; Shunda High Network; Nuke Watch; Citizens Action Coalition of Indiana; Don't Waste Michigan; Coalition for a Nuclear Free Great Lakes; Citizens Resistance at Fermi 2; Women's International League for Peace and Freedom; Citizens Awareness Network; Committee on New Priorities; MCS Health and Environment; Chicago Student Environmental Alliance; Home of Peace and Justice; West Michigan Environmental Action Council; and the Nuclear Information and Research

Service.

The statement is as follows:

Our call to the Nuclear Regulatory Commission is to fully regulate and isolate radioactive wastes and materials and anything they contaminate, no matter what level. The radioactive legacy of atomic weapons and energy production should be isolated from the public and the environment. We don't want nuclear power and weapons waste released, cleared, deregulated, exempted, generally licensed, designated de minimis, unimportant or BRC -- Below Regulatory Concern, or by any other creative, direct or deceptive means allowed out of nuclear facilities and into the marketplace or the environment on any level.

The current methods of releasing radioactive waste from commercial licensees and weapons facilities must immediately cease. No future radioactive releases should be permitted and a full accounting and recapture of that which has already been released should commence. Using radioactive wastes in consumer products poses unnecessary avoidable, involuntary, uninformed risk. The consumers, the producers, the raw materials industries don't want these radioactive wastes or risks.

It is not credible to believe computer models can calculate and accurately predict any or all of the doses to the public and the environment from all of the potential radioactivity that could be released over time. Projections of acceptable or reasonable risks from some amount of contamination being released are meaningless and provide no assurance.

Monitoring for the specific types and forms of radioactivity that could get out could be very expensive and tricky to perform. Hot spots can sneak through. We can't trust the nuclear generators to monitor their own releases. No matter what level the NRC sets for allowable radiation risk, dose, or concentration, it will be difficult to impossible to measure, verify and enforce. Who is liable if the legal standards NRC intends to set are viable -- or violated?

For decades the public has clearly opposed releasing radioactive materials into commerce. We continue to do so. Naturally occurring background radiation cannot be avoided except in some instances -- for example, reducing radon in homes -- but its presence in no ways justifies additional unnecessary, involuntary radiation exposures, even if those exposures might be equal to or less than background, nor does it justify shifting the economic liability from the generators of radioactive waste and materials to the economic and health liability of the recycling industries, the public and the environment.

We fully support the complete opposition and zero tolerance policies of the metal and recycling industries, the management and the unions. We appreciate their efforts not only in opposition to legalization of radioactive releases but in their investment and detection equipment and literally holding the line against the radioactive threat to the public. They should not have to be our de facto protectors. The NRC, DOE and EPA must act to prevent the dissemination of radioactive wastes into recycled materials and general commerce.

The problems that have been experienced by the steel recycling industry with generally licensed sealed sources getting into their facilities and costing tens of millions of dollars to clean up should serve as a warning not to let any other radioactive wastes and materials out of regulatory control.

The fact that radioactive waste is already getting out should not be use to justify legal levels allowing more out. The NRC, EPA and DOE should prevent future and correct past releases. The fact that other countries are releasing radioactive materials into the marketplace is no excuse for us to legalize it. The United States should take the lead in preventing contamination of the international marketplace. We protect ourselves best by not facilitating international radioactive commerce.

The fact that it is difficult and expensive to monitor and detect radiation does not justify its release. It is all the more reason to prevent any waste getting out so we don't have to check routinely for contamination.

LESNICK: One more minute. One more minute.

BENCHELOW: The nuclear industry and regulators should be aware of what materials at reactor and weapons sites are waste and which have been contaminated. Those materials must be isolated, not released at any level.

The mindset of the NRC appears convinced that it should legalize radioactive waste being recycled into the marketplace. Our demand for prohibiting releases has been considered unreasonable. That is why many of us are refusing to spend two days at this meeting.

Until the logical public positions that radiation exposure should be prevented and that radioactive waste should be isolated, not recycled into daily use are considered reasonable, our time is better spent educating the public on what you are planning than here debating levels we will never expect and methodologies we will never trust. Thank you.

LESNICK: Thank you. If you have an extra copy, if you could leave it, we would appreciate that.

Would anyone else like to comment at this time? Yes, please. If you don't mind, please identify yourself.

WOLDENBERG: Yes. Can you hear me?

LESNICK: If you can get closer, can you tilt the microphone down a little bit towards you?

WOLDENBERG: Okay.

LESNICK: That's better.

WOLDENBERG: Can you hear me now?

LESNICK: Thank you.

WOLDENBERG: All right. Just two days ago --

LESNICK: Could you identify yourself, if you don't mind?

WOLDENBERG: Oh, sorry, yes. My name is Sue Woldenberg. I live in the area, but what is happening here affects everybody everywhere.

Now I have only heard about this two days ago and when I heard about this I said, gee, what they are trying to do -- this doesn't sound right. Can people in their right minds and hearts allow something like this? And it scared me.

I have never done this and I am shaking right now, because I said to myself, well, you know, I got to find out a little more about this. This doesn't seem -- this doesn't seem good -- and this is going to be occurring here in the United States when we are all trying to think how can we make this world a better place, whether it is individual like me -- because I am representing myself. I am here because I am just curious and, my goodness, if you have the ability to have some kind of check on controlling what others are trying to do that are wrong, please, use your conscience, use your intellect, use your own self, like me. I came here by myself.

I think what you are doing, what you have power to do is to check what is going on that is wrong and please vote with your intellect and your conscience and do what is right. Thank you.

LESNICK: Thank you very much. Anyone else care to comment? Yes, please.

BAIMAN: I'd just like to tell a little story.

LESNICK: Would you re-introduce yourself? I know you spoke yesterday but if you don't mind.

BAIMAN: I spoke yesterday. I am Sydney Baiman. You heard me shout yesterday, so today I am going to tell a story.

My niece used to live in Syracuse, and we drove up from New York City and she had a dog, and when we arrived on a Sunday night we took a pail of water. She gave the dog some water from the tap, and the dog refused to drink the water and we didn't understand why, so then we had to get some spring water for the dog.

Then we found out that there was a steel mill -- I think it is AllSteel, is that right? -- I was talking to one of the gentlemen -- nearby, that had just recycled radioactive steel with cesium in it, and apparently it was called "orphan waste" -- somehow these wastes by accident -- I don't think it was an accident, I think it was a Mafia job -- get to these steel mills.

Okay, so this dog refused to drink the water and of course it was June, so all the cesium, radioactive dust just from this little bit of recycling blew over on the strawberries, of course, and all the beautiful gardening that was going on. Also, this radioactive dust went to the reservoir so that is why the dog wouldn't drink the water, and there was a little article this big in the tenth page of the newspaper saying that this steel company had recycled the cesium.

Now this is just one incident of what happens when you recycle this stuff. It is not just going into the products. It is going into the land, the sea, the air, and guess what? -- pregnant woman comes along and eats those strawberries -- what is going to happen to her baby? Will she be a Down Syndrome or retard because she didn't know that this was going on?

All right? I think we are playing with -- what is happening with this industry is really unconscionable and you know you are killing people with doing this. That is all I have to say.

LESNICK: Thank you very much. Anyone else care to comment? Yes, sir, please.

WILLIAMS: My name is Chris Williams. I'm the executive director of the Citizens Action Coalition of Indiana. We represent a quarter million households in the State of Indiana. We worked on some very significant nuclear issues over the years, mostly construction issues regarding commercial power plants.

I want you to just consider that right now, as you talk about these substances, which you want to label as below regulatory concern, I just want to assure you that once the public at large begins to be informed about what that means and what you're trying to act on here, it will not be beneath public concern. And as the debate and the public education on this issue grows, you will see what I mean. Thank you.

LESNICK: Thank you, very much. Any other comments? Sir?

TREPANIER: Good afternoon. My name is Lionel Trepanier. I'm with the Blue Island Greens, a local affiliate of the Green Party U.S.A. I say with certainty that the Greens have been, are, and continue to be opposed to nuclear power and nuclear contamination of our environment. And I could -- based on that, I could assure you, also, that the Greens would oppose unrestricted and restricted release of nuclear contaminated materials.

I had a question, if that's appropriate, as to when or if the comment period was extended from the June 30, '99 notice?

HULAHAN: The comment -- Trish Hulahan, NRC. The comment period for the issues paper closes on December 22nd.

TREPANIER: Do you know the date that -- that notice that was in the Federal Register, June 30, '99, with a cutoff date that has already passed. Is that the date that was extended?

HULAHAN: Yes. That original date, I'm sorry, was November 15th, and it was extended and we published a Federal Register extending it to December 22nd.

TREPANIER: Do you know the date of that Federal Register or announcement of the extension?

LESNICK: No. But, you know what, when you sit down, we can -- someone can get you the -- if you want the Web site, you can track all the information and what announcements were made. It might be most convenient for you to see everything in one place. Would that be helpful?

TREPANIER: Thank you.

LESNICK: Great; thank you. Any other comments?

[No response.]

LESNICK: Okay. Before we break for lunch, Mike Mattia, you had a quick --

MATTIA: Mike Mattia, Institute of Scrap Recycling Industries. I, personally, want to thank the individuals who came here to make comments, because I think they're important to hear. There was two phrases, and I apologize for not remember names, but you indicated that it doesn't sound good; it doesn't sound right. And you're right. When we -- when the public, and even individuals like us that are close to this thing, when you look at the concept of recycling radioactive material, it doesn't sound right. It doesn't. And the comment of below public concern is probably one of the best statements I've heard, because you're right, this has got to be everybody's concern.

And I go back to the one comment, the one position that I have trumpeted, and I promise this will be the last time you'll hear it this session, and that is that there is a tremendous fear about radioactivity and it's a well placed fear. There's a tremendous concern about the material that is out there and what's going to happen to it. And if we do not address the concerns, if we do not address the options, if all of the stakeholders, be the steel industry, the recycling industry, the research, the medical industry, the public at large, until everybody can understand exactly what is there, exactly what is present, and exactly what the options are, and everybody weighs in on what is acceptable and what isn't, then we really cannot have a rulemaking. Because the purpose of a rulemaking is to put in place mechanisms to casee and affect that everybody needs and wants. It's like when OSHA creates a rulemaking to protect the safety of workers, it's a foregone conclusion that workers are getting hurt for a particular reason and that those workers need to be protected and so the rulemaking, in essence, creates the mechanisms to protect them.

In the issue of radioactive material and what's going to happen to it when its usefulness has expired, we haven't addressed that issue appropriately, properly, and completely, so that all of the parties understand it, have gotten their arms around it, have seen it, understand the options, and have weighed in on what options are acceptable and what are not.

And I, again, urge, number one, the Commission, to consider allowing the stakeholders, themselves, with your assistance and your backing, to study the issue, to allow the stakeholders to see all of the issues, to quantify, to obtain acceptance for alternatives. And then once that has happened, once we don't have public fear about what may happen, once we have industry assurance that once they will get is acceptable to them and what will be done is acceptable, then you do a rulemaking to make that happen.

And on behalf of my industry, I pledge to be the -- to start whatever is necessary, and I ask anyone that's here and anyone that has been at these meetings, if you agree that we need to cut through the fear and through the rhetoric and get to the facts and get acceptance of the facts and the alternatives before the rulemaking, to please let that be known, because that support is going to be necessary for the Commissioners, the folks that these folks report to, to hear loud and clear the public and industry don't want a rule until we've agreed to what we'll accept as part of that rule.

LESNICK: Thank you, Mike. I see two cards. I will take those before we break for lunch. I just want to note for the gentleman, I'm sorry, I don't recall your name, in the back, that was curious about the extension date in the Federal Register notice, Bill Lipton was able to find a photocopy, so we're able to get that to you. So, I hope you have it. I think it was in the October 19th Federal Register. So, thank you, very much.

Charles and then Peter and then we will break -- Paul, and then we'll break for lunch.

WILK: Yes. I think Mr. Mattia -- I'd like to join with him in thanking the public for coming by and giving their perspective on this issue. I think it's very relevant.

We were talking about soil and I think Mr. - is it Crooks, from DoD, was talking about remediation, different scenarios. And I don't really know how the cleanups are conducted at DOD and the NRC. Under the EPA, they have different cleanup scenarios, as far as establishing the acceptable risk posed between industrial scenario and then the residential scenario. And perhaps that leads into how the NRC would handle restricted use of contaminated soils on a particular property.

The regrettable part of that is that that restricted use, under institutional controls, would be -- would rely on institutional controls. So, we're talking about deed restrictions and fencing and so forth.

LESNICK: Thanks, Charles. Peter and Paul.

HERNANDEZ: Peter Hernandez. The steel industry has been working with the environmental community for over 10 years to promote recycling, as a societal good. We appreciate the comments and the support that we've received from the environmental community, as we have heard it at these hearings. And we urge the Nuclear Regulatory Commission to get very serious consideration to the comments you're hearing from the public and the environmental groups. Thank you.

LESNICK: Thank you, Peter. Paul?

GENOA: Paul Genoa, NEI. I wanted to take just a moment to follow up on Mike Mattia's comments and offer, as I believe there is merit there. I believe that there is -- that we have talked past one another on numerous occasions; that there -- that the packaging of this issue has not been the best; that it is understandable that people have concerns. It's understandable that some people would not accept this under any conditions, particularly the way it's been portrayed.

But, I think there are realities that could be explored and I would offer to participate in further debate, further opportunities. And as I have in the past, I would offer, within reason, to try to arrange for tours of facilities, so that people can get first-hand experience with the kind of materials we're talking about it, the kind of controls that we're already opposing, if that would help the debate in any way.

LESNICK: Thank you, Paul. Okay, friends, I'd like to thank those around the table, a good thorough discussion this morning; very frank. People drawing upon their experience, their point of view. I'd like to thank observers, members of the public, people that have come and taken time out of their day to share their thoughts and their views about this, as well.

Let us take one hour for lunch. Report back at 1:30 and we will continue our discussion. Thank you, very much.

[Whereupon, at 12:26 p.m., the workshop was recessed to reconvene later, this same day.]

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

[1:32 p.m.]

STINSON: Our prior discussions entered into the steel area, and then we'll talk a little bit about next steps and where NRC is going from here, all that before 3:00. Wish us luck.

Charles, and we'll give it to Mike Mattia. Go ahead, Charles.

WILK: I was asked earlier during the concrete part of our discussion about were there every any cases where people have lost market as a result of recycling material. And over lunch, I gave that some thought.

I can relate the following to you: I think Ms. Rogers is probably familiar with this, that cement kilns do recycle hazardous materials. These usually are hazardous wastes that have fuel value to them.

And so they are used as energy to drive the cement kiln or to fire the cement kiln. It has been rather controversial in different markets across the United States.

In response to, has anyone every lost market as a result of that kind of recycling activity, there was a case where a large home building supply store or -- what do you call it -- chain, that passed a policy within their own company that they would not purchase cement that was produced from the burning of hazardous waste.

So there you have an actual account of loss of market as a result of doing some sort of recycling.

That gives you an idea of why people would be very, very sensitive to that issue. That response by that retail chain was not a response to the science of whether or not this cement contained a hazardous or toxic material; it was in response to what their purchasers or their customers wanted.

And so here you have where the public perception of an endangerment posed by including these hazardous constituents in cement, whether they be scientifically real or not, did cause an economic hardship on certain distributors of cement.

We had talked about reuse of material. There is a Super Fund site in Salt Lake City that's called the Midvale Slag Site. The EPA is busy trying to figure out a remedy for this site, and part of that remedy or part of the alternatives used to look at that remedy is to interest people in using the contaminated slag as a road base for the interstate highway that's currently being built there, I-15.

And because it's a Super Fund site, there are liabilities that are associated with that material that continue basically forever. The Federal EPA was unable to, so far, interest the state DOT in accepting this material that came from a Super Fund site into their highway.

You might be then able to guess what the public or Department of Transportation's reaction might be to someone saying, gee, we have this radioactive concrete, can we put it underneath your highway? It might be a very similar situation.

The final thing I wanted to say, in thinking a little bit more about it, I think the NRC is interested in developing a list of stakeholders.

When I talked about concrete, I was remiss, and I should have talked also about the other paving material, which is known as asphalt/concrete in the terminology. Obviously, there is Portland cement type of pavement, and there is asphalt concrete paving.

And the asphalt people also use aggregate, and perhaps the NRC might be interested in getting the asphalt people to recycle the radioactive waste in their materials.

STINSON: Thank you, Charles. Tom, did you have a general comment?

CIVIC: Yes, a general comment. I'm sorry that Kristin Erickson isn't here this afternoon. But I had talked with her at the break, mainly because of the information --

STINSON: This is Tom Civic.

CIVIC: Sorry, Tom Civic from AISI. The information that she was presenting here at the workshop was very enlightening in terms of the rigorous sampling and measurement protocols that they had developed at Michigan State University.

She does not have all of them -- and I'm just paraphrasing what she had to say, so don't quote me as this is exactly what she said -- she has most of them written up, but she does not have all of them in writing.

If she was asked to, she would prepare them and submit them to the NRC for consideration. And I would recommend that that would be done.

From what I heard so far at the sessions I have attended, they sound pretty close to being best practices. So I would encourage the NRC staff to contact Kristin and ask her if she would be willing to submit those for the record.

STINSON: You bet, thanks. Okay, let's shift into trash and materials for reuse, items for reuse. Again, these came up at prior -- these ideas came up in prior meetings. What do you do with equipment, and what do you do with just general rubbish? Maybe we're talking largely about fairly large licensed facilities where this would be an issue, but Paul, we're just going to cut to the chase here and turn to you and ask you to make some introductory remarks about what this issue is all about.

GENOA: This is items for reuse.

STINSON: We'll, we're going to try to combine -- you may not have been here when we started this session, but I said that we're going to try to -- we've got to accelerate this process a little bit to get through by 3:00. We're going to combine trash and items for reuse. And that's going to make Georgio's life really difficult, but we're not going to get through it otherwise.

GENOA: I'll go through a range of items for reuse first. At a large facility, and to a lesser degree, at all the smaller facilities, they may have the same kind of issues.

And this has to do with virtually any type of material that needs to move in and out of the facility.

Now, at a power plant, that includes clothing, workers' tools, and tools are small hand tools, as well as things like welders and forklifts and cranes and trucks; pallets that materials are packaged on; consumable materials such as paints, oils, lubricants, you know, anything that you could find in your garage or in a shop or in an industrial facility. That's the kind of thing we're talking about.

We're talking about compressed gas cylinders that are used, you know, industrial compressed gas cylinders that are used for many applications.

We're talking about wire, we're talking about scaffolding, we're talking about containers such as Sealand containers that have materials in them; boxes, drums.

We're talking about computers, computer terminals, video screens; we're talking about video monitors that are used to observe remote work activities. We're talking about hand-held radios; we're talking about beepers.

We're talking about clipboards and notebooks; we're talking about anything you can imagine in an industrial facility, that's what we're talking about.

And what we're saying is that if those materials are clearly radioactive, and if they can be decontaminated to become non-radioactive at some standard of proof, then that's what should happen.

If they are contaminated and can't be decontaminated, then they'd be disposed of as we've always talked about, as waste.

But the materials aren't waste if they're not contaminated. They're not waste if they're still reused and reusable.

And most of the material can be reused and is being reused. So I hate to try to make it a quantitative list, because, you know -- and then if you wanted to go to a university laboratory, it's a little bit different.

It's the same thing as it would be in any nonradioactive laboratory, university laboratory, only it has the radioactive constituent. So petri dishes and bunsen burners and pipettes and ventilation systems and bench top counters, and that sort of thing.

So, I mean, that's a small sampling of the kind of materials that are or use. Obviously, many of those are very, very valuable in their current form to be reused. A truck is still a truck when it leaves. A compressed cylinder, many of these things are actually --

I mean, we take a compressed air cylinder in, we plug it into our system. It pressurizes our fire suppression system or some other safety system.

When it gets down to a certain level, it's changed out, swapped out with a new one and taken out and taken back to the vendor to be refilled and brought back.

Now, if it has to go into an area of the plant where there is know contamination, we put a canvass bag over top of the cylinder, or we wrap things in plastic. I mean, we take the appropriate steps to reduce pollution, to avoid contamination, but some level, particularly if we really are rigorous, some level is inevitable and has to be dealt with.

Most of it can be managed through the same types of control mechanisms that we've talked about. So the first level of control is, don't let it get contaminated.

The second level of control is evaluate whether it can be cleaned or not, and if not, isolate it from the environment.

If it can be cleaned, send it to a place that can clean it, or do it yourself, and, finally, use whatever is appropriate to ensure that there isn't residual activity that is above whatever the appropriate standard is.

Our current standards are a legal definition that is not verifiable, period. And so that yields the problem.

LESNICK: Frank?

CARDILE: I just had a question of clarification. Frank Cardile, NRC.

Can you, in your daily practices, clearly distinguish between materials that are clean that have never been -- all the ones you've ticked off or read down the list of, that are clearly from clean areas and are clean, have not been exposed to any radiation, and those that, like you say, go into radioactive areas that you --

I mean, that would be your practice, you know what's coming from where?

GENOA: The answer is yes, and all of the things that I just mentioned are things that have the potential. There are also the exact same kind of materials that we believe don't have the potential and we don't evaluate.

Those include your furniture in your office complex, the food in the cafeteria, the soft drink dispenser in the cafeteria. People come and go from there all the time.

The security guards, their guns, all of that sort of thing. So I really do believe there needs to be this principle of process knowledge.

A nuclear facility is a very large facility, and only small parts of that facility are actually engaged in operations that involve loose radioactive material in any fashion.

So that's a clear distinction, but all of the things I mentioned anyway still could be going into that area, and it's proving, in fact, that they are clean when they come out that we have difficulty with.

Again, when I talk about framing the issue, our sense is that in most cases, this material, we believe is clean, or we are surveying it to find out where it is not clean so it can be cleaned, segregated, chopped up, you know, sectioned or whatever.

CARDILE: But before we move on maybe to talk about your kinds of facilities, I have a question for you: The category that says analysis needed, given the wide range of kinds of materials that you're talking about, is there anything you would encourage the NRC then to think about as they consider this kind of grouping of material, anything different, in particular, to what's been suggested thus far?

GENOA: Yes. And although I believe that there should be a dose-based standard as the basis for moving forward, I recognize, as was pointed out, that to implement a rule, you need to have concentration-based values.

Of course, they're going to be derived from that dose-based value. But you can do detailed analysis using all assumptions, and you can end up with a whole hodgepodge of numbers for every different material possible.

And while I hate to choose the most restrictive in every case, which is sometimes ludicrous but often done, I do believe that looking at a distribution of values and picking a rational value that everyone would implement uniformly, would aid in our evaluation of these diverse materials from one facility as well as comparing the release and verifying it to the public's satisfaction from many facilities.

CARDILE: Can I ask one other quick question? You read through a long list of items. Where might they go? I mean, you mentioned tools, scaffolding, computers. They don't go into the general public domain? Where would they go?

GENOA: Sure they can. The scaffolding, depending on where it is, may be reused by a nuclear power plant or a nuclear facility, or it may be used, if it's free-release, by any other industrial facility.

When the computers come out, if they are clean, they are treated as any other computer, and they go to someone's desk, and when they get obsolete, they go to recycling somewhere or whatever.

Hand tools, if they are free-released, you know, are free-released. They may be used on the nonradioactive side of the plant.

Now, traditionally, many of these tools -- it's prudent to go ahead and just set up with a paint scheme, a set of dedicated tools that never comes out. Those are for work in contaminated areas.

But as I say, there are materials that we talk about that we know are radioactive.

Unless they're easily cleaned, we're not going to worry about those, or they're going to go to a dedicated facility to be cleaned. It's all the stuff that we're not sure of.

How do we prove that it is clean? But, yes, I mean, that's why the terminology in our industry is free-release because there are no constraints on the material, once it's released.

And although we do dedicated surveys, we don't sit down and develop a documentation package associated with every wrench that comes out of a facility. That's just not the way it's done.

CARDILE: Thanks, Paul.

LESNICK: Can we move on to Kristin to talk about you type of facility in a university research kind of facility and what your experiences are, both with items for reuse as well as trash, rubbish?

ERICKSON: This is the biggest bulk of our problem, or our volume, I should say, in medical and academic institutions.

We have both reuse all the time. In fact, that's the very nature of our work, and this is something that may not be so straightforward to some people, but I have a laboratory, I've got a lot of people working with loose radiation there.

And every day they have to control it at the source. Okay, let's say they have some contamination on their absorbent lab paper, they have to survey after every use. If it's contaminated, they have to clean it up.

And so every single day in every way, we are sort of free-releasing. And the way we do it is under our license and with the regulatory guidance.

We have a limit of 200 dpm for high-risk betas and gammas; 2,000 dpm for low-risk betas and gammas. They all have to have their own geiger counters. We require before they're approved to use it in their lab.

We calibrate those geiger counters with NIST-traceable sources, so we know they work. If they don't work, we decommission them and they have to get another instrument, or they can't use this until they do have an instrument.

So this is common every day. Survey, release, reuse. And whether it's a big piece of equipment or their little pipetter or the bench top; it's all the same ball game.

Now, as far as waste is concerned, we have primarily paper/plastic gloves, but it's also glass and all kinds of things, you know, the lab glassware, the pipetters, and the little stock bottles and all of those sorts of things that you can commonly see.

But that's not the only categories. So here, I would like to add and share with you some of our way of managing it, because we have a good waste program that works, it's cheap, and it's extremely safe, and extremely compliant.

We have categorized our rad waste into two primary categories, of course: Solids and liquids. And then within that, we have regular radioactive liquid and a regular radioactive solid, so that's the primary liquid waste that I generate from my research or the solid waste paper/plastic gloves.

And then we have a category called other solids, that's stock bottles, a sealed source such as a Nickel-63 electron capture device sealed source.

Or there are some of the other unusual solids you might run into like a piece of contaminated lead that they can't use, obviously.

The other liquid category is the same kind of thing. We have an Other category for liquids, very specialized, very concentrated stock bottles, those sorts of things.

We don't want them dumping it in with our big carboys because that's higher concentration, higher activity. Also, we have to, all the way through this -- our worst and most challenging problem that we spend time on is the mixed waste issue.

If I have a tiny bit of methanol on my liquid waste, I am now RCRA. And with my stock bottle, I mentioned the C-14 cyanide in an ampule. That's being kept right now until we decide how we can get rid of that.

These things cost a tremendous amount of money.

Then we have another category of scintillation vials, which is flammable, counting cocktails, toluene-based, so it is a RCRA hazardous chemical because it's flammable, and it has very, very low amounts of tritium and Carbo-14.

There is a deregulating category and that's another way of releasing that we have. Less than .05 microcuries per gram or milliliter is able to be released for vials and for animals or tissue or bedding.

So then that leads to the animals or tissue. Now, that category, we don't have so terribly many actual animals in our waste, because that's not the state-of-the-art anymore. It's typically cell culture, molecules, DNA that we're looking at, more than whole animals anymore.

So there isn't so much of the whole animal, although there are a few mice and rats. And then there is a lot of the cell culture types of things. We have to worry about blood-borne pathogens applications and their uses, because they're using sometimes serum, body fluids. It depends on the research.

So we have a broad spectrum of regulations and risks in this waste and in these uses. It's an everyday thing.

This waste stream -- we categorized five waste streams for the users because that's easy for them. Then we take it and we break it down further, and then we have like many, many, probably 50 or 60 or 70 different ways you could manage our waste.

The free-release part or the unrestricted release limit that I suggest is something similar to what you have for air and water. That would be very useful in many respects in our institution. And I guess this is a good place to read to you the impacts on a institution like ours.

Certainly there is solid waste. Secondly, there is decommissioning of use areas. Decommissioning is going to be a big issue for us in the next couple of years, because we have four buildings whose ventilation systems are totally trashed, ancient, need to be replaced.

Those ventilation systems from the fume hood all the way up through the roof and the ducts, the blades, the fans, all of that will have to be surveyed for release. And most of them are not going to be anything, because they were small amounts, short half-life, and we know it's not there.

We measure. But if it's tritium or Carbon-14, long half-life, then we have a number that we have to worry about. How am I going to do that? That's going to be a big problem for us.

Mixed waste issue: If I had to have a limit beneath which I don't consider it radioactive and can treat it as hazardous chemical waste, I eliminate a lot of expense and a lot of problems for something that is essentially no risk -- less than our fly ash risk by a long shot.

Our incineration and our ash monitoring: We use the MPCs and we control with MPC out the stack, and, in fact, take ten percent of the MPCs to control that. It's the same with the ash. Any detectable radiation in the ash, we are going down to 10 to the minus eight, tenth microcuries per gram numbers to monitor this, which is very, very low.

Routine surveillance: Like I talk about in the laboratories, our laboratories, if we're inspecting a lab for contamination and we say we found it and we tell them they have to clean it up, is it cleaned up? What's the number?

Security: Lab security is a huge problem, and you in NRC know how much we struggle with that. We are required to secure all radioactive materials. We're a public institution and it is not restricted. We don't have cards, we don't have only rad workers, we have everybody coming in and out -- students, staff, faculty, visitors, in these research labs.

Yet we're required to secure these radioactive materials, and we should for anything that has any significant amount or any significant risk. But here's the question that came up with one inspector.

We laughed about it because I said this is my ridiculous scenario, and what do you think? If I have a tiny benchtop centrifuge and there's 10 dpm of P-32 inside the motor of that centrifuge and nobody is in the room, is that a security violation? They said, yes, even if that's the only radiation in the room. You see the problems we face.

Medical and veterinary uses: We have nuclear medicine for animals, and now for humans, there is a nice program with nice limits, and it's all well done and everybody pretty well knows what they're doing, but not for animals.

They don't have regs for animals, and so we had to bring it in under our broad license. When can we release the horse after they've had a nuc med scan, or the cat?

In one case, we even did a bunch of ducks, because the research was what toxicity in the ducks are from the buckshot. It was interesting, and they all got away, too. It was funny.

Sound science problems here: I have a real problem talking to our researchers who are very educated, knowledgeable people about some of these issues. When I come and give them these silly mixed messages, it sounds like I've got a forked tongue.

Well, this is safe, we know it's all safe, yes, you can have this, we know you've got a good record. But now you're in trouble because you've got this contamination, all because of this or that.

The risks are not equated with the management. Small licensees have trouble with this, so that's another issue. I get a lot of working with people with small licenses who don't know what to do with their stuff.

Public perception of the mixed messages comes into play and we get a lot of that. Sensible ALARA is another impact.

Permits and licenses: How we write our licenses, what our permits are, all of these things are impacted when we write a license that says we will survey, too, we will not release unless, our waste is managed thus and so, a cleanup of a spill is thus and so, that's a big picture thing, too.

Finally, there are the environmental programs and operations.

I can probably make this list bigger, but you can see the broad impact it would have for all of us.

As I interacted with the academic and medical radiation safety officer group by an e-mail list, we were all struggling really hard with this. Should it be a dose-based limit? Should it be a concentration and what should we do with it?

LESNICK: Kristin, thank you. I say this to you but also to everyone: I hope people will consider, having had the benefit of the workshops, to do some reflecting about what got discussed here, and things you might want to write down, either to clarify points, to put down in writing, things you shared verbally, or further reflections you have, based on the conversations. Please take advantage of that.

Do we have any other comments around the table regarding items for reuse, or trash, or any questions from NRC staff that you'd like to pose for the table about this particular set of topics?

Paul?

GENOA: Paul Genoa, NEI. I just wanted to add the trash component because I sort of stopped at the reuse component. I mean, for good waste management practices, we try to reduce the amount of materials that are sent to a low-level waste disposal site.

I mean, there are clear economic advantages and there are also societal advantages because those resources are very limited.

And there is waste material that is generated within the power plants, some of we know is radioactive and we know where it's going. It's going to get processed and disposed of.

But there is a vast majority of material which we call green is clean. There is a program that most of utilities use where they essentially put within the radiation control area, not within contaminated areas, they put special containers that are specially marked.

They train the workers, and the workers have the responsibility to make the determination, do I think this piece of paper, this piece of wood, this piece of plastic is clean?

If they believe so, then they put it in the green drum. If they don't think so, they put in another drum that's designated for waste.

Most of the utilities will go ahead and collect that material and then send it to a facility that is dedicated to review and survey and release. And they apply their limits and their license to do so. And we've all talked about what those conditions are.

And that material, the vast majority of that material does go out as just industrial trash to an industrial landfill. Some small amount of it, if it does trigger an alarm, gets disposed of as radioactive waste.

I will try to get you numbers on the annual generation, but it's fairly significant. You can imagine that any large industrial facility has a fair amount of that kind of trash material that would be generated.

And it's material like the computer printouts from the computer in the chemistry lab that's doing the effluent release work and so forth. You know how much computer paper we all use. We all know that. You know how big it can be.

CARDILE: Can I ask a question of clarification? So some of that material like the computer printout paper, is not likely to be radioactive or have been in a position where it could have been contaminated.

This is Frank Cardile, NRC.

Where it could have become radioactive -- and so that type of material, I guess, is fairly readily sent to industrial trash sites, or industrial landfill site. But I guess my question is, is there trash type material that has a potential for being radioactive, and what levels do you clean that to before you would -- or monitor that to before you could send it to an industrial landfill, before they would take it?

GENOA: Paul Genoa, NEI. The material that I just described in the Green is Clean Program is material that has a remote potential of being contaminated because it's within the radiation controlled area, or in areas where we know radiation has -- well, within the radiation controlled area.

So there is a potential, but our experience leads us to believe that the people have handled the material properly, and that it is clean, but we're going to survey it, and we're going to prove that it's clean.

Again, it's the same technology we've talked about before. If you're doing it yourself, you know, you're applying a surface activity using, you know, frisking technology set to at least the Reg Guide 1.86 values and upon seeing no activity, the material can be released.

If it's bulk material, your guidance goes on to say you must then pass an aggregate survey with a micro-R meter or something like that, so it's a two-step process on an aggregate.

But the bulk of the industry doesn't waste time doing that. We send it all to a dedicated facility, and that facility has a license condition. There are several of them and they vary a little bit.

Some have actual numerical values, some have non-detect under certain monitoring criteria, and in some cases, they do apply the fingerprinting I mentioned before to ratio, hard-to-detect isotopes, to the others, and adjust their release limits based on that.

For trash coming from an office building that is outside the RCA, we don't monitor it at all.

LESNICK: Paul, I assume, if staff have further questions, you might be accessible to them?

GENOA: They know where I live.

LESNICK: I figured that. Susan, we're going to get your comment and observations on this, and then move on to lead, nickel, and steel.

LANDAHL: Susan Landahl, ComEd. Just to put it in perspective, I do have some numbers on volumes.

LESNICK: Great.

LANDAHL: They're not exactly what you're asking for, Paul, but on average, anywhere from 100,000 to 200,000 pounds per year per reactor are the kind of numbers that we're talking about just going into the dry active waste stream.

And some percentage of that is definitely clean, but either because it's been mixed with something else or the economics of trying to prove that it's clean is such that we don't take the time to do it.

I don't have -- our educated guess is something like less than 20 percent of that falls into that category. But we're talking a tremendous amount of pounds of stuff, and that's my only reason for bringing it up. Thanks.

LESNICK: Thank you.

GENOA: I guess I'm wondering if on lead, nickel, and steel, should we do them separately to see what things might be different? What do you think?

LESNICK: Together. Any advice around the table for those of you who are familiar? Should we take lead, nickel, and steel separately from each other, or as a group and ask you to clarify as we go along? Any advice on this?

Let's start with lead, okay? Let's start with any comments about lead. Is that all right?

Paul, do you have any comments about lead? Judd?

GENOA: Paul Genoa, NEI. Kristin alluded to lead. I think lead, unlike aluminum, where we think it's out there in lots of places, it's in small amounts.

Lead is used routinely, because of its shielding properties, in the nuclear industry.

Lead is used not only in fixed facilities within the design of a facility as permanent shielding, it's used in sheets or bricks or shot, or in a wool form like a steel wool, a lead wool.

The lead wool -- and so the permanent facilities tend to be sheets or bricks, or melted solids into a certain configuration, a shielded drum, for instance.

Generally, those are -- the sheets and bricks are just stacked as they are in some configuration. They're manufactured for that purpose in different interlocking configurations.

If it's a fabricated shield for a certain utility, it actually is probably poured into a stainless steel container of some kind. So in that case, its' likely protected from contamination.

There is also temporary shielding used. There are racks, commercial racks that are used that you can wheel into an area and you can hang blankets that are made up of this lead wool inside of a PVC plastic cover that's sewn around it with eyelets so that you can strap them onto a piece of equipment or hang them from a rack to shield workers from those sources.

Those clearly can be decontaminated by simply removing the external package and taking the wool out and using them. In most cases, that is done.

But when it comes time -- there is also lead used in shielding for packages. There is lead shot used in certain applications.

And I don't have good numbers, but there is a lot of lead in facilities. The bulk of that lead is going to come out when you decommission the facility or you change your configuration within a room.

The lead adds problems, of course, because lead is a hazardous material under RCRA.

So lead can be cleaned very easily. There are approaches to clean lead. Electropolishing is a good way. It's sort of the reverse of electroplating, and it just sort of strips everything out and it's clean.

But you then end up with a mixed waste stream from that process. So there are some difficulties in dealing with the material.

But lead has value, commercial value. It is a useful product, obviously, and there is a lot of it that is probably clean. I guess that's --

LESNICK: Before we turn to Bill, since I'm assuming you're going to have some similar comments, potentially, here, why don't you keep the mike for a second about anything you'd say then about your suggested alternatives for how to address lead?

GENOA: Personally, I don't see a differentiation between handling a lead brick, a piece of copper, a piece of steel, a piece of aluminum, or anything else.

LESNICK: Bill?

LIPTON: Bill Lipton, Detroit Edison. We generally avoid using lead in the form where it can become contaminated. As Paul mentioned, we only use lead that's securely wrapped. Then it's just a matter of when we no longer need the lead -- generally, it's stored for reuse, we don't or very rarely generate lead waste, but it's just a matter of removing the wrapping.

I think that's the best approach to take. It's probably different in medical facilities where they have to use more sheet lead, but I think the way lead is generally used, it can be used in a way that it doesn't become contaminated. And I think that's probably the best approach, preventing the contaminated waste generation in the first place.

LESNICK: Thank you. Let me sneak Mike Mattia in here.

MATTIA: For the recycling industry, the lead brings up an interesting issue of storage. Generally in recycling, most of the materials, you don't stockpile them. You bring ferrous in, you want to get it out within a few days of processing. And that applies oftentimes to a great deal of the metals.

Some of the nonferrous metals such as copper that we talked about this morning, you'll bring in and hold for a short period of time until you've accumulated it to an amount that you want to ship out.

Lead is one of those interesting things where there aren't as many lead smelters in the U.S. as there are steel mills or as there are copper smelters. So, you will hold onto the lead for longer periods of time.

You'll bring it in and hold on to it until you have accumulated it to the point where it's justifiable to ship maybe a truckload or a good amount to someone.

And you will accumulate it slowly, because it's not something that finds its way on a daily basis to the scrap yard.

That brings up a problem in that if you have contamination, even a low, low level, we're talking about this material being in a warehouse where people are working constantly, for long periods of time while it's waiting to be accumulated and shipped out.

So, lead that would have low level contamination would be a concern, because it's going to be there for awhile. Whereas, for example, if copper were to come in, it would probably move out within days; ferrous, within hours, but lead might be around while you're slowly letting it pile up.

CARDILE: As a point of clarification, I can't speak for NUREG 1640, but I know NUREG 1640 did not address lead. If we were to extend the analysis of 1640 to lead, I would presume that his contractors would work with the industries who handle this material, and follow what you just said about how the material stays at the site there.

Presumably, potentially, this group of workers would become perhaps a critical group, and so any dose limit that we use would protect -- if they were the limiting case or the critical group, it would protect them.

So it's not like this would be something we would not have to consider.

MATTIA: If I may just extend that concept, again, when you look in the recycling industry, the ferrous materials are generally outside because they're big and they're bulky, and the machinery that needs to operate them are big and bulky.

The nonferrous materials are generally inside, and would generally be inside the warehouse. And in many cases, not just with lead, but the nonferrous materials, the copper, the brass, the lead, and in some cases, some smaller types of aluminum, definitely the nickels, that would come into a scrap facility, would be inside a warehouse where people are working constantly, and they would be held there for anywhere from days to months, waiting for the right market or the right accumulation.

So whereas ferrous, I would say a ton of ferrous that comes in on Monday, at some point is going to be gone that week.

The nonferrous could come in and be there for weeks, and even months, waiting for the right buyer, the right market.

LESNICK: I mean, that's the point you just made.

MATTIA: yes, but it doesn't apply -- I want to make sure that it doesn't just apply to lead, although that is something that would stick around the longest. The others will be there for periods of time as well.

LESNICK: I'm sorry, Mike. Thanks for clarifying that.

All right, let's keep moving quickly through lead. I want to make sure we have time to talk about nickel, and finish whatever else we have to do on steel, as well, and then we've got some wrapup. We've got to be finished by 3:00, so Kristin, some comments?

ERICKSON: Yes. For us, lead is an everyday business, lots of it. I wouldn't say it's a huge, huge volume, but it certainly adds up, because every single shipment that comes in, most of those are in a little lead container of some sort, and we get about 3,000 shipments a year.

The University of Michigan, our sister institution in Michigan, is even bigger. I think they're more on the order of 6-8,000 shipments a year.

So you think of how many little lead pigs that is. And then you look at the number of lead bricks, and then you look at a bigger facility like the cyclotron with the shielding in it, or the old scintillation counter. When you take that apart, there's lead in there.

Not to speak of our -- we can -- orphaned, inherited lead things that we have. It would be nice to be able to prevent contamination by wrapping everything, but they don't ship them to us that way, unfortunately.

Most of the lead is not contaminated, but there is a lot of effort and time put into surveying, and most of the time there are short half-life, so not a problem, typically.

But we do have some that is long half-life, high gamma, and we are stuck with that, basically.

The other big point about lead that I haven't heard mentioned yet that we need to keep in mind is even more of a problem. It's not the radiation. Lead itself is a hazardous chemical.

Now, you've got lead sitting around your facility, it's oxidizing and you've got lead oxide in the air and people are breathing it, and that is not a good thing. What have they done with the lead-based paints? Well, you need to look at that if you're storing big piles of lead anywhere.

Is it going into the air? We have had the cyclotron as the worst pack rat of the whole facility. We've got so many tons of lead bricks over there, you just couldn't even believe it.

And they're ancient, powdery. And so those are more of a risk to worry about than the radiation.

I think you don't need to worry about the rads here, but that chemical risk is a whole different thing.

LESNICK: Thanks, Kristin. Tony, and then we'll come over to Robb.

LAMASTRA: Tony Lamastra. To follow up on what Mike was saying, with things like lead and copper, not only are they inside, but they tend to come in in relatively small quantities. So you might have a pickup truck load, and it's going to be off-loaded by hand as opposed to iron and steel which will be handled in much larger quantities.

And that tends to be typical for most of the nonferrous, other than aluminum, maybe.

LESNICK: Thank you. Robb, then we'll come back to this side of the room and maybe finish up on the lead, I think.

LEIB: Robb Leib, First Energy. I have just a thought on lead. My experience in aggregate areas, rooms filled with items that have been controlled to levels below current release levels if there's no increase in background.

Secondly, lead would offer the additional benefit of providing self-shielding. A pile of lead will certainly not be a dose concern from small amounts of material that might be on the inside.

And third, I just want to reiterate, yes, the overriding concern at our location is the handling and ingestion of the lead material itself, rather than the radiation.

LESNICK: Thanks, Robb. Paul, you wanted to make a point?

GENOA: Yes, actually very briefly, and it was to kind of follow up on this last theme. The real difficulty with lead is lead disposal. As I said, lead is a valuable product that has to be used carefully.

But lead that is wasted and is no longer useful is a detriment to the environment, and it's significant.

And so avoiding disposal of the lead is a good thing. And I also wanted to point out that although there are ways to encapsulate it, and do all that, it's still a challenge.

But lead is unique, also, as I mentioned, because of its radiological properties. The nuclear power plants across the country have generated about 70,000 metric tons of spent fuel and will generate almost a like amount over the life of their facilities.

All of that fuel will need to go into specially-designed packages, ultimately for disposal. We're currently looking at Yucca Mountain as a possible source.

Some of the designs for those disposal containers and also the transport containers include some lead or depleted uranium. Now, the Department of Energy is responsible for that activity, and actually has a lot of depleted uranium, so it might be able to make it available.

However, we haven't progressed very far in that. My only point is that there may be some direct within the industry recycling potential of that material for a useful purpose, which is the ultimate disposal of the fuel in appropriate packaging.

But there is a lot of work that needs to be done on approving the design of the packages. Right now, it's not going to be a government design; it's the private sector, but if that material was available as a resource and made available essentially for free, I think the free market would figure out how to impose its use in those packages to the betterment of society.

LESNICK: Thanks, Paul. Can we move on to nickel? Is that all right?

Comments or information you'd like to share about nickel? Mike Mattia?

MATTIA: Very briefly -- and I had mentioned this earlier, that nickel is probably one of the precious metals of recycling. There are very few in the world, nickel refineries, and the scrapping of nickel is a very, very valuable commodity.

We have talked about a couple of dollars per pound for things like copper, which was really great, and the scrap value of nickel can be in the tens and hundreds of dollars per pound. It depends on the market and it depends on the purity of the nickel.

It's a very, very valuable substance because it's in high demand for a lot of specialty metals, and because, as I understand it, there isn't a great many mines and refineries that refine new nickel. There are a few of them. It's not as well mined and as plentiful a natural resource as many of our other metals.

So it's a very, very valuable commodity, one that is in high demand in the recycling industry, has a lot of specialty applications for very expensive equipment.

So it's a very highly sought after, highly marketed piece of scrap commodity. And like with the others, it's stockpiled inside, it's handled by hand. And it will be gathered until there is a sufficient quantity or sufficient market force to say now is the time to deliver it. So it will also accumulate.

LESNICK: Question, Trish?

HOLAHAN: Trish Holahan, NRC. You mentioned earlier with copper that it was the processing of that that was simpler than with steel. Is that also the same with nickel?

MATTIA: Yes. In a scrap recycling facility, ferrous and those types of metals, there's a lot that has to be done. You know, ferrous material will come in the shape of a car or an automobile, something that you have other materials there. You can't ship a car to a steel mill. You have to tear the steel apart, you have to put it into certain types of packages or bundles or shred it.

Most of the time, like if copper were to come in and you were to get copper windings or copper motors, they'll go in a box because that's how they'll go to the refinery because there's a refinery that can melt them that way.

If you get nickel in, it will be graded as to what kind of nickel, and it goes in the box until I find a buyer for that kind of nickel or that kind of lead.

So the amount of processing that you actually do is nothing more than sorting, grading, weighing it, and putting it off waiting for it to be shipped.

LESNICK: Thank you, thanks for clarifying that. Let's take the cards over here on the left first. Jud?

LILLY: This is Judson Lilly with the Department of Energy. I don't think I could have avoided speaking about nickel.

One of the most notable aspects of a large decommissioning project we have in Tennessee is the removal of 6,000 tons of nickel from the gaseous diffusion plants. And the nickel in those plants is in the form of thin tubes about the size of your finger.

There are several thousand large vessels and each vessel contains several thousand of these nickel tubes. Our decommissioning project is to take the equipment out of those buildings.

We pull the nickel tubes out of the vessels. We pretreat them, and then they're shredded, and then they are sent to an MSC -- I guess it's licensed by the state of Tennessee, an agreement state.

At that point, at the MSC facility, they are melted. After they have been -- they are classified, classified nonproliferation technology, both in terms of the shape of the tubes, the dimensions of the tubes, and some of the chemical components that are with the tubes --

When they arrive at the NRC licensed facility, they are melted. At the point they are melted, the classification issue is resolved, so at that point forward, it can be treated as nickel.

The primary contaminants of the nickel tubes, the most difficult one is Technetium-99. The gaseous diffusion plants took fuel that had been used at Savannah River and Hanford, Washington, and that fuel introduced Technetium into the gaseous diffusion plant system.

And that is the most difficult radionuclide to remove from the nickel. The process that we have for that, we will be melting the nickel, then we will be dissolving it into an electrolytic solution.

There is a filter within the electrolytic bath, and then the nickel will be plated out. So what we will wind up with is a nickel cathode from the electroplating process.

The technetium will be held up within the electrolytic solution, and will be pulled out in the filter media on a regular basis.

The license that the state of Tennessee granted on this specific proposal is three Becqurels per gram of Technetium-99 with no ingot, no single ingot having any concentration above 6 Becqurels per gram.

For uranium, it's .3 Becqurels per gram with no single ingot having greater than .3 and no greater than .6 of concentration of uranium in the nickel ingot.

That's the process that we have for this. I'm trying to think if there are any other issues I need to refer to that?

The doses that have been calculated for that proposal are .0017 millirem as the maximum dose that would be resulting from that. The State of Tennessee was the -- the requirements that the Department put upon the project were that the contractor needed to find -- needed to receive a license to proceed with this and have an authorized limit.

They did work with the State of Tennessee, and the State of Tennessee licensed the process, and at that point, the Department was willing to go ahead with the project.

We are overseeing the radiological control program, but it is really the responsible -- we are not stepping in and taking over the turf of the State of Tennessee; they are the regulator of record, and we are there as a technical resource as well.

LILLY: 6,000 tons from this particular project. The problem, the thing that has received a lot of notoriety is this is a volumetric release. The nickel in the plants is centered, so it is effectively a sponge. And you're pumping gas through the sponge, and that gives you effectively volumetric contamination. When you melt it, you certainly have volumetric contamination.

We spent a lot of time and a lot of care to make sure we have an effective decontamination technology. By way of an overview, that's how that project is being handled and how it's being treated.

LESNICK: Thank you very much, Jud.

CARDILE: Can I ask a quick question?

LESNICK: Yes sir. Frank.

CARDILE: Frank Cardile, NRC. I just wanted to ask a quick clarifying question. The calculation, the calculated dose from the pathways, I guess, that you did was .0017 millirem per years.

LILLY: This is Judson Lilly, U.S. DOE. Yes. That's the maximum, the maximum dose. The controlling scenario for that was hip implant that would be in, in place for twenty years. The second most limiting case was a, a set of braces, and those would be in place, the assumption was, for three years.

Now the, the true use of most nickel is not an, in personal care products. Our intention would be that the majority of the material would be used in an industrial application, but that, the program doesn't have anything in place to guarantee that. So for being conservative, we assumed the most direct use for the product. So that is our limiting scenario, our limiting case.

LESNICK: Thank you.

LILLY: One aspect that was noted in the analysis was that the, the x-ray doses that would be taken for either the hip implant or the, or the orthodontic procedure would be several thousand times the dose from the x-rays than you would have from the actual use of the nickel in the devices. LESNICK: Thanks

CARDILE: Can I ask one other quick question?

LESNICK: Yeah, quickly because I want to make sure --

CARDILE: Frank Cardile, NRC. If I could just -- I assume that you also looked at, as NUREG 1640 did, the scrap worker, the, in the pathway analysis. I mean, the people who process the material are also in this analysis? I mean --

LILLY: Yes.

CARDILE: -- 1640's analysis showed that the scrap worker was bigger than the end user.

LILLY: No, my understanding was that the, that the worker analysis was not, was not specifically spelled out in the license application. Now, our Office of Environmental Safety and Health noted that, I believe. I believe you all have looked at that as well. That case may be, may be a more limiting, may be a higher case, but it is certainly well below any -- you know, when the levels are so low that, that even if you were off by several orders of magnitude, you'd still be well below any standards that have been contemplated.

I believe the IAEA and the European Union have standards for technetium that are 1,000 beckerels per gram and 300 beckerals per gram.

CARDILE: Thank you. I appreciate it.

LESNICK: Let me take the last two comments about nickel because I want to have, make sure we've covered steel appropriately and we still have wrap-up to do, and we will finish by three. So, with vigor.

SZWED: Okay. Dan Szwed for MIRC. Just to reiterate some of Mike's comments about the value of nickel -- I guess I'm questioning how it gets to a hundred dollars per pound. I'm not that familiar with the, the costs. I'm more familiar with single dollars per pound. But nickel, nonetheless, is a valuable material, particularly to the stainless steel industry. It's a key alloying element. It's what makes our product applicable in many of the uses, many consumer uses. And therefore, the quality of nickel -- to use the term -- perfect. I mean, we can't accept anything less.

LESNICK: Thank you. Mike, last comment on nickel?

MATTIA: Just a quick question of Judson is, given all security issues, considered how much of this refining, decontamination process would be observable.

LESNICK: If you could be brief in the answer, Judson, I'd appreciated.

LILLY: Yeah. This is Judson Lilly again, with the Department of Energy. Once the nickel is melted, there are no security restrictions. It would be -- the only restrictions you would have would be on the radiation, operation aspects. That's why yesterday -- the classification issues of nickel will be resolved before you get into a clearance situation. So the clearance issues are not going to cloud or make the, the release of this a problem.

LESNICK: Thank you. Let's move on to steel. Now, I guess --

CARDILE: Can I ask one quick question? This is Frank Cardile of the NRC. I, I assume -- and I wanted to ask two quick questions. One is, Paul, is there any -- I guess I'm showing my ignorance -- in the nuclear and NRC license industry is there any nickel material? And the second question is, I would assume that the same concerns about dose levels, you know, the doses and receiving any of the nickel with radioactive contamination, would hold amongst the scrap people and the steel people that the same concerns would be there, as are there for the steel?

LESNICK: And if you could be succinct.

GENOA: Paul Genoa, NEI. Briefly, I don't know if substantial quantities of virgin nickel. It's used in, for plating out sources. It's used in radiolytic chemistry -- usually not by our people but by labs. Clearly it's a component of stainless, and we have huge amounts of stainless. But our stainless, generally because of the systems, is used for highly radioactive fluids, and generally is not applicable for clearance.

That doesn't mean that smart people in the future won't learn how to decontaminate stainless; it is being done today and it can be done in the future. But I'm not sure if that really is related to pure nickel. That's more a stainless steel recycle question.

LESNICK: Okay.

CARDILE: I guess my question to Mike was, for the same concerns or reasons that the scrap and steel industry would be concerned about having steel coming in, it would also be concerned about having nickel coming in, despite the higher value.

MATTIA: Oh, absolutely.

CARDILE: Okay.

MATTIA: There's no question, especially because -- and it's not even just especially. As was mentioned, you take a substance like nickel as the other non-ferrous, there's more handling being done by the worker in the scrap yard than is being done with the ferrous. So there's even, I would say, more concern. And it sticks around near the worker a lot longer than the ferrous does.

LESNICK: All right, let's move on. Let me make a suggestion --

LILLY: I'd like to include one remark. With -- this is Judson Lilly again, with the Department of Energy. I understand what the, what the position, the policy position of the Associations both for scrap metal and ESRI are. The metals that we're having coming out of our project are generally, generally being dealt with through brokers. And in point of fact, we have -- the pedigree of our, of our materials coming out is very well known. The quality of our materials is very well known. And we've not had a problem or reluctance on the part of individual firms to purchase that. It's very clear what it is, where it came from, what it looks like when they get it. So that, that has not been an issue with specific companies who would be in the market for this material.

LESNICK: Let's move on to steel. And I think -- let me make a suggestion here, that, you know, we've had good conversation about steel, and I think an evolving understanding also, over the four workshops. But I don't want to assume that we've heard everything that we need to hear or that some of the subtleties -- you know, we've gotten everything.

So I guess I would like to ask people around the table to have a fairly high threshold here -- things that you think are particularly unique or special that should be emphasized about steel and/or things you think that really haven't been said yet that need to be clarified, given the kind of schema we are working with. That way, we don't have to probably replow old ground, so to speak. And let's keep, keep the bar pretty high.

Pete Hernandez.

HERNANDEZ: I was going to -- Peter Hernandez. I was going to suggest that we go through the process for steel with Paul, explaining its applications. And I need to address a number of questions that were posed earlier to us by a number of representatives here. This may be part of the discussion, but I believe Paul should proceed.

LESNICK: That's agreeable I think, right? Maybe quickly, Paul and others, just ways things are being used and current practices being cleared, and then your suggestion of, of alternatives.

MATTIA: I just [OFF MIKE]

[LAUGHTER]

LESNICK: Anything you want -- as with other materials, let me -- since it is, it's late and it's the fourth --

[APPLAUSE]

LESNICK: Did you forget that you use steel?

MATTIA: No, that's right. I do.

[LAUGHTER]

LESNICK: Paul Genoa, NEI, Mars landing.

The question Paul is -- looking at this schema, when we've kicked off each area, it's been helpful to hear from the main users. How do you use this? What are current practices? How are you clearing now? And your preferred alternative, if you will. And I think that would be very helpful. Is that all right?

GENOA: Yes, I know exactly what I was gonna say. Paul Genoa, NEI.

[LAUGHTER]

GENOA: I want to say that obviously, steel is a very important product. It is used substantially in the millions of pounds. In our plant's specialty's stainless as well as a structure steel, carbon steel. The bulk of our material's carbon steel, and we do release materials from our plants routinely in the form of scrap metal when components are changed out, equipment breaks, etc. And when we decommission a facility, there'll be much structural material in the form if beams and I-beams and steps and staircases and all sort of stuff.

And I have learned about the orphan source issue, and I am very sympathetic with the concerns of the industry. And I am also very aware about nuclear stigma, radiation phobia, what it does to an industry, because I live in it everyday. So I am sympathetic.

But the way that we, the way that we regulate and control our activities -- I can understand that it's hard for you to understand it because it is so grossly over-conservative that no rational being would believe that that's how we actually do things. But I think you've heard from Kristin that it's actually not just the electric utilities but also industry, medicine, and everyone else.

So there is a very high compliance and a very high care and huge resources expended to ensure that materials are clean, safe, monitored, etc. And you probably don't need to hear more about that. But I think it's important on the issue -- I don't think we can set a standard that will affect the industry by setting off their alarms. If you set a standard like that, then you're gonna have to mitigate the situation or avoid it somehow.

I understand that the analysis that you've done, Tony and others, that, you know, you just take some numbers that come out of these regs and you assume a certain volume and it all gets there and it's gonna set off your monitoring -- and it would under those conditions. But that's another example of the difference between a theoretical study and reality.

In reality, we release material. It may have -- on a 400-pound piece of steel, we may find one spot that has contamination. We clean that and then release it. We're nowhere near a fraction of the limit. We're nowhere near a fraction of the standard. And so it's unlikely, in my opinion, that if a carefully constructed standard were developed and it was implemented by our industry the way we implement business, that it would result at false alarms at your facility. But again -- so that's it. Thank you.

LESNICK: To make it easier -- from you and your perspective about steel and how it's used and the implications of this material.

ERICKSON: Kristin Erickson, Michigan State University. Current steel problems are not much, but they will grow as we continue to decommission parts of our accelerator and build new accelerators.

The other things that we have as impact, as I mentioned before, was the decommissioning of building ventilation systems, which are many stories tall -- ventilation ducts, fan blades, some of them steel, some stainless. And those components are, although not tremendously problematic as far as how often you find radiation, if it's there, it's problematic because it's a big piece of equipment. And that's our primary use of the current controls, or just as we do with everything else, survey down to nothing -- a monstrous endeavor to assure that there is no contamination of any kind. Tritium on up. Thank you.

LESNICK: Pete, maybe this is the time to turn to you then, and maybe for some others, for any reflections on this. We'll take five minutes or so of comment before we start wrapping up.

HERNANDEZ: Peter Hernandez. Thank you. I'd like to addresses the questions and comments made by Frank Cardile, Bob Mack, Rob Lieb Paul Genoa, at least to some extent.

The challenge that NRC faces is a complex and multifaceted problem. The frailty of the licensing and regulatory system has put the public at risk with respect to loss of control of orphaned sources. And since 1983, there have been 24 meltings in steel, aluminum, copper, lead and aluminum production facilities. So steel companies have learned the hard way that they cannot let their guard down, and they've pushed manufacturers of the radiation detection equipment to improve the detection limits. And they've demanded that their suppliers pre-screen scrap if they want to sell it to them.

Steel companies have also learned the hard way, in the '70s and '80s, that we must be customer-focused if we're going to become and remain globally competitive. And that's where the industry is today.

If the Nuclear Regulatory Commission adopts a free-release limit for steel products, it'll be creating a new scrap product, some of which has detectable levels of radioactive material. This new product, we believe, will trip our alarms, our members' alarms, and it will be rejected.

The risk of ignoring the alarm, for the steel companies, creates both potential employee and community health risk and a significant economic risk, if also buried in that material is a shielded source that would have, typically, by our calculations, significantly lower emission levels than would the free-release scrap at the free-release level. Consequently, we believe it would be imprudent for the NRC to establish a free-release limit without considering the role of the orphaned source problem in this whole equation.

Market-based solutions will work when you have a willing seller and a buyer. We only have half the equation here because the scrap metal customers who serve the general market in the United States don't want this new product. Thank you.

LESNICK: Thank you very much. Do we have any other last comments about steel before I turn, Don, probably to you to talk about next steps and clarify what else will be happening in this process? Tony, is that your card?

LA MASTRA: Yeah. Tony La Mastra. I guess I visited Alaron, which is a facility that decontaminates commercially, decontaminated materials, at the wrong date, because when I went there, there were several I-beams that had much more than a single spot. There were large -- I don't know if they were turbines, or whatever they were, but they were big hunks of material. And if you looked at, at the metal, it basically had areas that were much higher than 5,000 DPM per hundred square centimeters. But if you averaged over the whole piece, it was significantly lower.

I'm, I know when people ask me about the safety of radiation in a steel plant, I have a tendency to present a relatively rosy picture. And I guess I'm not sure that reality is exactly, you know, the one tiny little spot all the time.

Secondly, something that really hasn't been looked at is the cost of disposal. If -- and again I have no numbers for what a reactor would pay for, say, cubic foot of rad waste --

GENOA: $375.

LA MASTRA: How much?

GENOA: $375.

LA MASTRA: Okay --

LESNICK: Keep going, Tony, but be succinct. I'm aware we need to get public comments.

LA MASTRA: Okay. Typically, if a steel mill or a scrap yard finds a piece that they are forced to dispose of, they are looking at $2 to $3,000 for that small little piece, which I think is not what the NRC ought to be encouraging for the little guy essentially to be pushed into that kind of a bracket.

Third, I just did a quick calculation, and if my reading of NUREG 1640 is correct, the proposed number, or the number that they used for cesium, is one picocurrie per gram, roughly. I think it's 1.08 picocurries per gram. If you take -- again, I'm not arguing that a piece of steel would be uniformly -- yeah. I can't speak any faster, or I'm really gonna be coughing and that poor guy over there is gonna end up blowing his ear drums out. But if you take tons, throw it into 100-ton heap of steel and it's contaminated at 1 picocurrie per gram, the dust that's produced is now at 6 picocurries per gram. That exceeds the limit that the NRC proposed to the Steel Manufacturer's Association, back, I think '93 or '94, of 2.

So in a sense it looks like what you are setting as a potential limit could possibly cause the steel industry to exceed what you're limiting them to. It would definitely exceed the 1 picocurrie per gram of dust if they then had to dispose of it.

LESNICK: Thank you, Tony. I appreciate it. Charles.

WILK: My comment is not directly about steel. Will I have an opportunity to say it?

LESNICK: This is it. This is the end of the line, so make it quick please.

WILK: Okay -- I've got the mic. I just wanted to relate something. We've heard a lot of things from the recipient industry concerning perhaps what you might consider paranoia on our part, of public opinion. But you, the Commission of the NRC may wish to consider that there's a superfund site in Denver called the Denver Radium site, part of the Shaddock Chemical Superfund clean-up out there. And I believe in 1993, the EPA came out with a remedy decision for the site that involved solidifying contaminated material, radioactive material, on-site and placed within the city limits of Denver.

And the regional administrator for Region 8 of the EPA signed that remedy decision, and the region then implemented, did a remedial action, did this remediation at the site, placed this material on-site, within the city limits of Denver. All the time that this was going on, the decision process, the public and local government politicians were incensed about this remedy, even though the EPA -- which is part of the government -- said that this remedy was protective of human health and the environment. And very recently, this fall, the U.S. EPA out of Headquarters decided that that material needed to removed. So here's a remedy that was -- the government said it was protective of human health and the environment, and as a result of public opinion, ripped out the material and had to dispose of it elsewhere.

LESNICK: Thanks. Charles. Paul, and then Mike. And then we will take public comment and hear from Don. And then we need to close this up.

GENOA: Paul Genoa, NEI, just very brief. The entire discussion on steel has revolved around recycling. I tried to point out early, because the bulk of our steel is just carbon steel scrap, and it's low value, that the economic advantage of recycling it is not significant. It's cost avoidance of shipping it across the country to a low-level waste site, and we have not spent any time talking about disposal in non-Part 61 facilities, which would be, has been done, it was done recently in Florida, a turbine rotor. And it could be done. And that's something that should be discussed at some point.

LESNICK: Thank you. Mike, briefly please.

MATTIA: In just about every city or region of every country on the planet, there is a recycling facility. We're not talking about the curbside recycling. That's been a phenomenon over the last ten or twenty years. We're talking about metal recycling facilities that, in the U.S., date back to the Revolutionary War period. Metal is recycled daily, tens of thousands of tons. Metal is presented to a scrap recycler, and the scrap recycler has the technology and the equipment and the know-how to create that metal and to create it in a form that's acceptable by an entity who will take it and melt it and create something new in order to preserve yours and preserve the planet in other ways.

The recycling industry has always been at the forefront of what is good and essential, and we want to be there for this issue as well, and we'd like to be able to move from here to dialog, which will keep the process of what is good for industry, what is good for the public, what is good for the planet, to continue so that everyone will be in agreement as to what works and what's acceptable. And then that can be turned over to our regulators to create a rule to implement that.

LESNICK: Thank you very much, Mike. Let me see if there's anyone who would like to make public comment at this time. Can I see a show of hands, please.

[NO RESPONSE]

LESNICK: Okay, I see none.

Before I turn this to Don Cool for discussion about next steps and any other comments

Don would like to make, let me just say on behalf of myself and colleagues at Meridian Institute, Barbara Stinson, Sarah Whalen, Rebecca Hensey, thank you very much for participating, those around the table and observers. Those who participated in four workshops -- we encourage you to stay involved, and stay in touch with this ongoing process. The to the NRC Staff, thank you for making this a very transparent process, and good luck.

COOL: Thank you, Mike. Let me do a couple of things very, very quickly for you. First let me add my thanks to each of you for your participation. I think this has been an extremely useful couple of days. We've really gotten to some details and some information, and I think we've really been able to put a finer point on a number of issues that will really be useful to me and my staff as we start to take the next steps.

The Commission has asked us to bring them a summary of all of these public interactions, and some recommendations for how to proceed in March of 2000, just a little over three months from now. If you wipe out the holidays, we really have less than three months to try and assemble that particular package. We will do that with all of the informations that are available -- the transcripts, written comments -- and those are still open until the 22nd. And I would encourage you, as is often the case, on the flight home, if you suddenly think of something, write it down and send it in so that we have the advantage of all of that information.

The transcript of the meeting should be available next week. We will post that on the website. If you've got a really fast modem and want to work on downloading that, I suppose you can do that. Or you, too, can get your very own six-inch copy of paper. We could probably manage that if you want to whack a couple of trees.

Meridian, as an additional part of their contract, will be preparing a formal summary. That will be in three weeks or so, a 15- or 20 page digestion of the details. Sarah Whalen has been sitting over here at the side or in the back, on the laptop, busy adding some of those particular levels. So there will be those two particular summaries.

We have a website. There have been several references to it over the course of time, which has a number of the information. I encourage you to keep checking that. We have put together a list server -- I'm not sure whether you could consider it active, because I'm not quite sure anyone's subscribed yet. But we have tried to establish that mechanism. I'd encourage you to try and do that, so that's yet another mechanism for you to find out when some of the next steps in the process will be.

As my staff puts together the commission paper, the summary of comments, that information, we expect that some of the working group meetings that the working group has will be open to the public. We will announce those, try to get those up on the NRC's formal site for noting public meetings, get that on the list server, so that you have an opportunity to interact with us. Those will probably be half-day sessions to look at a particular thing, like the summary of comments or some of other pieces so that we can do that in a way that you can get into it and look at it.

The draft materials that they will be looking at will be available for comment. We'll put those on the site so that you can read them and tell us whether we have or haven't captured those particular items or there are things that really don't reflect quite the way you saw them, so that we try to have as best a representation to the Commission as possible.

The actual Commission briefing will be an open public meeting. It will be in late March. I don't think we've actually got official dates scheduled yet. The Commission has in times past invited stakeholders to the table. That is a decision that the commissioners will need to make, so I do not know whether that invitation will be made in this particular case or not, but we will again certainly let you know as we go through that process.

The Commission, following that meeting and with the paper, will then be making some decisions and giving the Staff some direction of whether that's to proceed in some particular rulemaking avenue to continue a set of interactions to stop entirely for a little while or some other combination of things. Obviously I can't predict yet. One of the great joys of the system we've got is that we can engage in a very serious and lively and far-reaching discussion within the Commission, just as we have here around the table and in other public meetings.

So that gives you an idea of some of the next steps in the process. There will be opportunities for you to see information and continue to interact with us. Obviously if the Commission does direct rulemaking at some point, if that were the decision to be made, we would then enter into a process which would also be an open public process, and there will be lots of additional opportunities for interaction before we ever got to anything which would constitute a proposed rulemaking.

And with that, unless there are specific questions, I wish you all safe travels. Be careful on the roads out there, because that's a much more risk-informed situation. And have a good afternoon. Bye-bye.

[Whereupon, at 3:00 p.m., the workshop was concluded.]