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NUCLEAR REGULATORY COMMISSION

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PUBLIC MEETING ON THE INTERNATIONAL ATOMIC ENERGY AGENCY BASIC SAFETY STANDARDS

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FRIDAY,

FEBRUARY 26, 2010

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The meeting was convened in the Auditorium of Two White Flint North, 11545 Rockville Pike, Rockville, Maryland, at 9:30 a.m., Francis Cameron, Facilitator, presiding.

PRESENT:

FRANCIS CAMERON, Facilitator

ELVA BOWDEN BERRY, Facilitator

DON COOL, PHD, Senior Advisor, NRC

ROB LEWIS, Director Division of Materials Safety and State Agreements, NRC

TREVOR BOAL, PHD, IAEA

C O N T E N T S

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

9:36 a.m.

MR. CAMERON: Well, good morning everyone not only in the room but those of you who are on the phones or watching the webcast of this meeting. I'm going to be back -- my name is Chip Cameron and it's my pleasure to facilitator for the meeting.

I'm going to be back in a few minutes to go over some meeting process issues. But we're going to start off with a welcome from Rob Lewis of the NRC staff. And Rob is the Director of the Division of Material Safety and State Agreements.

Rob, I'll just turn it over to you.

MR. LEWIS: Thank you, Chip. Good morning everyone. Welcome to the NRCS headquarters building in Rockville. Special welcome to those of you traveling.

As Chip said, I'm Rob Lewis, I'm the Director of Material Safety and State Agreements here at the NRC and I'm also the U.S. representative to the Radiation Safety Standards Committee at the International Atomic Energy Agency.

That's the committee that has been giving advice to the IAEA as they've developed the document we're here to talk about.

NRC is very happy to host the forum today on the -- to host the interagency steering committee on radiation standards forum today, to have a dialog and exchange ideas on the IAEAs international basic safety standard for protection against ionizing radiation and the safety of radiation sources or BSS.

Hopefully that's the last time we have to say the whole title. We'll talk about the BSS for the rest of the day.

We appreciate everyone coming in on a Friday, especially those who had to travel. We know that for those of you that did travel, we might have impacted your weekend, we apologize for that.

I want to give a special thanks to Mr. Trevor Boal who has traveled, as far as I know, has traveled the farthest, he traveled all the way from Vienna, Austria, he works at the IAEA.

He's one of the principal authors of the BSS and he places us in a very good position to have a very fruitful discussion today just by being here.

The BSS was last revised by IAEA in 1996, so it's been almost 15 years. The new updates reflect many events as in radiation protection over those years, including the recommendations of the International Commission on Radiation Protection or

ICRPs publication 103, which was published in 2008.

The BSS covers many activities regulated by NRC within the United States, but it also covers many other areas such as radon in homes, machine-produced radiation such as x-rays and other issues such as medical use of the radioactive material and advice to physicians using such material.

The BSS is a foundational standard amongst all the IAEA safety standards and guides. Those are built from the BSS, so when it is revised, it's very important.

Many countries will use the BSS as one of their basis for their domestic radiation standards.

IAEA has issued the document in late January to all the member states of the IAEA for 120 day comment period, and that's what we're in right now.

Ultimately the United States is not obligated to adopt the BSS into our domestic regulations.

We have within the NRC begun the process of looking at our radiation protection regulations, which appear in 10-CRF Part 20, but we're several years away from any final rule making or even proposed rule making on that regulation.

But we do expect that the BSS that IAEA is producing this year, will be one of the key references we look at as we change Part 20; however, any revision to our domestic regulations will go through our formal public comment and response requirements as dictated by the Administrative Procedures Act.

So, we are very happy to host this forum again. We think it's a very important forum because we want to ensure that we give the most informed comments as the United States to the IAEA for them to consider as they move forward on this document.

We recognize that many in the U.S. that we regulate and use radioactive materials or radiation producing devices do more and more business internationally.

And this is a key point in time for them to comment on this document as they will have to use the BSS for their international activities, if those countries were to adopt into their regulations.

So please be very active and participate today, that's our appeal to you. We'll furiously be taking notes in the back of the room. Your speaking up will help ensure that we give the best possible set of comments from the U.S. to the IAEA to consider as they move forward on this key document.

So thank you very much for attending, again. Chip?

MR. CAMERON: Okay, thank you Rob. I just want to go over a few points of meeting process before we get started. I'd like to tell you about the format, give you an agenda overview and talk about some simple ground rules.

The format is pretty straight forward. We're going to have two presentations basically and we're going to be going out to you for questions and comments on the presentations and the material in the BSS.

And our agenda, we're going to start with Dr. Donald Cool, who is the Senior Advisor for Radiation Safety and International Liaison at the Nuclear Regulatory Commission.

And Don is going to give you an overview of how the BSS standards are formulated, but more importantly perhaps because we're going to hear a lot about that, what the relationship is between the BSS and what's done in member countries such as the United States.

And after Don's done, we'll go out to you for clarifying questions on that process. We're then going to go to Dr. Trevor Boal, who is with us from

the IAEA and he's with the radiation protection unit at the IAEA and he's been working on the BSS for the last three or four years.

Trevor's going to give us an overview of the BSS and talk about the various chapters, I guess is the right way to call it, in the BSS. And we'll take a break in the middle of Trevor's presentation for some questions and then we'll have some questions at the end of that.

The real discussion comment part starts after lunch in the afternoon where we're going to go through various exposure issues in the BSS and then we'll go out to those of you in the audience for comments or questions.

And we also have people on the phone and we'll be going out to them for questions and comments also.

In terms of ground rules, when I go out, if anybody has anything in the audience question or comment, just signal me and I'll bring you this cordless microphone. And if you could just introduce yourself to use and then either ask your question or make your comment.

I would ask that only one person at a time speak most importantly, so that we can give our full

attention to whomever has the cordless mic at the moment, but also so that we can get a clean transcript.

Eric is our stenographer, court reporter in the back of the room, and he's going to be taking a transcript of everything that's said, not only in the room, but those of you on the phones. And that will be your public record of the meeting and also the NRCS record of the meeting.

And I would just ask you, since we do have a lot to cover, to just try to be as crisp and economical as possible in your comments so that we can make sure that we can hear from everybody and cover all of the materials.

I'm going to go to the audience first when we go to questions, discussions and then after that I'm going to go to the people on the phones.

We do have an operator who is going to be establishing the queue of people who want to talk on the phones and we'll go out to the operator to help us with that part of it.

OPERATOR: Thank you. To ask a question on the phone, please press star one on your touch tone phone and un-mute your name to record your name clearly when prompted.

MR. CAMERON: That wasn't planned, but that was a great coincidence I guess. Anyway, that was the directions for the people on the phone. Thank you operator.

And there may be issues that come up that don't fit squarely under the agenda item that we're on at the moment and we'll put those over in the parking lot over there to make sure we come back to them.

The last discussion period at the end of the day is open discussion in the sense that if there are issues that haven't been covered during the previous agenda items, we'll look forward to hearing from you on those particular issues.

And with that, I think just a couple of housekeeping items. The restrooms, if you don't know, they're right out at the back of the lobby. For coffee during breaks or lunch, you don't need an escort to go to the NRC cafeteria, which is up on the main lobby level from here.

If you are going to go outside of the building, however, you will have to turn your badge in and sign back in before you come in.

We did receive some written comments already on these issues and by we, I just want to emphasize again I'm talking about ISCORS. These

comments are for the benefit of ISCORS and we will try to pass out anything that we've received already in the form of a written comment.

And with that, I think I'll just go to Don for his overview. At the end of Don's presentation, we'll go out and see if there's any clarifying questions. Thank you.

And one last thing, I'm going to be assisted by Elva Bowen Berry, who's right here. Elva is one of the NRC employees that is in the NRC facilitation training program. And so we're trying to groom a number of new facilitators, so Elva will be helping me. Don?

DR. COOL: Thank you, Chip and good morning to everyone. On behalf of the Interagency Steering Committee on Radiation Standards, which I pronounce as ISCORS, other people pronounce it other ways, I'd like to welcome you to this forum and opportunity to talk about the draft of the international Basic Safety Standards.

I'm Donald Cool, I serve as one of the co-chairs for the ISCORS committee and Mike Boyd of the Environmental Protection Agency, also co-chair the Federal Guidance Subcommittee of that organization, which is taking the lead in actually doing the

coordination amongst the federal agencies in developing the U.S. comments.

I really do appreciate each of you taking the time and effort to come down here today. If anybody was coming down the northeast corridor I know that you've enjoyed the latest round of snow and wind and other things making it interesting to travel around.

Also welcome those who are on the phone lines, and we will try to make sure that we remember to give you opportunities to provide your views and welcome all of those who may be watching on the internet on our webstreaming.

The webstreaming is not a two-way flow of communication, so if you wanted to be making a comment, then you would need to join the telephone bridge in order for us to be able to actually hear you. So, if we could go to the next slide.

What I wanted to do this morning before we have Trevor provide a detailed review of the draft of the Basic Safety Standards was to give you a little bit of the context, there's already been a couple of questions.

So what are the IAEA safety standards, how exactly are they developed and exactly who is ISCORS,

this magically lovely long acronym and what is the purpose of today's meetings.

So I'm going to try and touch on some of those points fairly briefly and see if we can deal with some of those, make sure all of your questions are answered in that regard before we get into the actual technical details of the document.

So, let's begin by looking at what the IAEA safety standards are. Let's go ahead and go to the next slide.

First, the bit of context on this. International standards, like anything else, are developed within a larger context of information, scientific information, practical experience that goes into developing what becomes part of the safety standard series.

So those of you who are watching will be able to see this, those of you who are on the phone and not able to see it are perhaps at a slight disadvantage.

There are several pieces of things which contribute to this. There are some technical basis materials developed by groups such as the United Nations Scientific Committee on the Effects of Atomic Radiation, known as UNSCEAR that look at the radiation

risks, the radiation doses that are seen in different places.

They produce documents and review in a lot of the underlying technical basis. Some of the same types of information here in the United States are developed and published by the National Academies Biological Effects of Ionizing Radiation Report series, which you may also be familiar with.

They provide input to some organizations that do recommendations. That's principally internationally the International Commission on Radiological Protection or ICRP.

One of the drivers to the current discussions is an update that the ICRP did of their basic recommendations for radiation protection, which were published in late 2007, ICRP Publication 103.

All of those materials, plus information that's developed through experience of various countries in regulating radiation, radiation protections, that's the experience globe up here.

Lots and lots of things that we learn; operating experience, what have happened in events, what's going on in various places all comes together to help inform the kinds of things that might actually become the safety standards.

And the IAEA, the International Atomic Energy Agency standards are actually a set of documents in three levels. The top most level is a document which is referred to as the fundamentals. It gives a fundamental safety objective to provide adequate protection.

And then a series of principals, a responsibility for safety, the role of government management, justification of exposures, optimizing exposures, limiting exposures, protecting future generation, preventing accidents, emergency preparedness.

I haven't tried to cover all of them, but that gives you a flavor of the topics that are covered in the fundamentals. All very nice as large principals, those get translated into the what's really necessary to accomplish that in a well-running program in a series of documents, which are called the safety requirements.

Those documents are formulated in a form of shall-type statements similar to the way that you would see regulations in a country. We will talk a little bit more about those as it relates to the international Basic Safety Standards.

The Basic Safety Standards are one of the

requirements documents, but not the only one. There are requirements related to transportation, there are requirements related to nuclear safety, there are requirements related to waste safety.

So there are a series of requirements documents at that level, sort of international set of shalls, the things necessary in order to achieve the outcome of the fundamentals.

And below that are another series of documents, which are the safety guides, for those familiar with the U.S. Nuclear Regulatory Commission system, this is somewhat similar to the regulatory guides.

They are should statements. There's some good practices, some best practices in various countries on how to try and accomplish what are required in the requirements level documents. So, if we can go ahead to the next slide.

So, who do these apply to? As Rob Lewis pointed out in his introduction, the IAEA safety standards are not binding on member states, but they may be adopted by them.

Now, with that general statement, there are of course some certain specific things. The IAEA safety requirements are binding on things that the

International Atomic Energy Agency does when they're providing technical assistance or otherwise. Perhaps that's obvious, but that's one of the things it applies to.

They are also binding on a member state, and a member state by the way is a country, so the United States is a member state, 153 member states of the International Atomic Energy Agency I think, something like that.

They are binding on a member state which is getting assistance from the IAEA, technical assistance and support from the IAEA in developing their regulatory infrastructure and programs.

Some countries, like the United States, provide assistance, we don't receive assistance. So again, that doesn't obligate the U.S. to in any way adopt these requirements.

So there are some situations in which they're binding, they're not particularly binding in the United States, but they do serve as a point of reference.

And obviously in the global economy and activities that are now ongoing these days, if you're doing business across national boarders, you are probably going to run into these requirements in other

places.

And so that's part of the reason why we wanted to provide an opportunity for everyone to ask some questions about what's going on, see what's going on, provide some viewpoints that would help to inform what the U.S. Government would do in terms of actually providing comments back to IAEA in this process.

I'm going to say this a couple of times. What we're going to be doing here today is getting some thoughts and ideas and questions together on an international document.

This is not a U.S. Agency proceeding, it's not a U.S. Agency document, this isn't an NRC document or an EPA document. We don't have a formal docket, so this is not an Administrative Procedure Act process with formal comment, comment docketing, comment resolution, responses to comments and all those sorts of things.

Anything that might eventually move to being looked at in a U.S. regulation or guidance document would have to go through that process, and those opportunities for public comment and public input would be provided then. So just to try and help differentiate where we are now in this process.

So let's look a little bit at how IAEA

develops the standards. As with any good organization I suppose there's some nice structure process that has actually been developed over a number of years to try and be rigorous in looking at the information that's available in developing the process.

So they start, as you might expect, by developing a work plan. Anybody just can't have a bright idea and go start writing a document. They actually have to put together a formal what they call document preparation profile.

I know some who have looked at the IAEA website who are trying to download this document were saying what's that little thing that says DPP. Well that's what that is, Document Preparation Profile.

And that's a small little file that says what they were originally intending to do. That was not the draft that people are actually commenting on. It's gets to be a little bit confusing.

It goes through a development process, sometimes that's a very iterative process that goes around multiple times with a number of people involved. It gets reviewed by one or more of the safety committees, those are listed over on the right-hand side of the screen.

The acronyms, nuclear safety, that's the

NUSSC or NUSSC, radiation safety, waste safety or transportation safety; four major topical committees.

In the case of a document like the Basic Safety Standards, everyone had an opportunity to review because there are issues for all of those organizations and all of those topical areas within a document such as this.

After it's finally gone through that process and the committees are comfortable for a requirements document such as this, it goes to a higher level committee actually called the Commission on Safety Standards or CSS which has to provide an additional review and finally endorsement.

And then it actually has to be approved by the International Atomic Energy Agency's Board of Governors. So there's a fairly long process with multiple steps in the process.

The United States has individuals who serve as representatives on each of the safety committees and on the Commission of Safety Standards and of course the U.S., as a member state, is to participate in the final approval process, we are a member of the IAEAs Board of governors. So if we can go to the next slide.

Because the classic question, so where are

we? Or where's Waldo? Or where's the draft? We are here.

Because one of the steps in the process after the safety committees have become sufficiently comfortable with the draft is to send it out to all of the countries who are members of the IAEA to provide all of them an opportunity to prove comments and inputs and thoughts on the document before it completes the process.

So this is the IAEAs formal opportunity for all of the government's for all of the countries who are members of the IAEA to provide comments.

So like I said, the U.S. as a member state of the IAEA has this opportunity to provide comments back to the agency as will all of the other countries.

The Basic Safety Standards is also a bit unique in that not only is it an International Atomic Energy Agency document, it also has a number of co-sponsoring organizations, Trevor will talk a little bit more about that.

It includes the World Health Organization, the International Labor Organization, the Fruit and Agriculture, I'm not going to try and give you a complete list, but a number of major international organizations play an active role in the development

process.

And in fact, the U.S. Government as members of those international organizations has the opportunity to look at it from each of those perspectives.

One of the things that the Interagency Steering Committee on Radiation Standards is going to be doing is coordinating the views of all the federal agencies, including Health and Human Services, the Occupation Safety Health Administration other units in the U.S. Government so that all of the views come together for the U.S. Government view.

So you don't have different parts of the government just looking at discrete little pieces and getting separated from each other.

As Rob noted, the Basic Safety Standards were posted for the member state review at the end of February and every country's comments are due back to the IAEA at the end of May.

So, let's move on, try and look at the question. So who is ISCORS? ISCORS is, as I said, an agency, set of agencies committees intended to foster early resolution, coordination of regulatory issues associated with radiation standards and guidance.

We do not have a mandate that in any way

takes away from the mandates of each of the agencies. Our job, our role is to coordinate the views and to put some things together. But each of the agencies still has all of its own legal authorities and other activities in putting things out.

But we serve as a coordination mechanism, a communication mechanism to help the agencies work together to achieve common goals.

The federal agencies that are formally a part of this include the Environmental Protection Agency, the Nuclear Regulatory Commission, Department of Energy, the Department of Defense, we have several representatives from some of the branches of the Armed Services today, Department of Health and Human Services represented by the Food and Drug Administration and by the Centers for Disease Control, the Occupation Safety and Health Administration, the Department of Labor, Homeland Security and the Department of Transportation.

We also have a number of folks that server as observers, including the Office of Management and Budget, Office of Science and Technology Policy, which is actually a group that's directly associated with the Executive Office of the President of the United States, the Defense Nuclear Facility Safety Board and

we have folks who are observers from the radiation control programs of the states.

Because each of the states in the United States have radiation control programs, have very active programs and are responsible for significant segments of the overall plan of looking at and providing protection against various types of radiation exposure in the United States.

So all of them actively contribute and they're all looking at the process.

So what is this meeting? Why are we here? In certain situations because a document has far reaching implications we have in the past tried to provide opportunities to get additional input to these kind of international documents.

And I'll give you a couple of examples that have been in the past. We've done this on a couple of occasions associated with some of the transportation standards because of the necessity for there to be quite a high degree of alignment with standards for transportation.

Because it just wouldn't work very well if you were to ship it out of the United States and it gets rejected at the border when it tries to go across into Canada or something else.

So we've provided opportunities for people to provide comments and inputs in that area.

Likewise, as the U.S. Government agencies were looking at the recommendations that the International Commission on Radiological Protection were developing over the last several years, we provided a couple of public opportunities to help inform the agencies as comments were being provided to the ICRP.

So it seemed logical to us that in this case, because the Basic Safety Standards also have far ranging implications for cross boundary movement of materials and people in the global economy.

Lots of things move back and forth, sources move back and forth, people move back and forth, medical activities, all sorts of things happen to provide everyone an opportunity to help inform us of some of the issues that are out there in developing our points of view.

As I said, what we're here today is to talk about an international document. It's not a U.S. document. So as I said, this is not an agency comment process. We're not planning to try and write up a docket.

On the other hand, we are transcribing

this, we are webcasting and arching all of this so we have the information available.

If, as a result of this discussion you go back and you scratch your head a little while and you say I'd really like for them to think about whatever it is, a particular issue, go ahead and send it to us.

You have the contact information for myself and Ms. Monica Orendi, who's been helping me in this effort.

Materials that we get, we will put into our agency management system so they'll be publically available and we will make sure that they're circulated to all of the agencies.

So all of the folks in the federal interagency, who are going to be looking at and developing the comments, have the opportunity to see and be informed by your suggestions. So there is a mechanism in order to make sure that we capture and receive that sort of input.

We recognize that when you're looking at a document like this, that there's going to be lots of viewpoints. And it's not surprising that people will not always have exactly the same viewpoint, we won't even have exactly the same viewpoint amongst the federal agencies.

So, don't be surprised if not everything that gets said can possibly end up in an agreed upon interagency set of comments. We eventually have to reach through the process and decide what position would actually go back to the IAEA.

So we make no promises that this is in and that's in and everything else is in, but we will try to use the information to develop all of the materials.

In addition to that you're probably saying well, so how does what is in the IAEA standards relate to what you're going to do in the U.S. It's a very good question, a very logical question.

This serves as another point of reference. There are certainly some reasons why having consistency with what's going on internationally and what other countries may be doing is an advantage for the people of the United States, for commerce for trade, for consistency. So we want to look at it from that perspective.

The Basic Safety Standards is being updated to help reflect information that's been obtained over the last 15 years.

The IAEA has gotten a lot of information as a result of applying the previous set of standards

that came out in 1996 and they're responding to the new recommendations of the ICRP that were published in 2007.

The United States is also looking at those recommendations. We have started the process, the NRC has started the process, other agencies have started the process of looking at our own regulations and guidance to see if there are issues and areas which might need to be adjusted in our own regulations.

As I said, that's going to be a separate process from what we're trying to focus on today. But this serves as another input. They're not disconnected. They're not inextricably linked either. Just try and get a clear understanding of the relationship.

As U.S. agencies, such as the NRC, continues to move forward with our discussion, there's going to be our own stakeholder dialog forum meetings that are going to be taking place.

Eventually there would be the formal notice and comment process that would work through anything that might be looked at to adjust the U.S. regulations.

So this is certainly not the opportunity to tell the agencies and never again will we listen.

No, not at all. It's only the very beginning of an early step and it's related to a document which is an interesting point of reference, not even exactly the U.S. document.

The comments that are submitted by the interagency steering committee once we've been through this process, we expect to be publically available on the IAEA's website.

Obviously I can't give you a weblink today to tell you where to go to get there eventually, that's still several months down the road. We will have those available.

The IAEA will continue to work through that process I showed you a little bit earlier. The committees will review it, eventually it would get to the Board of Governors.

And so I would expect sort of one of the last questions to say, well Don, so when is that going to happen? Good question. A little too soon to tell.

I can tell you that the agency is in hopes to have a document which can be reviewed again that responds to all these comments during the safety committee meetings which will happen late this year.

But depending upon the number of comments and the issues, it may be a document to begin moving

on further in the process at that time or it may need some other discussions. So we'll just have to see how that process progresses.

And with that, I'm going to open it up, Chip, to see if there are questions from everyone on what we're doing here and the process so that we can spend the rest of the day focusing on the BSS. Thank you.

MR. CAMERON: Thank you, Don. Don, before we go to the audience for questions and then the phones, could you introduce Mike Boyd if you didn't already and also Marty Virgilio.

MR. LEWIS: Why certainly. We actually have a number of members of the ISCORS different agencies here. My co-chair for the Federal Guidance Subcommittee is Mr. Michael Boyd from EPA.

And since you wanted me to, I guess I'll introduce my boss. Mr. Martin Virgilio who is our Deputy Executive Director for Operations.

MR. CAMERON: Great.

MR. LEWIS: And he's able to listen to some of these discussions today.

MR. CAMERON: Thank you very much Don. And Don mentioned Monica Orendi is right over here and Leah Spradley who is also working on this.

And with that, are there any clarifying questions for Don in terms of what I call all the moving parts on this? We're going to go to the audience first and then we'll go to the phones. Anybody in the audience have a question?

Okay, great. Operator are there anybody who has questions that are on the phones?

OPERATOR: Yes, sir. Len Howard Ehrle, go ahead with your question.

MR. EHRLE: Yes, Dr. Cool there's a process question, it relates to the organizational structure. It appears as though the comment process makes no provision for involving non-governmental organizations in a direct role in formulating this particular response to the document.

I would urge the Nuclear Regulatory Commission to move to involve NGOs. I'm Senior Biomedical Policy Analyst for the Organic Consumers Association and I chair it's 43-member International Science Oversight board composed of scientists, physicians and policy analysts from 11 countries.

We have 17 members on a low dose radiation policy group who are experts, many of whom have been closed out with papers that have been presented to various journals throughout the last few years.

And there's a concerted effort to prevent comments and presentation by persons who have criticisms of the IAEA and its agreement with the World Health Organization.

That was established in 1959 whereby the IAEA has taken over the investigatory role of accidents such as Chernobyl even though it has a statutory requirement to "accelerate and enlarge the contribution of atomic energy through peace, health and prosperity throughout the world," unquote.

And it is that charge that places it in conflict of interest with the World Health Organization and other health related agencies. It cannot promulgate standards in this area and particularly also in the medical x-ray area, which is part of this document.

So that now is placed in a unique position of not only promoting nuclear energy throughout the world, but of making efforts to correct some of the inequities and to investigate a nuclear accident. So you can see --

MR. CAMERON: Len, can you hear me?

MR. EHRLE: -- the obvious conflict of interest here.

MR. CAMERON: Len?

MR. EHRLE: In addition, the NRC has an advisory committee --

OPERATOR: I'll check that.

MR. CAMERON: Thank you, Operator. Can you make sure that Len hears me. Len can you hear me now?

MR. EHRLE: Yes, I can.

MR. CAMERON: Len, let's get on to answer your fundamental process question. And I have put the conflict of interest issue up in the parking lot and I think you've gotten the point across there, but we'll ask you to elaborate on that when we get to the open session at the end of the day.

MR. EHRLE: That's fine.

MR. CAMERON: Okay.

MR. EHRLE: That would be fine.

MR. CAMERON: Thank you very much, Len. And Don, the NGO question, how does that work?

DR. COOL: Well first, let me thank you for being able to listen and provide the views. Part of the reason that we're doing what we're doing is because we want to provide you the opportunity that you're asking for.

So this discussion is in fact, I think, exactly the kind of opportunity that you're asking.

There are a number of organizations that has international NGOs and otherwise, have an opportunity for some discussion and input to someone at the international agencies that are co-sponsors.

I can't give you specific details because there are lots of folks that interact with lots of the different units and their six co-sponsors, but there are some opportunities.

In the end, whether we sort of like it or agree with it or not, the IAEA looking to the government's of the member states so the final approval process happens with governmental representatives.

So we make some differentiation between more inclusive opportunities for everyone to be involved in providing comments including what we're doing here and then the final approval process that the IAEA might pursue, which has to involve the actual government of its member states.

In terms of the conflict of interest, we will certainly take some note of that. I think that's a bit outside of what specifically we're looking at today, but I will work on making sure that the folks in the Department of State and others are aware of some of those concerns. Thank you.

MR. CAMERON: Okay. And I just note that we do have a submission from Len Ehrle who is the questioner on the phone that we have copies of here.

And Len, I can assure you that as the NRC moves forward with its development of radiation protection standards here in our workshops that we're glad you're on the radar screen now and we'll contact you about those.

Operator, anymore questions from people on the phone?

DR. COOL: We lost them?

MR. CAMERON: Okay. Anybody -- yes? And please introduce yourself too.

MS. FOLKERS: My name is Cindy Folkers, I'm with Beyond Nuclear, we're a citizens group in Tacoma Park, Maryland.

My question is, and I apologize because I came to this process a little late knowing about this meeting, and there's a huge document that I have not had time to read from the IAEA.

But, I wanted to know sort of a timetable of when the NRC and/or ISCORS and all the other member organizations are looking at doing some sort of final thing and what the process would be. And I assume some of the process has to be in the Federal Register.

So if we could have sort of a timetable because I know that public comments for NRC and ISCORS most likely will be able to be promulgated through the Federal Register notices and I assume you have to notice some of this stuff.

MR. CAMERON: Okay. Thank you Cindy. Don is that clear?

DR. COOL: For this document, our timetable is dictated of course by the IAEAs comment invitation process where the U.S. Government, as all the other countries, are invited to provide comments and they have to be provided by the 31st of May.

The U.S. agencies will spend the next month and a little bit more working more or less individually trying to help develop their particular issues. And then we'll work together in the ISCORS format to develop a consensus set of comments to go out.

Because this is not a federal agency document, an action of any one of the particular agencies, there was not an expectation that there would be an additional notice or comment process on comments that the U.S. Government would eventually try to assemble from all this information and provide back

to the International Atomic Energy Agency.

As the U.S. moves forward, or if the U.S. moves forward with any looks at how we might look at our own regulations and guidance, those certainly would be part of notice and comment process probably at a number of steps in the process.

MR. CAMERON: Okay. Thank you very much Don. We're going to take a short break, if people want to get coffee or use the restroom. And thank you and Len Ehrle and others on the phone and thank you operator.

We'll be back, we're going to start sharp at 10:35 Eastern Standard Time. So we'll give you 15 minutes. And you do not need an escort to go up to the lobby for coffee. Thank you.

(Whereupon, the foregoing matter went off the record at 10:21 a.m. and resumed at 10:41 a.m.)

MR. CAMERON: Okay. If we could get everybody in and operator, if we could make sure people on the phones can hear us at this point.

Before we go to Trevor Boal from the IAEA, there was one question that Don got on the break about where the United States is relative to all of this in terms of our radiation protection standards. And let's just see what Don has to say about that, Don?

DR. COOL: Yes, thank you, Chip. The question really was trying to make sure that they had an understanding of, I guess the easiest way to say it is what generation of the recommendations and information are being used now in the U.S. regulations and what's being looked at in this draft revision.

And so just to lay it out very clearly so that no one can -- the U.S. regulations, right now 10-CFR Part 20 of the Nuclear Regulatory Commission are based, included as an underlying basis, the recommendations of the ICRP from 1977.

ICRPs recommendations came out, the NRC went through a rule making process and our regulations were published in the early `90s. In parallel with that, the ICRP was working on revising the recommendations which came about the same time the NRC regulations were done.

And so, some of the provisions and those recommendations are included and some of them are not.

Most of the rest of the world and the Basic Safety Standards that Trevor is going to be talking about that were published in 1996 are based on those somewhat more recent ICRP recommendations that were published in 1990.

ICRP has, after another 15 years, done

another update of their recommendations consolidating information and putting things together. So the IAEA is doing yet another update to theirs.

The NRC, and many of you are maybe aware of what's a parallel effort, the NRC staff is looking now at issues to try and increase alignment with the recommendations with one of the possibilities being that certain pieces of our regulations would actually leapfrog from 1977 recommendation basis all the way to the 2007 basis for the recommendations.

So there are some differences. There are some distinct differences between regulations in the United States and regulations in other countries of the world and the recommendations of the ICRP.

So I just wanted to try and clarify a little bit for some people what the basis of some of the different things are. Because it has changed every 15 years or so.

And we in the NRC actually made a rather deliberate decision in 2000 or so to wait for the next set of the ICRP recommendations rather than going through the involvement process and getting all of our stakeholders and working through all the issues only to be done about the time new recommendations came out.

We've tried to actually do a lessons learned last time and wait for these to be completed so that we can include all of the considerations as we looked at it here in the United States.

MR. CAMERON: Great. Thanks, Don, that's very helpful. And thank you to whomever asked that question to you. And Trevor, let's go to you now and you can be comfortable here or be comfortable at the podium, whichever you would like.

Trevor Boal from the IAEA. And we will take a break for questions at a point during Trevor's presentation.

DR. BOAL: I might sit for my presentation.

MR. CAMERON: Wonderful.

DR. BOAL: Thank you. Thank you for the invitation to attend this meeting. It's my pleasure to be here. And I'm going to cover -- can we go to the next slide first.

The aim of the presentation is to provide a brief overview of draft 3.0, I think in some parts the overview may be rather brief, to highlight areas where text of the current BSS has been revised or new text has been added.

I'm assuming you have some familiarity

with the current BSS. And to highlight areas there's been considerable discussion and the text has been developed. There are some areas I'm focusing on because we've had a lot of or many hours of discussion on these key issues or these issues which I'll highlight.

The IAEA statute gives the agency the mandate to develop standards. And Article 3 IA-6 of this meant, the statute says to establish or adopt in consultation with competent organs of the United Nations and the specialized agencies concerned standards and safety for protection of health.

And so through the consultation competent organs of the United Nations and for that reason we work with our co-sponsors, the other UN organizations, World Health Organization, Food and Agriculture Organization, ILO are fully involved in the development of the BSS. Next slide.

And to facilitate the involvement of the other UN organizations and other specialized agencies, we have established the BSS Secretariat. There's a resolution of our general comments from 2005 to set up the BSS Secretariat to carry out a review of the current BSS.

And the Secretariat there consists of the

IAEA plus seven other international organizations. There's five other co-sponsors of the current BSS, Food and Agriculture, International Labor Organization, Pan American Health Organization, World Health Organization and Nuclear Energy Agency, the OECD.

And for this revised BSS UNEP, United Nations Environment Program and the UP Commission are potential co-sponsors and are also members of this Secretariat.

And again, there is now the resolution of the general conference in 2006 for the Secretariat to cover the revision process. And we still have the revision process in 2007.

And the objectives of that Secretariat are set out in this slide, to support and facilitate the revision making sure that interest views and the responsibilities of each cosponsoring organizations are fully taken into account, to provide a forum for the co-sponsors, to inform each other of developments that need to be taken account and to coordinate the approval process.

Don mentioned in his presentation the IAEA process for developing standards. And the final step is the approval by the IAEA Board of Governors.

But the BSS Secretariat is another part of the process, which I have outlined is the IAEA process. So through each step through that process we have gaining the agreement, we've had co-sponsors for various drafts.

And each of these co-sponsoring organizers will have their own approval process. So the IAEA Board of Governors will approve the revised BSS, but my understanding is it will also go to the WHO, World Health Assembly, the ILO equivalent to the Board of Governors, these other organizations have their own approval processes as well.

In developing various drafts, we started the drafting process in 2007, and the co-sponsors have been fully involved. So the chapter on -- for example the chapter on occupational protection, we had our first drafting meeting on that part hosted by ILO.

The International Labor Organization is unique among the UN organizations in that there's a Secretariat plus there's also employee representatives and representatives of the workers. And they are fully involved, all three parties of that organization involving the review and revision process.

And for the protection of patient section, WHO and PAHO, Pan American Health Organization have

been fully involved in the drafting meetings and have hosted some of the drafting meetings in relation to the chapter on medical exposures.

The co-sponsorship, at least through organization, provide an assistant advice and assistance through member states' various government agencies.

So for example, one being the World Health Organization Ministry of Health, ILO deals with Ministry of Labor, Environment Program with the environment protection agencies.

And so by having the UN co-sponsored the one document, we should be giving consistent advice to our different constituencies within each member state. It also leaves the expectation that change order-sponsoring organizations apply the co-sponsor safety standards in their work assisting their mistakes.

And it also is a basis for exchanging information between the co-sponsoring organizations. And my final point on this slide is that each co-sponsoring organization has its own process for seeking input.

And so some of the co-sponsoring organizations are sending this draft out to their own member states as well for input or seeking comments.

The agency has about 153 member states as Don mentioned. The World Health Organization has more than 119 member states and so there are additional member states who receive this through the WHO.

The Pan American Health Organization has member states from the Caribbean Islands and in Central America, which may not be member states of the IAEA. So it extends the coverage of these standards to states which are not part of the agency.

And through the PAHO process some of these member states will be providing feedback on these standards or this draft.

Don also mentioned the DPP. The DPP is approved by our standards committees and as we've been developing the drafts of the BSS, we've been getting feedback from the standards committees.

And the guidance from RASSC and the other committees and from our Secretariat in revising the BSS is to retie in the BSS as the international benchmark for radiation safety standards across all fields.

So across medical, across the protection of the workers, across the protection of the public.

To recognize the need for stability and that we have to justify any changes to the standards

to maintain close to ICRP. So ICRP, as Don said, the 1990 recommendations were taken up in the 1996 standards. And now the 2007 recommendations of ICRP we're adopting into our revised BSS.

To keep the co-sponsors fully involved and they've all been involved through their BSS Secretariat and we are having three to four meetings with the Secretariat each year.

And as each draft has been sent, been developed and sent to the committees for comment, as they've gone through the Secretariat for their agreement to send the text to our committees, to seek and take feedback from member states on the current BSS and to assist developing countries to participate.

During our review process we hold a technical meeting where we invited developing countries who are not normally members of our committees to attend and make presentations on their experience in using the BSS.

And during our -- last year we held a meeting with developing countries in West Asia, we're holding -- I'm sorry a meeting in April for countries in Central and South America to discuss this trial for the BSS.

The other guidance is the commitment to

maintain the paradigm, which is what Don mentioned. INSCA publishes documents on the effects of atomic radiation, ICRP makes recommendations for protection and these are taken up into the agencies standards.

And we're also asked to maintain the comprehensive character of the BSS, the regulatory framework, occupational and public exposure from all practices.

Whether that's from nuclear power plants, mining, medical uses of radiation, industrial uses of radiation, transport to cover safety of sources, to cover places for the safety of radioactive waste, medical exposure of patients, existing exposures including radon from dwellings or radionuclides in building materials, remediation of contaminated sites.

To cover the basis for emergency preparedness, remediation I've covered already and then the basis for the safe transport of radioactive materials.

This slide contains an overview of the contents of draft 3.0. Like all standards, we have a standard introduction.

Chapter 2 is the general requirements for protection and safety and this chapter contains requirements which are applicable to all three

exposure situations.

Chapter 3 is the planned exposure. Chapter 4, emergency exposure. Chapter 5, existing exposure.

So chapter 2 contains requirements which would be applicable to Chapter 3, 4 -- all three exposure situations covered in Chapter 3, 4 and 5.

And there are four schedules covering, exemption, clearance, categorization of sources, dose limits and planned exposed situations and criteria for use in emergency preparedness.

Our first part will cover some general issues. The draft 3.0 of the BSS has a new structure compared to the current BSS. There's a new format for the requirements document.

For the first time we've included some requirements for actually protection of the environment. And I wish to make some general comments about -- between safety and security.

So the new structure, next slide. The structure of the revised BSS follows from the new recommendations of ICRP 2007. And these new recommendations there are three exposure situations, so we based the three chapters.

And within each exposure situation, there

are three categories of exposure; occupational exposure, public exposure and medical exposure. And so the structure follows from this new recommendation of the ICRP.

And the decision to follow this route was taken after a technical meeting on the revision of the BSS held in 2007 with over 130 participants from member states from the co-sponsoring organizations and from other international organizations such as International Society of Radiologist, International Organization of Medical Physicists, the World Nuclear Federation or the nuclear medicine experts, the Society for Radiation Technologists.

The technical meeting involved experts in all of these areas and they recommended we should follow that new structure.

I'd like to make a brief comment about the new format. The current -- this draft 3.0 contains 52 so-called overarching requirements.

These are rather -- they contain a shall statement with a discrete number written in plain language, clear short sentences. And this was a decision from SCSS, Commission on Safety Standards in 2008 to follow this new format for our safety requirement documents.

Underneath these overarching requirements have been conditions associated with that overarching requirement. And they're an integral part of our safety requirements document.

In the draft 3.0, they are written as shall statements, in some of the other safety requirement documents they are written as has to statements or they may contain explanatory text.

In this BSS here, these conditions associated the overarching requirement are written as shall statements. And one of the aims of this new format was to improve user friendliness of the safety requirement documents.

As I mentioned, draft 3.0 contains 52 overarching requirements that maybe uses too many or too few that's maybe some area you wish to provide in your comments.

For the first time there are requirements for protection of the environment. And I'll urge you to read one, paragraph 126, which sort of -- which sets out some basis for current decision with protection of the environment.

And the requirements contained in, now this is at the bottom there, the number of paragraphs, essentially this stated appropriate assessment made

with the potential impacts of the environment. It's a rather basic requirement of this stage.

The framework for protection of the environment is still being developed. And since this BSS will be in use for the next 10, 15 years, we feel it's important to include something in this revision of the BSS.

Although how far we can go -- it's unclear whether we can go further than requirements of and assessment of the potential impacts. It's still an evolving area.

Interface between safety and security, there are a number of paragraphs in the current draft relating to this interface between safety and security.

In Chapter 1, there's a reference to the documents being prepared in the nuclear security series, it's a parallel series to the nuclear safety series. And the number of paragraphs sitting out requirements in relation to security or the interface between safety and security of sources.

And I mentioned that the paragraph in the text is paragraph 228 in relation to requirement on government. Paragraph 331 on licensees when they're preparing their safety assessment. Paragraph 350 it's

another requirement on licensees.

I mean, one of the issues being raised during the revision process was that we needed to expand the interface between safety and security in the draft BSS.

Whether this is sufficient, it's unclear, but I guess it's one area where we'd expect feedback on during the comment period.

Chapter -- Section 1 is the introduction to the BSS. It's a standard chapter in all of our safety standard series documents. It includes a background, sets out the objective, scope and the structure of the document.

The background chapter leads to our safety fundamentals. To ICRP 103 system of protection and safety and some expansion material.

Whether there's too much data or not enough data would be an area where we seek comment. But there's been considerable discussion to have -- which would go into describing ICRP system.

Chapter 2 of the general requirements of protection and safety, and as I mentioned earlier, these requirements were applicable to all three exposure situations; planned exposure, emergency and existing.

The first part of the chapter covers three radiation protection principles. And these radiation protection principles, justification, optimization and dose limitation apply to all three exposure situations.

They might be slightly different the way they're worded, but they're still applicable. Well the dose limits only apply to planned exposure situations.

The next block of paragraphs within section 2 cover the responsibilities of government and the responsibilities of the regulatory body.

In the current BSS there are no recruitments in these two areas, but in the preamble to the current draft it's stated that these standards are based on the presumption that a national infrastructure is in place and having the government charged with responsibilities with for radiation protection with safety, which included establishing legislation, establishing regulatory body, the functions of the regulatory body and other national infrastructure which may be required to support users in using -- when they use sources.

So there are about 26 paragraphs in these two parts. Don mentioned that we have about 10 to 15

safety requirements documents and one of the other safety requirements document is GS-R-1, Legal and Governmental Infrastructure.

So some of these paragraphs are common to both documents and certainly those which are not common text are consistent, but have been included in the BSS to retain a comprehensive character of the BSS.

The next part of the Chapter 2 are the responsibilities of other parties. So the list of responsible parties includes, for example, licensees, employees in the case of occupational exposure, and that's in the current BSS.

And this has been expanded to include principal parties to include radiological medical practitioners in the case of medical exposure and for emergency and existing exposures, the principal parties are the designated persons organizations who are required to deal with those situations.

So a list of principal parties has been expanded from the current two, the licensees and the employees to these other two groups.

And there's another paragraph in there about the importance of education and training in qualified people in implementing the requirements of

the standards.

The next block of paragraphs in Chapter 2 are management requirements. In the current BSS, there's two or three paragraphs on quality assurance, that's now been updated to paragraphs on management systems.

And there's a paragraph on safety culture, which has also been extended, updated to take account of another publication in 2006 of management GS-R-3 Management System for Facilities and Activities, which is currently subject in much more detail, but is a basis for these two areas included in the BSS.

Chip, this is about half way, would you like to have a short break?

MR. CAMERON: Well, Trevor why don't we see if anybody has any questions on the materials so far before you go into three, four and five, is that okay?

DR. BOAL: That's fine.

MR. CAMERON: All right. I'm going to go to the audience first. Trevor has given you an overview here, are there any questions on what he's talked about so far before we go into some of the details? Okay, Cindy?

MS. FOLKERS: This is Cindy with Beyond

Nuclear. I have a question. In the United States we recently had a tritium leaks from Vermont Yankee Power Reactor and I was wondering in this particular plan, I'm assuming it would be an emergency release, but I'm not exactly sure where it would fit in.

And obviously how -- I mean if the NRC would adopt this plan how would they account for that particular pathway and it's not clear to me that there's an answer formulated.

MR. CAMERON: And Trevor, I don't know if you've been following what's been going on with Vermont Yankee in the United States in terms of the leakage of tritium and this has been an issue at other plants.

The question is, is where are those types of releases covered in the BSS?

DR. BOAL: Chapter 3 covers planned exposure situations, which are practices. And so in Chapter 3 there's a section on general requirements, a section on occupational, section on medical and public exposure.

And within the public exposure it would cover -- I'm sorry, within the general requirements there would be a section where a practice would need to require an authorization to conduct their practice.

And as part of that, that would require a safety assessment and that would require procedures in place for covering prevention of excellence, prevention or how to deal with situations where you may get releases.

Chapter -- the third part protection of public includes requirements related to discharges and would cover all the different monitoring of the environment, it would cover all different pathways, in other words direct radiation or pathways through exposures in different parts of the environment.

MR. CAMERON: And thank you. Thank you Trevor, let's see if Rob wants to add to this. And if we need to go further into this, we'll do it when we get to Section 3 as long as Cindy's going to be here with us after lunch. But go ahead Rob.

MR. LEWIS: Well first I think it's a very good question. I think Trevor got it just right. In the way that the BSS has divided up planned emergency and existing exposure situations, that type of activity would be a planned exposure situation.

Because in the U.S. when the license was issued, there would have been a safety analysis report submitted with the license application and that would have to cover any potential discharges and risk

assessment including the probability of types of releases and the consequences of those releases.

MR. CAMERON: Okay. That's great. And we have it in the parking lot, we'll go back when we get to Section 3. Thank you. Anybody else have a question in the audience for Trevor on material so far?

Operator, can we see if anybody on the phone has a question for Trevor?

OPERATOR: There are no questions on the phone, sir.

MR. CAMERON: Okay. Thank you. Thank you, operator. We're going to go back to people here in the room. Rob?

MR. CAMERON: Yes, one thing that we in the NRC hope to discuss today, and I think this is the right time is that the provisions in the BSS on protection of the environment.

Those, as Trevor mentioned, appear in Paragraph 1.26, which is not in the requirement section of the BSS. But they are adding in for the first time into the BSS some explicit consideration of environmental protection.

And in terms of the explanatory text in paragraph 1.26 there's some key words in there that we

hope people would weigh on here or later that essentially the guidance in paragraph 1.26 notes that the environment needs to be protected irrespective of any human connection to that environment.

And another way to think of that is when we have environmental protection evaluations in the U.S., we always have the key factor is the potential dose that people that might be living and affected by that environment.

And IAEA is saying is whether people are there or not, the environment needs to be protected in the amount of radiation, radioactive material going into the environment would need to be limited.

And that's kind of a shift in the fundamental radiation protection structure that's been in existence many years and ICRP is covering this. So I was wondering if anybody had any thoughts on that provision.

MR. CAMERON: Let's see if they do. As Rob mentioned, this is a dramatic shift and it's in the BSS. There's nothing similar in the United States regulations on this. Trevor do you want to add anything before -- on this environmental protection before we go to the -- see if there's any questions or discussion?

DR. BOAL: No, I think Rob referred to the text.

MR. CAMERON: Okay. Well let me check with the audience. Does everybody understand the implications of what Rob was talking about in terms of this particular provision? Did anybody have any questions or comment on it while we're here?

Okay. And just introduce yourself to us Mike.

MR. BOYD: Thank you, Chip. This is Mike Boyd from EPA. I just wanted to point out relative to your last statement that while Human Health is almost always the driver under the Superfund legislation, CERCLA, there is a requirement for doing an ecological risk assessment and there are other requirements and statutes for national resource damage assessments.

So, there are instances where the effects on biota are a particular focus of our regulations. But in general, it's almost always, if not always so far the human health risk that drive the clean up decisions. Thank you.

MR. CAMERON: Thank you, Mike. Just another example how the differences in the United States regulation are. Amanda?

MS. ANDERSON: Yes. Amanda Anderson from

Department of Energy. And we actually already have this worked into our own regulations. We do require our sites to do assessments of the environment separate from Human Health and Safety and so we do see this as an improvement.

MR. CAMERON: Great. Thank you. Is that under an order, DOE order then?

MS. ANDERSON: Yes. Right now it's DOE Order 5400.5, Radiation Protection in the Public and Environment. And we do require them to look at biota separate of Human Health and Safety.

MR. CAMERON: Okay. And that covers the -- the order covers DOE facilities, that's who it's applicable to. Okay. Thank you. Anybody else on this issue? Let's go to Henry, and Henry please introduce yourself to us.

MR. MORTON: I'm Henry Morton, consultant to the nuclear industry. I think my observation would be looked at long term, beginning especially in the growth of the reactor era in the United States, in the early environmental impact assessments, there was a lot of investigation, a lot of studies of the ecological impact dose to biota.

And out of that eventually came a sense and a guidance basically through the standard setting

agencies. If you protect people, you have adequately protected the environment.

That basically then diminished the attention for decades or so. But then in more recent decade, we've had increased attention through more microbiological investigations to return to this issue.

So the fundamental question I think now would be will the conclusions be different and will the microbiology then indicate that we should have standards for concentrations in the environment with respect to the biota.

The key question will be then, if so, what? If we, for example, apply this to the nuclear power industry, the nuclear reactors, then you would have, you would revisit, for example, Part 50 Appendix I and look to see whether there is additional restriction or guidance needed with respect to effluence.

MR. CAMERON: Great. Thanks for that explanation Henry. Let's see if anybody on the phones wants to comment on this particular provision, not a requirement as you'll see in the parens.

Operator, does anybody on the phone want to say anything to us on this?

OPERATOR: At the present time no. We did get some new parties so I'd like to inform them once again, to ask a question, please press star one on your touch tone phone.

MR. CAMERON: Thank you very much operator. And we'll keep going on to the phones throughout the day. Okay. Trevor, let's go on at this point and then we'll sometime for clarifying questions before we break for lunch.

And then we're going to get in depth on three, four and five. Go ahead Trevor.

DR. BOAL: Thank you. So we move to section 3, planned exposure situation and the first part of the generic requirements. The first part of the requirements are the scope and the first paragraph is on the list of practices covered by the standard.

So that's been expanded for clarity, includes medical uses, nuclear -- sorry, nuclear power sources, research reactors, mining of radioactive material, uses of radiation for industry, security, Ethiopia cetera.

Then the next paragraphs on sources within those practices and there's a group of -- there's another paragraph on natural sources of radiation.

The current BSS essentially had three

bullet points; public exposure from discharges or waste arising from practice involving natural sources, occupational exposure to radon required by directly related to work. And that would cover radon exposure in the mining of uranium or other mining procedures.

Occupational exposures to radon, existing exposure situation where the annual average activity exceeds the reference level and the current business is 1,000 becquerel per meter cubed.

And the final paragraph is new to this BSS, exposure to material other than and other sources whether it's natural sources in food or fetal brooding materials and any relative activity listed in the practices where the activity concentration of material of any radio nuclide and uranium or thorium in K series is 1 becquerel per gram or for testing authority 10 becquerels per gram.

So essentially it's saying that in some industries which use naturally occurring radioactive material, that the activity is 1 becquerel per gram therefore within the scope of the standards. So uranium mining has always been covered by the standards, but some of the other industries where norms are covered right now fall within the scope of the BSS.

And I think the current BSS says that the regulatory body could nominate industries in the area of natural sources to include, the current BSS is more clear that those industries which are -- where there are natural occurring radio nuclides in the uranium and thorium series above 1 becquerel gram are now within the scope.

Whether the -- sorry. The stringency of the or the implementation standards would depend on the concentrations and regulatory body would still have the reply graded approach and that may exempt some of these industries from the standards if they think the regulatory control is not required.

Sorry. The next part of the generic requirements cover notification and authorization. They cover -- they assign prime responsibility of the standards to the licensee and then the overarching requirements set out responsibility on government regulatory on a number of areas in relation to extension and clearance, relation to justification, optimization, protection of safety, dose limitation, requirement to set up, requirements for safety assessment and requirements in relation to human imaging which we'll come to soon.

There are a number of other requirements

for the licensee, related to monitoring, prevention and mitigation of excellence, investigation of excellence and providing feedback and the control of radiation generators.

In developing these overarching requirements there was some discussion about where to assign the responsibility, whether to assign the responsibility to licensees or to the regulatory body and whether it is still right is something we would like feedback.

Another one is overarching requirement graded approach. Graded approach applies to all exposure situations, so whether it belongs in Section 2 or Section 3 is still, there was some discussion.

At present it's been included in Section 3, but there has been some discussion where to put that requirement.

I just want to cover the next few slides some areas where there was a lot of discussion in developing draft 3.0. The first one is optimization of protection.

A lot of -- the current BSS includes the use of dose constraints as part of the optimization process. I'm not quite sure we had so much discussion on the use of dose constraints.

It's a tool for optimization and dose constraints are not limits. They may be set or approved by the regulatory body and this is the approach within the draft 3.0. I love this current change from the current BSS.

The definition of constraint was reviewed and the definition is as set out there, a perspective in source routed failure for individual dose or risk, uses of tool and optimization protection and safety of the source, which serves as the boundary in defining the range of options in optimization.

And there's also a lot of discussion in the development of the text about whether we should say it's optimized or subject to an optimization process.

The protection safety is optimized and as a regulatory requirement the enforcement of such requirements. And there were some arguments saying if we say subject to optimization process, it gives no guarantee that the -- we've received an optimized solution. So the current text is written right as protection is optimized.

We'll go to the next slide. The paragraphs on radiation generators and radioactive sources, there are a number of new requirements that

have been added to the BSS, paragraph 3.54, 3.59.

And that covers subjects licensees sharing inventory records with regulatory body, categorization of sealed sources, the marking of sealed sources, identification of traceability of sources, storages of radioactive sources and the disposal of sealed sources at the end of their useful life.

These paragraphs have been taken from the code of conduct on safety security of sources, which was issued by the agency in early 2000. And they've been included in the BSS now to strengthen the requirements relating to the control of sources.

There are a number of paragraphs in this section from the existing BSS which are unchanged, but these paragraphs were added on the basis to strengthen the control of some sources.

The next part, final part of the generic part of Chapter 3 that's covering human imaging for purposes other than medical diagnosis. And just some background, this covers two types of exposures, those carried out by medical staff using conventional radiological equipment.

So for example it may be exposures for occupational, legal or health insurances purposes without reference to clinical indications.

Let me talk about legal purposes. We may be talking about exposure of a person suspected of carrying drugs, where they have to go and undergo a radiological procedure to determine whether there are drugs within the body or maybe a procedure such as injuries to a child in say abuse.

Another type of non-medical or purposes for -- imaging for purposes other than medical diagnosis are those carried about by a non-medical staff, now maybe for theft detection, which is used in some countries for say in diamond mining, security screening, and there's been a lot of increased emphasis in the last decade in relation to security screening of passengers before flying or people visiting jails to prevent smuggling and screening of cargo and certainly in relation to whether there are people inside of cargo containers.

And so the requirements in these areas are under the justification paragraphs 3.18 to 3.20. There are a number of paragraphs relating to justification of such practices.

Human imaging for radiation for occupational, legal and health insurance purposes are referenced to clinical indications shall not be deemed not to be justified. If an exceptional circumstances,

justification of such needs to be considered, the requirements of 3.60 to 3.64 shall apply.

And this requires that such a practice be justified and a number of other requirements in relation to the regulatory control. They should be controlled by regulation.

Paragraph 3.19 says that human imaging for theft detection purposes shall be deemed to be not justified and it is a strengthening of the requirement in the current BSS.

In the copy it says if it is carried out, it should not be considered as occupations public exposure -- so, not considered occupational medical exposure, but shall be considered as public exposure.

And paragraph 3.20 which again refers to security -- sorry imaging for security or anti-smuggling purposes shall not only be deemed not to be justified if an exceptional circumstance for justification imaging is to be considered a requirement to 3.60 or 3.63 and 3.65 to 3.67 shall apply.

So that again is that there should be a justification process or the practice should be justified by the government or a regulatory body and that there will be regulatory controls on the use of

such or carrying out such practices.

And so the paragraphs 3.60 to 3.67 are due progress to strengthen the safety and regulatory control of non-medical imaging practices by making regulatory control justification decisions and optimization protection of safety explicit in the BSS.

Okay. The next group of paragraphs in the BSS covered occupational exposure. The current BSS essentially is unchanged. They cover responsibilities or occupational protection, local rules, classification of work areas, monitoring of work areas, dose assessment of employees, health surveillance, responsibility of workers and some paragraphs in relation to pregnant workers.

The definition of occupational exposure has been changed or it's been modified. The current definition would be similar exposure workers incurred during the course of their work. The current definition also include excluding an exposure from excluded sources or from sources which are exempt.

And the definition of worker is a person who works, has recognized rights under the occupational protection. There have been a number of paragraphs added in the section on responsibilities of regulatory bodies.

Regulatory body shall establish and enforce requirements, the protection of safety is optimized and doses for exposure comply with limits. The regulatory body shall establish and enforce requirements of monitoring and recording of exposures in planned exposure situations.

The next paragraph. The requirements in this section on licensees and on workers in relation to occupational exposure are essentially unchanged. There has been some rearrangement, consolidation and editing of text, the detailed requirements of monitoring have been removed and now been placed in a lower -- in a safety guide or other requirements of a document.

And the requirements for special circumstances, which apply to relaxation of dose limit have been removed. They're considered no longer necessary.

I think when the last piece has come into play, was approved there may have been some, perhaps, they may have relaxed the limit until they improve their procedures. But, now this is no longer required in the BSS.

The next section is on public exposure. Again, it covers responsibilities for public exposure,

monitoring, discharges to the environment, waste management, requirements in relation to visitors and requirements on consumer products.

The new requirements in this section in relation to placed on government or the regulatory body, to establish and enforce requirements, to ensure public exposure control, to establish or approve source constraints for dose and risk to be used in optimization and protection.

One of the use of constraints is that public may be exposed from several different sources at the same time. So a licensee would -- sorry, several different facilities public might get their exposure from. And so the constraints are applied to each different source.

To establish or approve source related criteria such as limits for discharge for the demonstration of compliance with the standards.

To ensure environmental monitoring programs are in place, results of record made available. And setting out response to regulatory body in relation to authorizing supply of consumer products.

The next slide covers new requirements placed on licensees. The monitoring area more

specific requirement on reporting of results and retrospective system of doses.

The requirement in the waste area has been expanded to include a requirement to maintain an inventory of waste generated. And I've already mentioned there's a new requirement in relation to environmental impact or impact on the environment.

The next part of Chapter 3 covers medical exposures. A medical exposure is an exposure to a patient undergoing a medical procedure.

It also includes exposure of carers or comforters from a patient who received a nuclear medicine procedure and also includes exposure of people participating in biomedical research activities.

There are a number of new terms, currently the BSS only has medical practitioner, but the revised BSS refers to referring medical practitioners and radiological practitioner who carries out the or is responsible for the procedure being carried out. In some cases it can be the same person.

The medical physicist definition has been updated and now uses the definition from the International Organization of Medical Physicists. And the medical radiation technologist definition has been

updated and it's from the International Society for Radiation Technologists.

There are a number of requirements, new requirements in the BSS related to the responsibility of government and the requirements refer to consultation between health authorities, professional bodies and regulatory body.

There's a proper authorization of all parties to ensure the responsibilities. The DRLs, DRLs and diagnostic preference levels are established. Dose constraints are established for carers and comforters and for volunteers in biomedical research and the guidelines are established for the relation of patients that have the radio nuclide therapy.

It just ensure that the health authorities and regulatory bodies and professional societies are all involved in the processes.

The next slide covers the responsibility of the regulatory body. And that must ensure that the personnel carrying out such procedures are properly qualified, they're specialized in the appropriate area, they've received education training and competence -- meet the competence requirements in radiation protection and as such, a list are maintained by the licensee.

Medical physicists, technologists, radiological practitioners are included in there, after that list, maintained by the licensee.

There's also a requirement in medical exposure part that on the licensee for the patient to be informed as appropriate on the potential benefit of the procedure as well as the radiation risk. That is a new requirement.

The next slide covers justification. The current BSS has a general requirement that medical exposures be justified. And since the current BSS was published ICRP has expanded its guidance on the recommendations related to justification of medical procedures.

There are three levels of justification of medical procedures. One is medical exposures are justified, a second level that particular procedure be justified and the third level is that there be justification for each particular individual patient.

And these are reflected in the revised BSS, there are three separate paragraphs covering each level of justification.

So the general requirement is as in the current BSS, level two requirement, health authority or professional bodies justify each particular type of

procedure and then requirement on the radiological medical practitioner that is justified for each patient. And it may involve use of relevant guidelines as before.

The next slide. Justification is also paragraphs in the medical exposure also covers health screening programs. There's a requirement on asymptomatic individuals and a requirement relation to biomedical research as in the current draft. But the requirement to asymptomatic I think is a new requirement for the BSS.

The next section, optimization of protection, this is by far the biggest part of this section and essentially some of the data of the current BSS has been deleted or has been removed and will go into a safety guide.

I think safety guides are developed on how to implement the requirements. So some of the data is considered too much for a report, to data for the BSS.

All assigned subjects in the current BSS have been retained. Some of the requirements which are updated, the design considerations, is a lot of equipment, the scope of equipment has been expanded to include gamma cameras, image intensifiers and software.

Operational considerations was a major consolidation requirement for the material was taken out to go into safety guides. Radiation optimization, protection and calibration of equipment that can't be assessed was the responsibility with the licensee in the revised draft 3.0, the responsibility has been assigned to a medical physicist.

And clinical dosimetry responsibility is now assigned to the medical physicist in the current BSS I think it's on the licensee. And diagnostic reference levels have been strengthened to the link to the clinical dosimetry part of the chapter.

Optimization protection in relation to quality assurance, the next slide, have been updated to -- that our quality assurance be carried out on the supervision of medical physicists at the time when quality control tests are made at the time of acceptance and commissioning prior to use and periodically thereafter and after any major maintenance that could affect patient safety.

And then the requirements optimization in relation to pregnant and breast feeding women that arrangements in place for protection, there be signs and procedures in place and to ask if the woman is pregnant or not.

The next part of the BSS Section 4 covers emergency exposure situations. Since the current BSS was published, there's been another requirements document GS-R-2 on emergency preparedness and responses been published by the agency.

So the current BSS, there's been some restructuring of the text and some parts have been deleted as they're covered by GS-R-2 and there are references made to the other requirements document.

And there's been a paragraph added to the BSS in relation to transition from emergency exposure situations to an existing exposure situation. And the current text has been updated to take account of the new ICRP recommendations.

The structure of this chapter follows, as the other generic, there's a generic requirement for public exposure, protection of workers and this transition paragraph.

So the generic requirements include the requirement that there be an emergency system established by member states and this is -- there's a cross reference to the requirements in GS-R-2 on the establishment of the patient system or the emergency preparedness and response arrangements within a member state.

Protection of public exposure has been updated to the new ICRP recommendations. The protection strategies include protective actions and these must justified and optimized. The ICRP now use a term reference level instead of action level.

Reference levels apply to residual dose and the BSS recommends a reference level in the range of 20 to 100 milisieverts. Half of the reference levels have been established, developed generic criteria for particular protective and other actions.

These actions maybe say iodine prophylaxis or evacuation, sheltering, reaction to food, Ethiopia cetera. And there may be default triggers for initiating different parts of the response plan.

And the requirements -- in relation to the protective strategies and then the response will be taken to implementation of their arrangements.

The annex -- annex four includes generic criteria numbers for in relation to prevention of acute effects. It wasn't tabled in annex four in relation to prevention of stochastic events that has been taken out or has not been included.

It was included in earlier drafts, it was not included in draft 3.0 it is in a safety guide, which is under -- close to completion and is going

through the approval processes within the agency's set of documents at present.

And these paragraphs here are consistent with what's in this other safety guide on the generic criteria for these protective actions. The next part of chapter on emergency preparedness, also emerging exposure situation covers exposure emergency workers.

The definition of emergency worker has been changed in the BSS and now covers any person having a defined role as a worker in an emergency and who might be exposed while having -- while taking actions in response to the emergency.

The section on emergency workers includes a program for controlling dose. They should not be sub-bullets, they should be to the definition, they're sub-bullets to the exposure chapter.

That the requirements for occupational exposure in planned exposure situations apply, but there are certainly cases where the maximum single year dose for occupational exposure may be exceeded during an emergency.

And they're set out within the paragraphs of this section on emergency, protection of emergency workers.

And the final part of this chapter covers

transition from emergency exposure situation to existing exposure situation and that there must be arrangements made in advance for this transition.

The final section of the revised BSS covers existing exposure situations. A few comments before I cover the text. The current BSS they're referred to as chronic exposure situations, so we're now adopting the ICRP terminology, existing exposure situation.

The current BSS uses action levels. An action level is if you exceed this level you're required to take action to reduce the exposure situation to below the action level.

The new ICRP recommendations use a reference level and the reference level it's undesirable to be exposed situation above the reference level, but you're still required to optimize below the reference level. So it's a slight -- so it's been a major change in approach to any of the existing exposure situations.

And compared to the current BSS, the section on existing exposures have been expanded and completely rewritten. So the scope of existing exposures, exposure to natural sources so includes radon, radon in dwellings or radon in work places,

radio nuclides in commodities, exposure to accrue to what cosmic radiation is now specifically included within the BSS -- has been included in the current BSS.

And this chapter includes exposure to contamination of various residual radioactive material from past activities which were never regulated or regulated to different standards.

And it covers residual radioactive material from nuclear radiological emergency, after the emergency has been declared ended. So this is carries on from the previous chapter where we saw the transition from emergency exposure situation to existing exposure situation.

The generic requirements for existing exposure situation there are specific responsibilities assigned to government, regulatory bodies and other relevant authorities, It may not be the regulatory body for regulating practices who's the responsible party within the member state and maybe another government agency.

The requirement in relation to government and these other various other authorities to identify and evaluate existing exposure situations, to establish a framework for protection of safety, to

develop national strategies, evaluation of existing exposure situations, to establish appropriate reference levels and to involve stakeholders.

And again, this chapter is broken into two sections; one for public exposure and one for occupational exposure.

Within the public exposure situation, there's a general section, three paragraphs in relation to protecting the public, justification of protective actions and optimization of protection and general recommends that the reference levels for the public exposure be in the range of 1 to 20 milisieverts.

There's a large group of paragraphs in the section on remediation of areas contaminated by residual radioactive material. There's currently a safety guide -- sorry a requirements document W-SR-3 on remediation and essentially all the text in this part of the document has been brought in from W-SR-3 and W-SR-3 will no longer be superceded by this revised BSS.

And there's a paragraph on areas, living in areas with residual contamination. There's a section on indoor radon, radon in dwellings or radon in other public buildings with examples schools or

hospitals.

And requirements in relation to dissemination of information to the public that if a significant radon level is found within the country that there should be a national action plan.

The reverence reference level established in general not exceed 300 becquerel per meter cubed and there's a requirement then to optimized protection below this reverence reference level.

There's a technical meeting in December of last year to -- on radon. And the outcome from technical meeting was to recommend that the reverence reference level in the BSS should be that in general should not exceed 300 becquerel per meter cubed and then the states could decided on the lower level if they wished to adopt a lower level.

The next part of protection of public relation commodities, for example food, water, construction materials is recommended reverence level for the not exceed 1 milisievert per year.

And for example for food it recommends after an accident the Codex Alimentarius values be considered by the regulatory body in relation to food. The water organization has also published guidelines for drinking water which will be considered.

The final paragraph in Section 5 are to occupational exposure. And the first part says requirements for public exposure for occupational exposure except for a number of situations.

In remediation of contamination areas that occupational exposure is controlled as per the requirements for planned exposure situations. So it's considered that the activity is planned and therefore the worker should be under an occupational protection program.

In relation to radon in workplaces, the technical meeting heard by the agency in December of last year recommended a reverence level not to exceed 1,000 becquerel per meter cubed.

So if the level is below 1,000 becquerel per meter cubed, the requirements stated earlier in this chapter would apply. I it's above 1,000 becquerel per meter cubed, then the requirements for planned exposed situation would apply for workers.

This would require the protection to be optimized and as I already said, if the radon levels remained above the reference level after optimization, the require for occupational exposure in section 3 apply to workers in areas where any average levels exceed 1,000 becquerel per meter cubed.

The final part of the occupational exposure in this chapter on existing exposure relates to exposure of cosmic rays. In relation to air crew, it's up to the relevant authority to determine where the assessment exposure is required and whether any agency requirements on the chapter on occupational exposure in section 3 apply, e.g., for pregnant air crew.

And then we were requested by a number of organizations to include some paragraphs on humans in space-based activities. The European Space Agency and the Canadian Space Agency requested that there be a paragraph in the BSS.

And so the paragraph says up to the relevant authority to establish a framework for radiation protection appropriate for this situation. They feel like this must be made to optimize protection, but the dose limitation requirements set out do not apply to humans in space-based activities.

Then there are four schedules. Schedule 1 comes exemption and clearance. The first part of the schedule is the criteria for exemption and clearance, dosimetric criteria and they include tables for radio nuclides.

Exempt, one title has exemption of

moderate quantities and material and a second title which covers levels for clearance and exemption of bulk quantities of material.

The current BSS includes only the table for moderate quantities, but since the current BSS was published, the agency has developed a safety guide, RS-G-1.7 which covered clearance and exemption of bulk quantities and that has now been brought into the BSS.

So the artificial radio nuclides are entitled I-2 and for natural radio nuclides exemption values clear and phase are 1 becquerel per gram as per the paragraph on defining the scope for natural radio nuclides in uranium thorium chains.

Schedule 2 sets out categories for source using common practices. This is a new schedule in the BSS, it is taken from a safety guide, RS-G-1.9, which was published several years ago. So this is updated since the current BSS.

And this characterization scheme was using the code of conduct for safety and security of radioactive sources.

Schedule 3 sets out dose limits for workers and for public and planned exposure situations and it does change from the current BSS, for ICRP recommendations.

The schedule does include dose coefficients for calculating exposure from radio nuclides for ingestion or inhalation.

The current BSS includes many, many pages of titles for these dose coefficients and we're currently investigating ways on presenting the tables in the new BSS or the reference to the ICRP publications or include a CD-ROM in the back cover with these dose coefficients.

These dose coefficients are currently being revised based on the 2007 recommendations of ICRP and they may not be -- a revision of those dose coefficients may not be completed by the time the BSS is completed.

So, if it's CD-ROM we can update the CD-ROMs after the -- as ICRP develops or publishes the new sets of coefficients.

Schedule 4 covers generic criteria for emergency exposure situations. Table 4.1 is generic criteria for acute doses in which protective and other actions are expected to be taken.

And table 4.2 a guidance for restricting exposure to emergency workers. And this covers other situations where they grant them the annual dose limit.

The next slide is a glossary. There's a glossary of terms in the BSS. The current draft includes those terms which are used in the BSS and list those which have been modified from the current IAEA glossary.

The IAEA has a separate publication on this glossary which has been updated in parallel with the original BSS. So any comments on the definitions are also welcome.

I have not included this slide on the next steps, but I'll just make a few comments before I finish. I mean the documents have been sent to member states by the -- IAEA member states by the agency and we have a standard 120-day comment period.

It was posted, draft 3.0 was posted on the agency's website on about the 30th of January and the closing day for comment is the 31st of May.

And the agency issues a note to the ministries of foreign affairs and comments are normally posted back through the official channels, which come back through the Ministry of Foreign Affairs to the agencies.

Some of the other co-sponsoring organizations are also seeking comment from their member states. The agency has -- from the 31st of

May, the agency will then be considering these comments.

And radiation, nuclear safety, waste safety and transport safety committees meet in the last two weeks of June or last three weeks of June, I think transport one is the second week of June and the radiation safety committee meets the third week of June and the waste safety and the nuclear safety are in the last week of June.

We are hoping to be able to present a summary of the comments to those committees during those meetings and if any issues identified prior to those meetings we may even seek some feedback on those key issues.

The intention is that the agency will go through those comments by mid to late July and we're planning to have a meeting our co-sponsors in August to review all the comments and revise the text on the BSS.

The intention is that we would send another draft to the committees by mid-September. The committees meet in the last week of November and early December for approval of the document. Now we hope we can make this schedule.

The CSS meets March next year, we may

attempt to get it to the CSS then and the Board of Governors in June next year. This is how we'd like to proceed and are our next steps. So I thank you.

MR. CAMERON: Thank you, Trevor. That was a real tour-de-force. There's a lot of work represented there, obviously and thanks for the addition of the schedule.

We're going to be going into in depth on sections three four and five, and when we do our open session there may be people who want to talk about the schedules, particularly schedule 1.

But, anybody in the room have any preparatory or overarching issues or whatever you want to say? Amanda?

MS. ANDERSON: In particular on Schedule 1, hopefully we will go into a lot more detail this afternoon on that. I know from our own agency at Department of Energy we had looked at this schedule in the first draft and done a crosswalk between what was already existing and it seemed like there was a lot of change.

We had asked for a technical explanation of that. We notice there was change in follow-on drafts, but we still have some concerns and in particular because we do -- what's currently in place

has been considered all throughout our regulations.

And so, you know, we have concerns about how something like this may impact us and if it does, we'd like to know what's the justification and is it really more protective of the public and the environment or is it just someone just felt like changing numbers.

And so we do want to know -- we'd like to go into a little more detail this afternoon.

MR. CAMERON: Okay. Thank you very much, Amanda and Trevor, do you want to say anything about that now just for starters? You get the gist, the drift of Amanda's concern, correct?

DR. BOAL: Yes, I think it's probably best that we go into further discussion this afternoon. I mean, I understand the discussion happens on planned, emergency, existing. So we may -- we discussed the planned exposure part, we should cover Schedule 1 within that discussion, but maybe we'll leave it until then.

MR. CAMERON: Okay. And I think Amanda is interested in hearing about what's the rationale for those changes too when we get there, you don't have to --

DR. BOAL: Well the criteria, well I'm not

quite sure what change you're referring to. The start is the criteria for exemption is set out there's a dose criteria of 10 microsieverts per annum for artificial radio nuclides with a low probability it can be slightly higher exposure.

Table 1 includes now about 800 radio nuclides. The current BSS has a much smaller number, but we were asked to include extra radio nuclides and we've now expanded the list, which is quite -- that's the exemption values.

You may be more concerned about the clearance?

MS. ANDERSON: Yes, accepted clearance.

DR. BOAL: Clearance values. The values in the path for clearance on bulk qualities are taken from the safety guide RS-G-1.7 and we have not changed any of the values from RS-G-1.7 into the BSS.

We've just taken the table from RS-G-1.7, which was published I think in 2005, 2006 and brought straight into the BSS. So I'm not quite sure when you said the change.

MS. ANDERSON: Well and that's where I guess that's where I guess are questions were because I know in the first draft, not for the additional radio nuclides, but ones that were already existing on

some of these.

And I haven't been able to do a crosswalk yet on the latest draft, but we noticed some of the existing values on a few different ones actually had changed.

DR. BOAL: Well I'm not aware of changing any, so we'll have to -- I'll talk to you.

MR. CAMERON: Okay. And we'll get into a specific discussion of that and maybe we'll have some examples of where there's been changes. Anybody else? Yes, sir.

MR. THOMADSEN: Bruce Thomadsen. You used the term optimization a lot through the document. Optimization has a quite clear meaning in the English, in the dictionary and in computer work and in medicine.

And it's clearly not as you use it, since there is really no way to optimize the exposure. And mindful of the, as you say footnote, and as it's written in the glossary in this document, what you really mean is a balance between risk and benefit in the exposure.

But rather than trying to redefine the term optimization or relying on the reader to go to -- to know that they need to go to the glossary to see

what that means, it might be best to use a term which is clearer and more in line with its regular definition; for example, balance.

MR. CAMERON: Thank you, Bruce. Let's put that in the parking lot for discussion perhaps a more descriptive word for that. Anybody else in the audience before we see if there's some comments from the phones?

Okay. Operator could we see if anybody on the phones has a question or comment for us right now?

OPERATOR: Yes, sir. Diane D'Arrigo, go ahead with your question.

MS. D'ARRIGO: I'm Diane D'Arrigo from Nuclear Information and Resource Service. I wanted to continue to express our opposition to exempting or clearing radioactive material that are currently under controls from controls.

And if someone in the U.S. agencies could correct me, the only place that the tables, the exemption tables exist now are in the transport regs, is that correct?

MR. CAMERON: Rob?

MR. LEWIS: Sorry about that. This is Rob Lewis. The values in the transport regulation are not clearance, the values in the transport regulation in

the U.S. are values below which you're exempt for purposes of transportation as a hazardous material.

It does not mean that it's not regulated at the origin or destination. But other than that I think I would agree with the statement you made.

MR. CAMERON: And Diane anything more on this?

MS. D'ARRIGO: Yes. I just want to express public opposition to the U.S. adopting these tables into our regulations.

MR. CAMERON: Okay. Thank you very much Diane. And so noted here.

OPERATOR: We have another question from Len Howard Ehrle again. Go ahead, sir.

MR. EHRLE: In relation to the previous two comments, I certainly support Ms. D'Arrigo's comments on behalf of the International Science Oversight Board.

I certainly recognize what Bruce said as well relative to a linguistic problem, which is true, and I recognized it early on when I began medical writing that required teaching in that my interviews with over 50 medical physicists and radiologists in preparational papers I was working on indicated that there is a very great need for definitions across the

board.

It's very difficult for clinicians who are not trained let alone those in the field to understand what is being communicated.

There's an additional problem that I should note at the outset that underlies this document and the problems with it and also the nuclear regulatory position that is raised in this document.

That is that the IAEA has used recommendations from the 2007 ICRP document as basis for this draft. That document has been rendered obsolete by events and activities and research over the past two years.

Recently, obviously, the assembled must have read about the recent activity and action by the Vermont State Senate in not renewing the license for Vermont Yankee.

This was based upon some of the misinformation that was provided to the public, but this is going on across the board, not just there.

And at the very time, the IAEA has dipped into the medical radiation field in these standards and here we have articles in the press that indicate tremendous over exposures, some of which have even caused death, but certainly future cancer and non-

cancer diseases.

What's going on here is criminal. Make no mistake about it. These standards are set to protect the industry no matter whether it's in the radiology field or in the nuclear reactor field.

And as such, they can not be given any credence and they certainly must be discarded by the Nuclear Regulatory Commission. And there is certainly good evidence to support a call for this kind of action.

And I hope it will be taken seriously by the NRC and by our other agencies. And furthermore, there is no place in the process where public interest NGOs can be involved directly in this process.

The comment period is a poor substitute for involving the process of standard promulgation, which is vital. And when we are closed out from that process, no comment period can take the place of that.

So we'll get into this in more detail in the afternoon.

MR. CAMERON: Okay. Thank you Len and I think when we get the appropriate point this afternoon, I think people might be willing or be interested in hearing more of an explanation about on the point that you raised about ICRP 2007 being

obsolete at this point. So we'll look forward to that.

Anybody else on the phones, operator?

OPERATOR: No, sir, not at this time.

MR. CAMERON: Okay. Well we're going to break for lunch here. We're going to come back at 1:15, okay, and we'll be back with you on the phone. We're going for lunch now.

You can go for lunch here in the audience to the cafeteria, but you can't get back down here without an escort. And at about 1:10 -- pardon me?

STAFF: Around 1:00 we'll have --

MR. CAMERON: Okay. Around 1:00 there will be escorts available.

STAFF: We will be at the elevator to bring you back down.

MR. CAMERON: So, Leah, Monica, whomever will be there to help get you back down. And bring a warm coat with you.

(Whereupon, the foregoing matter went off the record at 12:13 p.m. and resumed at 1:21 p.m.)

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

1:21 p.m.

MR. CAMERON: All right. We're going to get started with this afternoon's topics. But before we go to Section 3 and then we're just going to go through these and when we get done with Section 3 we'll move to Section 4, Section 5 then open discussion.

We thought it might be useful because the issue that Bruce raised about defining terms is for Don Cool to talk a little bit about the use of these terms, try to put that into context for you.

And Don, do you want to do that and we'll see if there's any questions and then we'll move to Section 3?

DR. COOL: Yes, thank you, Chip. One of the things that I realized as we were having the discussion just before lunch is that there are a number of terms of art, the way that certain words have been used internationally.

They've been used in the ICRP recommendations, they've been used in the IAEA safety standards for a long enough period of time that those of us who have had some interactions in that community don't necessarily think about the fact that we don't

use those terms or we don't use those terms that way here in the United States.

And so following up on the point that was made, there are a couple of words that are -- have a standard usage internationally, which I think in part we have to recognize that they're there.

And then try to make sure that we understand the definition and usage so that we can perhaps see if we can get beyond the term and get to the underlying concept and any issues that may be there in the kids of proposals that are being made.

And so I wrote down a couple of them and people may have some others. So let me quickly do these and see if there are other questions.

But a couple of the words that Trevor used as he was describing the provisions, one of them was constraint, which is actually I think perhaps an underlying phrase for one of the biggest pieces of the new concepts in the new ICRP recommendations.

But when it all boils down to it, a constraint, if you look at it from the way ICRP used it in the recommendations, is simply a planning value in the process of doing your ALARA program, using the U.S. terminology.

ICRP would say it's a planning value to be

used in the process of optimization. And it's what kinds of doses, total doses, individual doses, whoever you might, whatever materials you might have in planning your particular activity, what are the kinds of things where you know you don't want to be.

And in the United States, for example, in the nuclear power industry, you do all sorts of planning, you do task specific planning, you do outage planning and all sorts of things.

All of those values, sort of defining the area where they don't want to be and within which they're trying to see how well they can do. All of those fit the definition of constraint the way ICRP laid it out.

But it's when you think about the word constraint, it isn't intuitively obvious, but that's how the international community has been using the term.

Another word that got thrown around was reference level. And unfortunately the phrase reference level gets used a couple of different ways internationally.

In ICRPs activities, they talk about a reference level in the exact same way that they talk about a constraint. They use the word reference level

if they're talking about an emergency situation or an existing situation simply because you couldn't plan for it in advance.

So it still represents a kind of dose or a dose rate where you really don't want to be, but there had to be some recognition that when you discovered the situation or the event happened, you might or might not have the opportunity to make sure that you were below it.

Instead, you might have to use that as a target on the way to trying to do the best that you could for radiation protection.

But it's also used in the medical community as a benchmark for what constitutes a good level of practice, that which is well accomplished in a particular kind of procedure for facilities to match themselves to, to see whether or not they're doing protection that's comparable to protection that's being achieved elsewhere.

And so that has a slightly different connotation than the way ICRP used it in their recommendations.

The other couple things I want to mention, one of them was optimization, which we talked about just before lunch, where it really is a whole process

of trying to balance the set of things that are the risks and then the benefits and the costs and other activities, which is not the mathematical finding the minimum on any given situation.

And in fact, as ICRP often talks about, I've had an opportunity to listen to some of the ICRP members talk about it, is as much an operational sort of activity, what are the things that we can do to improve it, is that a reasonable thing to do, how much is this going to cost, a day-to-day constantly trying to improve things as the process of optimization.

And that's why Trevor, in talking about one of the issues, one of the issues that I know the Joint Secretariat when the draft was being developed had was does it -- does the requirements say to optimize.

Because how can you ever possibly know that you're optimized because it will always change, or is it you've made the thing subject to a process of optimization being that you've analyzed it and you've tried to figure out what are the best things to do and you make sure you run through the process.

Each of those has issues and so part of what we would look for some feedback, and I expect many people will want to comment on as member states,

is what's the right way to represent it, because there are issues.

If you say a process to optimize it, well of course you could always run the process, but does that mean you ever actually have to do anything or you just ran it through the process, you said fine and then you go on versus if you say you optimize it, which is something you could never actually measure.

So that's what I believe Trevor was highlighting on that issue. The other concept that tends to get some discussion is the question of justification, how do you justify an exposure.

And that happens at all sorts of levels, many of which the radiation protection things that we would talk about here are only one contributor.

And there's much broader questions of in the medical community, the medical benefit of the procedure, the value of screening at a certain time in order to prevent and catch disease early, down to the national level question, does a country want to have a nuclear power program.

And the radiation protection aspects of that really are only one contributor to a much larger dialog. And so those are some of the things that I note that have been tossed out on the table which may

have some sort of unique aspects.

And I hope that this little explanations been helpful and maybe some people would want to ask some questions about that, which will help further with the discussion this afternoon. Thanks, Chip.

MR. CAMERON: Okay. Thank you, Don. Why don't we move into Section 3 and there may be questions on not only optimization, but all the terms that you used and I think we had an issue on the tritium leakage, were that fits in and I think we said that's in three also.

So is there anybody who has a question or comment on the Section 3, planned exposure situations? Yes, sir, and please introduce yourself for us.

MR. UPDYKE: Sure and I'll try to keep this brief. My name is Craig Updyke, I'm with the National Electrical Manufacturers Association.

I'm a manager for trade and commercial affairs at our trade association, which is the E-trade association in the U.S. representing manufacturers of electrical infrastructure equipment and medical diagnostic imaging and therapy equipment.

And I believe the comments I'm making do fit into this section. And I'll try to keep it brief, I have some written comments here which I'll try to go

through as quickly as possible. And I'm happy to provide these in written form to the transcriber.

Certain types of products that are commonly known in the U.S. as light bulbs, but in the industry, in our industry are referred to as lamps, require the use of a very small quantity of materials that emit ionizing radiation.

Minimal amounts of these materials are required in order to achieve the most efficient generation of light. These substances are indispensable for the high performance of the products and are entirely safe as used at any time in the life cycle of the product.

Single lamps, high intensity discharge lamps and certain compact florescent lamps are well below the IAEA regulatory limit values, however, bulk shipments of these products may exceed the limit values, even though the radiation levels are indistinguishable from background levels in the environment.

Transportation, distribution and use of these types of lamps do not present a potential health hazard. Several scientific studies in the European Union and in the United States have shown that these products are not dangerous goods if shipped in

commercial packaging, and should therefore not be subject to these -- to requirements.

The cost of compliance with the regulations, including confusion among freight carriers who are handling products labeled radioactive and denials of shipments of those products greatly outweigh any additional measures of safety afforded by the IAEA marketing and documentation requirements that are applied to these products currently.

And I'll try to go through the rest relatively quickly as well. Four isotopes are applied in lamp technology. The most important of these are two, the rare noble gas krypton-85 and then naturally occurring thorium-232.

These isotopes have been selected because they have a sufficient half-life and a suitable type of radiation with a good ability to ionize.

They emit alpha and beta radiation with high ionization inside the product and without penetrating the light bulb. The share of gamma radiation, which may be able to penetrate the bulb is negligible.

Therefore the radiation exposure to the consumer or anyone who's handling that light bulb is very small. The applied activity inside the lighting

product ranges between a few and several thousand becquerel.

Many lamp manufacturers have enhanced their research and development for the reduction and in some cases elimination of the radioactive substances in their products and have already made enormous progress. However, many current applications do not work without the required radio nuclides.

The IAEA standards as they stand today not only concern U.S. lamp companies, but also affect other global lamp manufacturers and their customers.

And the regulations also concern distributors of lamps such as wholesalers, installers, retailers and manufacturers and distributors of products containing these lamps, for example, luminaries or lighting fixtures.

In our view, there's a clear disproportion between the regulatory requirements on one hand to protect the public and human health from danger and on the other hand the scientific facts demonstrating the safety of the mentioned lamps.

And we believe this disproportion needs to be corrected. Now I should say before I go on, this is an issue that has been brought up within the IAEA context within the transit subcommittee and has been

worked on for a number of years.

We believe the marketing requirements and the related restrictions on marketing and use of these types of products are unwarranted since the products in question do not pose any of the risks that the package label radioactive misleadingly suggests.

In addition, import licensing is remarkable burden, not only for lamp producers, but also for their customers. Presently, lamp producers have to apply for licenses in more than 120 countries, which usually also have different and unclear licensing regulations.

On the underside, each and every customer of the lamp producers in a country should apply for licenses. But a handling and application of lighting products by end users, however, there are no special measures for necessary protection in the view of their radioactivity.

The resulting radiation exposure by handing them, consumers handling them, is negligible and not considered to be dangerous. For end users, therefore lighting products are not regarded as dangerous goods.

The radiation exposure to the consumer by lighting products ranges well below the natural

background level by more than a factor of 100.

The lamps I'm speaking about are associated with an exposure of 10 microsieverts per annum which corresponds to a dose rate of 0.0023 microsieverts per hour.

However, many influences on the human life cause much higher exposures, for example an airline flight of an altitude of 10,000 meters or 33,000 feet causes levels of exposure 2,000 times higher than that for these lamps about which I'm speaking.

The lamp industry proposes to exempt these products from the requirements of an IAEA Basic Safety Standards concerning authorization and reporting.

This position is based on the fact that lamps with low levels of ionizing substances are safe as confirmed by numerous studies, which I won't go into at this time, but I'm happy to provide information to anyone who's interested in getting those references.

Moreover, in a study performed on behalf of my organization several years ago, the radioactivity of a fully loaded shipping pallet of packaged lamps could not be distinguished from background levels of radiation.

So we submit that the low public and

occupational radiation doses satisfy the principal criteria for exemption from the BSS. We have a long proposal, which I can provide to anyone who's interested in seeing it.

I just will summarize that we would propose that approved consumer products, such as these lamps, should be generally exempted from the requirements of the BSS if radioactive content inside is sealed and no direct contact with the radioactive material is possible and independent studies, scientific studies demonstrate that there is no safety hazard.

The lamp industry consumer products should not be defined as exempted products requiring exemption granted by a regulatory body, but should be generally exempted from the BSS based on these legitimate criteria.

Furthermore, we apply the inclusion in Schedule 1 of the draft, the current draft BSS, so the limit values for thorium-232 from the current TS-R-1 document and even welcomes the readiness of the U.S. and IAEA experts to consider our position and proposals.

Than you very much for your indulgence.

MR. CAMERON: Okay. Thank you, Craig.

And that was largely on the Schedule 1, is that correct?

MR. UPDYKE: Yes.

MR. CAMERON: Okay. And Trevor or anybody on the Panel, Rob, Don, any comment on any of that? I think Rob does and we'll see if Trevor does. Rob?

MR. LEWIS: I just have the clarifying comment. I guess Mr. Updyke what you're trying to show, the situation you have is that the lamps exceed the Table 1 values for krypton or thorium-232 and you would propose that the BSS include a specific exemption saying that that regulation or that standard would not apply to consumer products provided they're sealed?

MR. UPDYKE: I don't want to take the position of speaking for other consumer product industries of course, but that is something that we would submit for a discussion.

We know that's something that has been debated at the IAEA previously about how to treat consumer products and that it's not a great willingness to generally exempt consumer products.

We'll certainly be making the case on our behalf for these specific, these very specific products.

MR. CAMERON: And Trevor, anything for the audience on this?

DR. BOAL: Yes. I'm aware there's been discussions at the agency on these products, especially through the transport committee and I know there's been a working group meeting in the last two or three months on a document which will be fed into transport committee and presumably will influence the BSS will come into the process for reviewing the BSS as well.

But I'm aware there's a document in development in relation to these products.

MR. CAMERON: Okay. Thank you. Anybody else on this particular -- let's see if there's anything on Schedule 3. We are going to go back and make sure that we address Amanda's questions on the schedule.

How about anything on schedule -- or Section 3, excuse me? Well let's go to the phones and see if anybody there has anything to add on Section 3 or since that was a comment on the schedule, perhaps Diane has something on that.

Operator, can we see if there's any comments on this.

OPERATOR: Certainly. To ask a question,

please press star one. Just a moment.

MR. CAMERON: Okay. Well we'll tune back in with you.

OPERATOR: No, I have a question for you just a moment. It's coming through.

MR. CAMERON: All right, sorry. What's that, the nebula crab, the crab nebula? Is that where it's coming from? All right.

DR. COOL: Maybe somebody has the mute on their phone or something.

OPERATOR: Okay, finally your first question comes from Diane D'Arrigo. Your line is open ma'am.

MS. D'ARRIGO: Oh, hi. It's Diane D'Arrigo. I wanted to express a concern that consumer products or any radioactive materials that there should be some notification. I mean, in the situation that was just discussed, are the bulbs always going to be sealed, can't the seals be broken.

I think it's important that people know, even if it's a small amount of radioactivity that it's present. I don't think people know in their smoke detectors that it's there.

And my main issue is not consumer products, but I do believe that things are being

disbursed that are radioactive that there needs to be labeling of some kind and so there's a concern with that.

But the thing that I wanted to say to the IAEA is that, you know, once again, that throughout the United States there's strong opposition to exempting, and I'm not sure because I don't have all of your documents right here, but whether you're calling it exemption or clearance.

But that we oppose these provisions in the IAEA and in the ICRP and will continue to press our government agencies not to adopt them and complain to them for their part in including them in the international regulations or recommendations.

MR. CAMERON: Okay. Thank you, Diane. Operator, anybody else at this point?

OPERATOR: No further questions at this time.

MR. CAMERON: Okay. Thank you, operator. Cindy, do you have something?

OPERATOR: Sir, we just had another question come in.

MR. CAMERON: Okay. We'll be right back to you, we have someone who's ready to speak.

OPERATOR: Would you like to take it?

DR. COOL: She can't hear you.

MR. CAMERON: Okay. Go ahead, we'll go with you operator.

OPERATOR: The next question comes from Len Ehrle. Your line is open, sir.

MR. EHRLE: I'm on?

MR. CAMERON: Yes, we hear you Len.

MR. EHRLE: Okay, thanks. Just one brief comment. I certainly support the concerns that Diane expressed and I would add to it that in view of the BEIR-7 reports conclusion that there's no safe dose of radiation right down to zero, it certainly would suggest that persons dealing with standards take that into account.

Because it certainly is implicit in that statement that there is a risk following that albeit small. But as we all know, radiation is cumulative and so the combined effect of other radiation procedures that whether it's in occupations or general public, have to be taken into consideration, unfortunately they are not.

MR. CAMERON: Okay. Thank you, Len. We're going to go here for a question or comment and then I'm going to ask the panel that we have, Trevor and Don and Rob whether they have any comments on

this. Cindy?

MS. FOLKERS: Sure. This is Cindy Folkers with Beyond Nuclear. And we really are going to have to insist that any product that contains a radioisotope of any sort be labeled as such, especially when you are having consumers going and choose a product.

It's, you know, if we're going to have a so-called free market society that assumes an informed consumer and a consumer cannot be informed if the content of what they're purchasing is unknown to them and if the health effects are not clear.

MR. CAMERON: All right. Thank you. Any commentary from the panel on what you heard from Diane and Len and Cindy or anything that Craig said?

MR. LEWIS: Well, I think we have understood the comments that have been made. But I do want to point out, Trevor, correct me if I'm wrong, but in terms of what's in the BSS, there is no marking and label requirements of devices.

I think that the comment that was made about the light bulbs was focused at the transport regulation, which when it was changed in 2000 or 2001, I don't remember the date, added the requirement to now have marking of small devices like light bulbs.

So in 2000 the IAEA changed the transport requirements, not the BSS to add marking. And the comment now is from industry representative in the comments and opposition that have been voiced of that. We understand the comments, but to be clear, those aren't comments on the BSS.

MR. CAMERON: Okay. So to clarify, Craig's comments really were applicable to transport?

MR. LEWIS: Well I took Craig's comment to mean that there in the BSS there could be an exemption for particular products. And we heard comments and opposition to that comment as well, but the marketing issue in and of itself is related to the transport regulation.

MR. CAMERON: And Cindy, your comment was broader in terms of labeling of products.

MS. FOLKERS: What I wanted to say was labeling and you mentioned more concern than necessary based on a label. And I don't want that to go -- I want consumers to be aware of what they're purchasing.

So if his comment was directed toward the consumer end of things, meaning individual consumers, then we would insist that those products be labeled as containing radioactive material.

MR. CAMERON: Okay, thank you. Trevor?

DR. BOAL: The BSS does contain requirements for consumer products, paragraph 3-137 to 3-142 and it does include a comment in relation to labeling and identifying of radio nuclides particularly aimed at items like smoke detectors, Ethiopia cetera.

So, when you say about smoke detectors, there should be labels that contains small amount of americium what radio nuclide is included in it. I'm not aware of all the issues relating around the lamps and I'm not quite sure what the -- whether the lamps are using all products or all types of lamps with any specific types of lamps where the radio nuclides are included.

There's an issue in which this working group is looking at currently.

MR. CAMERON: Are you finished Trevor?

DR. BOAL: Talking, yes.

MR. CAMERON: Okay. Craig?

MR. UPDYKE: I'll just make two clarifying comments in response to what's been said. These products to which I'm referring are not really consumer products in the sense that we would go out to Home Depot here in the United States and purchase them these are -- or you and I would purchase them.

These are commercial and industrial types of products that you find in factories and outdoor lighting and other things. So it's not something that you or I would necessarily go out and handle.

And we certainly do not oppose and certainly support the comments that consumers should be aware of what they're purchasing and the individual package that's being sold to the commercial and industrial or individual consumer should have a notice on it.

We are much more focused on the shipping packaging that is -- that can contain hundreds of lamps that cannot be detected as a radioactive hazard and do not present radioactive hazard in transportation.

So going back to what Mr. Lewis mentioned on the transport regulations. So I hope that clarifies a couple of issues.

MR. LEWIS: Yes.

MR. CAMERON: Yes, that's good. Thank you.

DR. BOAL: Can I one more comment on that?

MR. CAMERON: Yes, go ahead Trevor.

DR. BOAL: I mean this issue is also taken up on the BSS and I think one of the paragraphs was --

referred to the paragraph where the information is on the retail packaging. I think the paragraph text may have been changed. I know there is an issue about the transport, but that is dealt with in the transport regulations and not in the BSS.

But there is -- we had to make sure that the terminology used in the BSS was going to be consistent with the terminology used in the transport regulations as far as packaging and we've worked to do that.

MR. CAMERON: Okay. Is there anything more that we want to say or -- on the leakage of tritium from nuclear power plants? That's covered by this section, correct? I think that's what we said before.

Cindy, do you want to expand?

MS. FOLKERS: I want a clarification actually, and I'm not sure that this question is for IAEA as much as it is for NRC and depending on what pieces of this they do and don't adopt.

I suppose with Vermont Yankee, I don't know when it was licensed, but I'm assuming that under the original license that this tritium leakage as of late is a planned release. And I'm wondering what health criteria or studies they based the release on

at the time it was licensed.

And if we are looking at licenses for new reactors, what studies and criteria are we going to be basing those on and how are they different?

Because over the life span of a reactor, as we get more and more into the health and the science of what's going on and how radiation affects human beings, I'm not sure that we can have static licenses for nuclear reactors.

Because as we learn more and more, certain things may be more damaging and should be taken into account as the life of the reactor continues.

MR. CAMERON: Okay. Can we have some NRC commentary on that? And can we also, if we can, try to relate that back to the BSS in some way? We're going to go to Rob and then perhaps Don. Rob?

MR. LEWIS: And I think industry person had wanted to make a comment when we're done. But, from the NRC point of view on the evolving issues, Vermont Yankee, neither Don or I are in the part of NRC that's working on that.

I'm not trying to dodge the question. I think you asked a good question. I understand the question. I think our earlier answer was if, you know, if we had in the U.S. the regulations that are

structured like the BSS, we would cover releases from a plant when we license the plant in the safety evaluation -- safety analysis report that's submitted with the license application.

That's not to say what any particular limit would be for any nuclide, that's part of the licensing application and the safety analysis report.

And that's the structure essentially that we have today under NRC regs in Part 20 and 10-CFR-Part 50 for reactor licensing. So that fundamental structure wouldn't change because of the way that the BSS is formatted.

And I think our point was if releases from plants are part of a planned exposure situation as the way BSS has been things. And once you find a release and there's environmental contamination, then you have a planned exposure situation to clean it up.

Now, some releases like a prompt release, like Chernobyl, would be an emergency exposure situation. But the slowly leaking tritium into the groundwater I don't think would be considered an emergency exposure situation because of the dose. It wouldn't meet the definition if you look at the definition of those.

So all that said though, we do not have a

static licensing situation. We have a system in the Nuclear Regulatory Commission to change our regulation as new information is learned and we have a system to require plants to upgrade where there's a safety issue, that's called back-fit.

And there's evaluations required, we have a committee and generic review of -- CRGR, Committee to Review Generic Requirements, which is chartered to do just that, look at new information and new regulations and see if they should be applied retrospectively to plants that are already operating.

So, hopefully that gives you a little bit of a response with the proviso that neither Don or I have been involved in the Vermont Yankee or the other reactor tritium leaks, but I'm trying to be as responsive as I can from the generic point of view.

MR. CAMERON: And just to make sure, maybe Don you can address this just to make sure that people understand this and, you know, I can be the ignoramus as the facilitator.

There are planned releases, the limits in Part 20, what Appendix B or is that Table B, but if there's a big spike of tritium that turns up in a monitoring well above those limits, that falls under the emergency?

DR. COOL: No.

MR. LEWIS: No, no, no.

DR. COOL: Let me try to add a little bit more clarity because it is complicated, no matter how you sort of slice up this particular issue.

Planned means that you're talking about an activity like running a nuclear power plant that you planned to do. And so in your planning, you should be planning to try and control all the materials.

Now, one of the things that has to be looked and is looked at in the licensing of the facility is the potential for releases in effluence.

There may be circumstances, and I think some of the tritium in groundwater is one of these where the conduct of the activities did result in a release, it wasn't one of the things that was planned, they didn't plan to release the tritium, but it happened in the context of activities that they were ongoing and doing, which puts it into this exposure category of the IAEA.

So I believe from the standpoint of the IAEAs regulations, and from our regulations, something like this which is ongoing, occurring as part of the normal activities, I'll say normal, operators of the facility all must be dealt with in the context of the

planning.

So, the agency is now requiring industry to look at and deal with the question of these releases which had not been previously anticipated and analyzed and do something about it.

Contrast that with emergency, which I think is probably best sort of put in a definition where something has happened which takes you really outside of the normal perimeters of the expected operational activities.

And where you've got to go in and do something immediately in order to try and regain control of the activity, in order to try and provide appropriate protection and the doses usually are higher, so you need to take immediate actions.

Things may need to happen fairly promptly when you find something like the tritium in the groundwater wells, but I think it was probably best to keep a distinction between something that happens like right now because of a completely unexpected something broke and you need to take some actions in the facility to regain control of the facility and deal with the exposures.

And something from the conduct of activities which you do need to react to, understand,

respond, inspect, correct and modify as part of the ongoing licensing inspection enforcement of the facility. I hope that helps a little bit.

MR. CAMERON: Okay. Thanks Don. We're going to go to Henry Morton and then I want to check in with Diane and Len and then we'll go to emergency exposure Section 4 and I'm going to turn the microphone to my colleague Elva. Henry?

MR. MORTON: Henry Morton. I'm not familiar with this particular case so the first key question was the route of discharge through an effluent treatment system or was it a leakage through -- from piping through an unexpected direction?

I think the way, instantly the way the issue seems to me is this, if it wasn't through an effluent pipe or system, airborne or liquid, then it would be subject to Part 50, Appendix I, which regulates the radioactivity in the effluent as an operational or a planned release.

If it were not, but rather was an unexpected leakage through a building into the ground or something like that, then it would seem to me that perhaps this becomes subject to the timeliness rule under Part 20, Subpart E, which would then in effect begin to subject the question of this radioactive

material in the ground subject to perhaps decommissioning timeliness rule.

And then of course the next question is, was it found inside the restricted area or out in the public area beyond -- in the publically accessible area. But that is the way it would seem to me, but then in either case, in either case it seems to be to be subject to probably one of those two regulations for action.

MR. CAMERON: Okay. Thanks Henry. And Don, you want to say something on that and can you tell us if this is going to be something that would be going into the interagency debate on what the country position, i.e., U.S. position is going to be on the BSS? Just so we can see if we're connecting the dots here or whether there's no dots to be connected.

DR. COOL: Yes, thank you, Chip. That's actually exactly what I wanted to do. Because there are a lot of the details of the event around some of the findings of tritium at various nuclear power plants, which are really beyond the scope of these discussions here.

And there are ongoing investigations to try and find the causes, sources, do corrective actions and otherwise which, you know, we don't have

the right knowledge to hold a really informed discussion right here.

But what I take away from this is that the interagency needs to look carefully at the question of whether the provisions in the Basic Safety Standards have a mechanism for clearly providing the right kind of assessment before an activity is licensed and the right kind of monitoring and inspection, to cause the right kind of inspection and monitoring as activities are being conducted.

In a situation like this where it may not be on the a priory, identified list of effluent pathways, but which as a result of activities, a release may in fact occur at some point in time, in order to make sure, as a matter of our comments, whether or not a comment needs to be made, that this is not properly dealt with.

And if it's not properly dealt with to perhaps identify a mechanism that would help make sure that it was dealt with. And we could reflect as to whether there is something within the U.S. regulatory structure that's doing it, we can suggest to them or otherwise.

So I take that as something that the interagency should look at in developing the comments

is to ask this question and do that cross check.

MR. CAMERON: Great. That's a good connection. Thank you, Cindy for brining that up. Operator, can we see if Len Ehrle or Diane D'Arrigo have anything that they want to add to the discussion on tritium? And I think then we're going to go -- or anything else in Section 3 and then we'll go to Section 4.

OPERATOR: Diane, could you press star one again on your touch tone phone, please? She took herself out of the queue.

MR. CAMERON: Okay. And is Len, does Len Ehrle want to say anything on this issue?

OPERATOR: Press star one on your touch tone phone. One moment, sir.

MR. CAMERON: All right. Thank you.

OPERATOR: Go ahead Len.

MR. EHRLE: Thank you. Are we still discussing the issues, other issues related not just to tritium, but to the Section 1 on standards generally?

Has that been -- because you're stating we're now going to go to Section 4 and of course there's Section 2 and 3 that have some specifics in it as well.

Bu in relation to the tritium issues, I've been studying radiation health effects at low dose for over 40 years, and in my readings I was amazed to find that in Canada, they justified releases of tritium into the Ottawa River as a de minimis and then went on to explain that it dissipates in the water.

It was an amazing kind of a revelation to me, except it supports the general notion that has been promulgated that the solution to pollution is dilution. Well, follow that line of reasoning and see where it gets you.

And so here we have releases that apparently from the prior discussion were unplanned because they didn't know that tritium would be released from the normal process in the reactor.

There may be other releases such as xenon and krypton that are released that cannot be contained. And then this leads to a discussion of what was found in the KKiKK study, in Germany, where they found elevated levels of childhood leukemia around all reactors and they could not of course identify any confounding factors because there weren't any.

The same thing happened at Chernobyl, all the releases related in the, for instance, low birth

weight and related in the radiological problems, radiation sickness and other issues that were hidden by the government and were denied that there were any problem because these releases were de minimis, they were too low to have any health risk.

Well this is absurd on its face, particularly in light of the no safe dose issue that was dealt with by BEIR-7. So, in that sense I don't know what you do with this because obviously if there's some things that come out of the reactor that cause, in the case of the German study, elevated levels of childhood leukemia and then there's a cover up of that because we've had commentaries from our international oversight board, including my own, that have been refused publication in environmental health perspective and in science.

And I was an AAAS member. And they're denying publication of clarifying statements and commentaries, this was all across the board, and that's what we're running into. So here we have this issue and it relates to all of these safety principals as well in Section 1.

And it relates to the international, the ICRP standards and Dr. Cool you mentioned that you wanted me to clarify the issue relative to the

conflicts of interest and the issue with the document, the 2007 document. Is that germane now or do you want that later?

MR. CAMERON: Why don't you address it now.

MR. EHRLE: Okay. It does relate to this issue because first of all, ICRP has never acknowledged research on internal dose, that which we eat in our food and breathe in the air.

And these alpha and beta particles are much more deleterious than external dose by which the ICRP standards are based and which IAEA accepts without question, because that's the foundation for this document.

And so here we have a standard based upon the A-bomb releases, a single external dose where they never acknowledged -- they didn't even acknowledge prior exposure from x-ray to these victims, they just took the statistics from the dose, gamma dose from the bomb.

And so there were other confounding factors that were eliminated from the research, the subsequent research that gave rise to the BEIR statements. And so these principals are difficult to square with ICRPs denial of internal dose, they only

base their model upon external.

And by the way, they have the book I'm sure, but there's an excellent critique of the ICRP and its proposals and its modeling in the European Committee on Radiation Risk document, Health Effects of Ionizing Radiation Exposure at Low Doses for Radiation Protection Purposes, regulators edition, Brussels 2003.

I'm looking at the document now. It's an excellent summation, if anybody cares to go online and look up the European, ECRR, European Committee on Radiation Risk. I'm sure they would send you a copy at minimal cost to get the benefit of what 46 people that are on this committee have worked on in this document.

And it's very enlightening to go through that, but that's something that the ICRP is unwilling to do and of course the IAEA has its own statute, which of course, is designed to support atomic energy. And that's right in statute Part 2 of its statute.

And these requirements put it in conflict of interest with the NRC and the documents of ICRP even that say it want to protect the public health and safety.

Well you can see the conflict there.

That's an ethical issue and it's an issue that affects people's health and safety, and it goes right to the very heart of what is being caused by radiation at low dose.

Namely non-cancer diseases where there may be single strand breaks in the DNA, or in the case double strand breaks, which by the way are admitted in UNSCEAR 2000. In fact UNSCEAR even covers up the Chernobyl accident and denies it.

And I'm looking at the quote right now that says that these reports, critics say that it's based on psycho social causes. The major problem with health risk, meaning radiophobia, which those of us are concerned about radiation, they say well we have an undue fear of radiation.

Well, I don't have an undue fear, I've been reading this stuff for over 40 years and it certainly is not an undue fear because the science, I believe is all on my side.

So this is another factor in this Section 1 that relates to the standards. And there are other books that have been published by the European Committee. There's one called Chernobyl 20 Years On, and they published this book on the health effects of the Chernobyl accident in 2006.

So here are documents that are available, but they're denied. They won't even translate hundreds of studies by Russian scientists, three of whom are on my International Science Oversight Board.

The World Health Organization, the IAEA, the NCRP, the ICRP, they have these studies, but apparently they won't translate them, and if they did, they wouldn't distribute them because they show much greater risk than what the Chernobyl Forum came up with in 2005.

So I've read all this stuff and I'm beginning to get a little tired of seeing these conflicts of interest and these ethical problems because they do go to the very heart of the public health and safety.

And it's affecting whole populations, not just individual people. So here we have this issue dealing with that. So as far as Section 1, I think I've dealt with that, but I have comments on Section 2 if you want to get into that when you have time. There are a couple of points there.

MR. CAMERON: Okay, Len, those comments, and we get the point here on that.

DR. COOL: And we appreciate him putting some of these materials on the record, because this is

being transcribed so we have the information available. And I suspect that the interagency will want some of the legal folks to also take a look at part of this as we continue to move forward.

MR. CAMERON: Okay. And let's hear from Len on Section 2.

DR. COOL: Right. Because the general requirements crosscut all sections. So it would be good if there are any observations on that to take care of that now.

MR. CAMERON: Okay. So we'll do that and then I wan to go to Rob Lewis for some comments relative to Section 3. Len, why don't you go ahead and tell us about your Section 2 concerns.

OPERATOR: Is Len on the phone, sir?

MR. CAMERON: Can we get Len back on to talk about Section 2?

OPERATOR: Press star one on your touch tone phone Len. One moment. Go ahead, Len.

MR. EHRLE: On Section 2.16, the government shall ensure that the regulatory body is effectively independent in protection and safety related decisions of persons and organizations using or otherwise promoting the use of radiation and radioactive material so that it is free from any undue

pressure from interested parties and any conflict of interest.

Now, in the NRCS outline of its 15 member advisory committee on reactor safeguards, and I assume that committee has to deal with this document because of that primary concern, it is composed of these 15 members, 12 are engineers and 10 are also either work for nuclear industry or government agencies.

This is a violation of the Federal Advisory Committee Act that requires advisory boards to quote, "Be fairly balanced and will not be appropriately influenced by the appointing authority or by any special interest."

It is my contention, it's rather obvious, that this is a stacked deck, it's incomplete and in flagrant violation of FACA, which sets these regulations, not just for NRCS advisory committee, but for all agency committees.

So, it would seem to me that the NRC at least has to take cognizance of this and now since it's in the document by IAEA, it would seem to me that they must respond to this in kind.

And then going on to 2.31, the document indicates provision of information and consultation with parties affected by its decisions, and as

appropriate, the public and other interested parties.

I've been involved in similar discussions with other agencies and in the comment sections, and it's my conclusion that this is really somewhat of a rouse to delay or not involve non-governmental organizations in the process itself.

And we find ourselves in this unenviable position of making comments that may or may not be taken seriously because we're not sitting at the table with people who promulgate the standards. The same is true at ICRP and NRCP.

Those organizations were set up by self-appointed medical physicists. And of course I go way back to look at the history, and that's how they were formed and there's no way they're going to put on non-governmental public interest persons on those committees that are set up.

So what we have is a revolving door, a closed loop where we can't get in, all we can do is make our concerns public in a comment section such as you're giving me an opportunity now.

But I would submit that you have to go beyond this and go to other issues that relate to the structure because this has to do with the very heart of how we deal with these critical life threatening

issues.

And then going on to -- well this is in the third section, so I won't -- you're going to deal with that later. But it would seem to me that all of these advisory boards should make slots possible for representatives from non-governmental public interest organizations.

It calls for consultation, which implies collaboration. And since they affect entire populations --

MR. CAMERON: Okay. Thank you, Len. We're on Section 3 now also and Don Cool wants to say something relative to your remarks, your comments on Section 2 and we're going to come back to you for something that you have on Section 3, perhaps, and then we're going to go to Rob Lewis and then I think we have to move to Section 4. Don?

DR. COOL: Two things very quickly. First, just to note that it's probably appropriate for us to provide this piece of the transcript to our Inspector General since a great deal of these comments were not related to the IAEA document that's the subject of today's meeting, but rather relate to the conduct of activities of the federal agency. So I think we will do that.

And then secondly to actually reflect back a question and to see if my understanding is correct because in quoting the IAEA standard, I take it that you believe that the statement in the IAEA standard is appropriate.

So I'm trying to make sure whether or not you've identified an issue which should be commented on, on the IAEA standard or whether as a result of looking at the IAEA standard you have raised issues associated with U.S. agency conduct.

MR. CAMERON: And Len, do you understand what Don is asking you?

OPERATOR: One moment, sir. Len, go ahead. You have an open line.

MR. EHRLE: Hello.

MR. CAMERON: Yes, we hear you Len.

MR. EHRLE: Okay. No, to clarify, I think that what I was quoting was from the draft and it relates specifically to the draft document.

Now the other issue, of course, does relate to the federal issue and to the NRC, no question about it. But, it flows from the document itself that you're dealing with.

In Part 1 and Part 2 these issues are specifically spelled out in the document and they have

to be dealt with by the NRC, because that's what your remit is in this particular instance.

So it seems to me that that's where -- that's what I'm coming down on here are these specific provisions.

MR. CAMERON: Okay. And I think you affirmed what Don said that it's appropriate to have that statement in the Basic Safety Standards and he also said that there would be a referral of your concern for the NRC.

So I think that that is clear and perhaps you could give us your Section 3 comments and then we're going to move on.

MR. EHRLE: That would be fine. The relative -- the specific issue relates to 3.149 Part D; the patient has been informed as appropriate of the potential benefit of the radiological procedure as well as the radiation risks.

And it mentions prior to that, it mentions the health safety reports. Well, informed consent is mandated under the Nuremberg Code at Helsinki Accords, but it is not provided in radiological procedures partly because technicians are not trained, nor do medical physicists and radiologists instruct them in the necessity for this kind of informed consent.

They have a fear, and in fact in the paper that we published that demonstrated thousands of future deaths coming from pediatric CT scans, it was turned down by eight journals before number nine published it.

And one of those peer reviewers said that if the public -- if this document were to become public, it might create too much public hysteria.

Well that's the fear these radiologists have is that if you tell the people the truth, that if you provide real informed consent as this document calls for, then this shows the difficulty of bringing this into fruition.

And obviously, I think the IAEA is out of its element dealing with medicinal areas because these deal with x-ray, again it goes to the very heart of the mission statement of IAEA and I don't see how or why they got into this here.

But since they've opened it up, then I feel that it's our responsibility to at lest note that there's a serious problem with this document at that point.

And this informed consent issue is a burning issue right now. It's been raised in journal articles, most recently in the Archives of Internal

Medicine for editor Rita Redberg indicates that there may be a problem where the risk actually is greater than the benefit and she put that in her editorial.

I was amazed to see it. It's the first time it's ever been raised in that way, but that issue is certainly critical in this document and has to be dealt with by the IAEA in a way that it can be implemented, which I don't think it can.

Going down to 3.174 it talks about any radiological procedure that may give a significant dose to the embryo or fetus. It is my feeling and it's that of any scientist, that any exposure radiation to the fetus should be avoided and any exposure is significant.

In fact, it's pretty well accepted by a geneticist that in utero exposures are much greater risk than those exposures after birth. And so you have a problem there and there's very little research on fetal exposures.

It dates back to Alice Stewart's work that should have won her the Nobel in `57 and `58 where she found that a single x-ray to the fetus would cause a child to get cancer or leukemia before age 10, 40 percent increase in these particular diseases.

And so that was another issue in this

document that should be dealt with by IAEA. 3.177, the section is take practical measures to minimize the likelihood of unintended or accidental medical exposures arising from design flaws and operational failures of medical radiological equipment.

Again, this points out how obsolete that 2007 paper was by ICRP and now it's being used by IAEA. Because in this statement it ignores what just happened in the past month where the New York Times has publicized the terrible damage being done to individuals by overexposure from x-ray machinery and CT Scans unbeknownst to the operator.

Because there was very little oversight, either by the institution or by regulatory agencies who are charged with monitoring this equipment.

And of course, there are also government cover ups that date clear back to Hiroshima. I might point out to you that Hiroshima as at Chernobyl that there were issues, statements issued by the government to doctors not to report on radiation induced illnesses. That went on for over three years at Chernobyl.

MR. CAMERON: And Len are these all in the written comments that you gave us?

MR. EHRLE: Just briefly. I will be

giving further comments that will amplify on these and in fact I'm revising the document right now and you will get a copy of this and trust you will distribute it to all the members that are in the audience as well as your staff.

MR. CAMERON: Okay. Well that would be very helpful. Do you have any -- do you have a last point on Section 3?

MR. EHRLE: Yes, the other one -- yes, the last one was 3.183 which states that the IAEA document calls for making available as required the following records; in diagnostic radiology necessary information to allow retrospective dose assessment, including the number of exposures and the duration of fluoroscopic examination.

I can't get information for example from radiological labs that I checked with and we go to Mayo Clinic, I'm familiar with how they operate there, but they keep no record, for example, of additional mammograms that may be retake.

And of course you multiply the dose, which is .04 milisievert, you multiply the dose by the number of scans that they have to use and retakes. And some women get two or three retakes because they can't read them, but there's no way they keep a

record.

So you would think that the labs and radiologists, medical physicists would certainly be concerned about this since radiation doses is cumulative. But there is no record kept, to my knowledge, and I've asked many of the labs for this information, they just said they don't have it.

So they're not keeping proper records and here again is a standard that IAEA is familiar with and obviously they must have put this in here for a reason, but there doesn't seem to be the ability to carry it out.

And they also do not account for the fact that protracted exposures over time at low dose are now found to have a greater effect that an acute dose of the same exposure given at one time, at one examination. So those are the other issues relative to Part 3.

MR. CAMERON: Okay. Thank you. Thank you very much, Len. And we're going to go to Rob Lewis here in Rockville for another comment on Section 3. Rob?

MR. LEWIS: Yes. Just to wrap up Section 3. Well, first, those are some very thought provoking comments and we'll look forward to the written version

of those.

And I think we take those as constructively as not so much critical of what's written in the current BSS draft, but recognizing the difficulties of implementation of many of these issues at a national level.

We did get one written comment from the American College of Radiology. Is anybody from the ACR in the audience? I say I believe they went downtown to a congressional hearing today and they gave us this.

And so since the comment was on Chapter 3 I thought I would make mention of it for the record. The ACR submitted a written comment related to sections 3.149, 3.155, 3.156 and 3.158.

The same comment on all those sections basically that the current text, which refers to the referring medical practitioner they would like to replace with language, the referring medical practitioner in consultation with the radiological medical practitioner when appropriate.

So we will take that comment into consideration. The basis of the comment is that the referring practitioner isn't always the same person as the radiological practitioner. And I think that is

true in the American medical system.

So another implementation issue of how what's written in here may not be reflective of the domestic medical practices.

MR. CAMERON: Okay. Thanks for putting that on the record Rob. We're going to take a short break here, do you want to just do a stretch break or? Let's just take a stand up stretch, whatever break here and come back in about five minutes.

And then we're going to go to Section 4 and we're not going to lose track that we need to discuss Schedule 1 in terms of rational. Thank you.

(Whereupon, the foregoing matter went off the record at 2:35 p.m. and resumed at 2:48 p.m.)

MS. BOWEN BERRY: Okay, we're going to start again. We heard a little bit on emergency responses and so we're going to move on to that section and we're going to open it up for questions to anyone.

Anyone in the audience have a question or comment on Section 4? Okay. Operator, we're going to go back to the phone lines, is there anyone in the queue who wants to make a comment or have a question?

OPERATOR: Once again, to ask a question press star one. Len, go ahead.

MR. EHRLE: The section 4.7, reduce the risk of statastic effects to the public and timely implementation is another phrase there that's used in response to an emergency.

Is it my understanding, perhaps you could clarify this Dr. Cool, is the zone of evacuation still a 10 mile radius?

DR. COOL: I believe that is the case. There are actually a number of criteria that relate to when you would take certain actions at certain distances.

In the U.S. system for reactors and emergency preparedness there are a set of criteria and a set of things, which I believe correspond to the triggers or to take prompt actions in order to fulfill the statement.

So, I believe that's the case and I would ask back to you if there is a particular issue that you would like to raise around the wording of the IAEA standard that we need to consider in preparing some comments?

MR. EHRLE: Yes. In relation to the timely implementation and its response to the emergency, it would seem to me that based upon what happened at Three Mile Island, and I had all the

reports from the government, a whole big stack of them, the response did not really go to the heart of the problems down with beyond any 10 mile limit.

And I think that there's also a problem here that might be addressed relative to the need for planning by the relevant governmental agencies surrounding nuclear power plants.

Because this certainly may come into play in the future and an evacuation process would, I think, would be very difficult in some locations because of the high density of population. So that was not mentioned in the document.

I also wanted to ask, are you going to ask for final questions and comments later?

DR. COOL: Yes, we will be.

MR. EHRLE: Because I just wanted to make one brief comment because I don't have any further comments on the other parts of the document. So I can wrap mine up very quickly.

MS. BOWEN BERRY: Okay. We are going to ask at the end if there are any final questions or comments, so if you want to hold to there and we'll go back to the phone lines and see if there is anyone else for a comment or a question on this particular section. Operator, do we have anyone else?

OPERATOR: There's no other questions at this time.

MS. BOWEN BERRY: Okay. Are there anymore questions in the audience? Then we're going to move on to Section 5, existing exposure. Does anyone have any comment or question on Section 5, in the audience? Okay. Please introduce yourself.

MR. BOYD: Okay. Thank you. Again, it's Mike Boyd with EPA and I want to address this to Trevor based on the slides you showed this morning about Section 4 and 5. And in the emergency exposure situation we have the reference, residual dose level given as 20 to 100 milisieverts.

And then in Section 5 it's very interesting, we say that once a nuclear or radiological emergency, after the emergency has been declared ended, it then becomes an existing exposure situation and the residual dose limits there are 1 to 20 milisievert.

And I think there's been a lot of confusion, particularly among the lay public as well as some of us in the government about, you know, what residual dose means in the context of an emergency response.

And some people would say that, you know,

20 to 100 milisieverts would be, you know, they interpret that as that being the appropriate, you know, residual dose level in all phases post emergency.

And I think it would be -- all I'm advocating for is a very clear statement in the BSS that once the emergency has been declared ended, that the residual dose levels could in fact be quite lower, so.

MS. BOWEN BERRY: Thank you Mike for your comment. Trevor, would you like to comment on that?

DR. BOAL: In establishing these levels I think we followed the advice of the ICRP and their recommendations and the recommendations for the residual dose during emergency as well as 20 to 100.

The definition of residual dose is the dose expected to be received after protective actions have been implemented. So it's -- so during the emergency phase there would be a difference between your protected dose and the aversive dose.

When you get to the existing exposure stage, we're then talking about the residual -- yes, the reference level being established somewhere between 1 and 20 and it's up to the member state to decide what level they would decide to establish.

In the BSS we've just -- the recommendation is it should be between 1 and 20. And for other parts -- that's the level set and I think it's set in paragraph 5.8.

If you go then to the later paragraphs, if you're looking at commodities it's recommended that one for radon, the level is set at about 300 becquerels per meter cubed, which is a level somewhere around 10 milisieverts, I think the footnote says.

So they're in the range of, yes, footnote 37, the 300 becquerel per meter cubed corresponds to per annum dose of around 10 milisieverts. So we're setting reference levels somewhere between 1 and 20 but they're varying from situation to situation.

And that reference level of 300 becquerel per meter cubed is the maximum level you can set for radon and the states may choose to even set a lower reference level for radon. Is that?

MR. BOYD: Yes.

MS. BOWEN BERRY: Okay.

MR. BOYD: I'm really saying that I like what's in the BSS and I wanted to sort of reinforce that there's been a misperception that a level as high as 100 milisieverts per annum would be considered acceptable for 30, 50, 70 years of exposure, which I

think all of us agree is not the case.

And that after an emergency has been declared over, that the lower limits would then be appropriate. And that's what the BSS says, I just wanted to sort of put a nail in the coffin to the misperception that those higher numbers would be appropriate for long term exposures.

And I think the ICRP was a little ambiguous and I'm hoping that the revision to ICRP publication 82 will be, you know, more explicit in that regard. Thanks.

DR. BOAL: Okay. Thank you.

MS. BOWEN BERRY: Do we have anymore questions or comments? All right. We're going to let Dr. Cool talk.

MR. CAMERON: Questions from the phone?

MS. BOWEN BERRY: Right. On the phone line, operator, do we have any questions or comments for Section 5, existing exposures?

OPERATOR: No questions on the phone.

MS. BOWEN BERRY: All right.

MR. CAMERON: We can discuss Amanda's issue.

MS. BOWEN BERRY: We're going to go back to Amanda's question from DOE and she was talking

about Schedule 1 and the rationale behind that, so let's go back to that. I'll give the mic to you Amanda.

MS. ANDERSON: If you go to page 111, there's a note here and it gets a little bit at where our concern originated from. In the first draft of this, I recall there being a note that there were people who wanted to take out or delete the exemption column and replace it just with the bulk quantities.

And if you do that, it does change some of those numbers and then in another iteration of the draft, it seemed like the concern was addressed, but when you tried to match up numbers, there were still some radio nuclides where we were using bulk quantities for exemption when they were different.

And in reading the note further, there's a further concern because it basically here, I think what I'm reading is that there's still a lot of work to be done on the tables, on tables 1 and 2 and that, you know, for these 800 new radio nuclides or not new, but of the 800, you know, you included some new ones, but we use the European Basic Safety Standards.

And so it seems like it's those are now being inserted on the BSS and, you know, we've got concerns about how this will evolve and what went into

that and maybe you can speak a little more on that.

MS. BOWEN BERRY: Thank you, Amanda. Trevor, would you like to comment?

DR. BOAL: Yes.

MS. BOWEN BERRY: Okay.

DR. BOAL: The criteria for exemption is set out in paragraphs I-1, I-2 and I think they're essentially unchanged from the current BSS.

And in the current BSS in Table I-1 we have a list of around 300 radio nuclides, which were developed and published in a European Union document, I think it's reference -- it's in the list of references, RP, Radiation Protection 65, so it's reference number 20.

And the numbers in the current BSS for moderate quantities material are derived from that document, reference number 20, using the criteria which are here presented in the table. It's the same criteria -- the criteria is really taken from that European document as well.

Now since that European document was published, there were an additional 100 or so radio nuclides which for as far as the modeling done, which were then included in the transport regulations.

And transport community may have different

scenarios decided that would adopt the values from the BSS even if the level is slightly different from their own modeling just to have one set of numbers rather than having two sets of numbers.

And so there was a uniformity to all of it, the same numbers appear -- I'm sorry. The transfer rates had a larger set of radio nuclides than the BSS, but the criteria for deriving those numbers and the scenarios used for deriving those numbers for the extra radio nuclides were the same.

There was a slight difference in the fact that the extra set of radio nuclides there may have been a slight update in the ICRP dose conversion coefficients.

Then since the transport regs and the BSS were published in the mid-1990s, the group within the European community who developed those first two sets of numbers then produced the third paper expanding it up to 800 radio nuclides.

But they've used the same dose criteria, they've used the same scenarios in deriving the numbers for the extra radio nuclides. So essentially, they've all been derived in using the same, the dose criteria set out in the exemption numbers here and the same scenarios, but there's a slight difference in the

dose conversion factors again used in the most recent ICRP factors.

And I can give you a copy of that paper if you want a copy of it. So they're still based on 10 microsieverts per year, they're still based on the list of 20 scenarios which were in that original paper RP-65.

But people have asked that extra radio nuclides be added in. They didn't ask for all 800, but things people asked in the regs we thought we'd put all 800 in there and see the reg.

The first draft, 1.0, you referred to earlier did have tables I-1 and I-2 in the same table. There was an extra column, I think column three was the values from I-1 and column four in the first draft was the values from I-2.

And we're asked by RASSC in some of the feedback we got on draft 1.0 to separate the numbers from moderate quantities from the bulk quantities. And so we were asked to put them in two separate tables to avoid any confusion.

And initially we also got some feedback from some member states wanting to abolish the numbers for moderate quantities, just work with the quantities, the numbers for bulk quantities.

But at the present stage, other member states said no, we wish to continue having two sets of numbers for both moderate quantities and bulk quantities in the BSS.

The numbers for the bulk quantities are a smaller set of radio nuclides and at present we've got no plans to increase that number in the modeling. I'm not quite sure whether it's needed or whether the list included in I-2 is sufficient for the purposes of weight that we used. Does that --

MS. ANDERSON: That does shed some light on what -- where that came from and answers some of the question. But a remaining question, because I see after the BSS is published, Schedule 1 may need to be updated through an addendum.

And again, it's going to use a European Basic Safety Standards directive, so who -- where do you -- how do you see that evolving?

Will it, as those -- if it is updated in an addendum, who will be involved in that and will it be something where, you know, it may be that the European Basic Safety Standards directive, you know, is based on that, but will that also be open to review by other member states?

DR. BOAL: No, it will not be reviewed

after it's part of the European union. It will be -- one of the -- comes from the latest ICRP recommendations was that there were new weighting factors, new dose conversion factors which are currently being developed based on the weighting factors in the new ICRP publication organ weighting factors and weighting factors for the different type of radiation.

When ICRP publishes them, I know under the transport committee I came to reevaluate some of these numbers. If they're checked, it does not mean that we will automatically take them up into an addendum.

There would be consultations with RASSC, TRANSSC, WASSC and NUSSC, certainly RASSC and TRANSSC on any evaluation and whether there is a need to change numbers would have to be decided by the committees.

And that would involve also input then from the member states. It would not just be an automatic, the agency will do this, it would have to be an agreement that would have to be shown the output from these calculations and say is this sufficient to make a change or are we happy to keep the numbers, but as it changes would only be very, very small or minor.

I think the numbers in these tables have

been rounded to the nearest factor of 10. So for any -- if there's less than .3 it's rounded down or greater than .3 is rounded up. So there's a rounding going in these documents anyway. So we would not expect them too much, a great change.

MS. BOWEN BERRY: Do you want to comment Don?

DR. COOL: Don Cool. Let me just make the observation. In the United States we legally have to go through the formal notice and comment review process for changes to the numeric numbers.

And so part of what I think Amanda's identifying and I think probably which we in the NRC would also be looking at was to have confidence that there would be a systematic opportunity to review things like some of these numeric values when they came up.

And so we may well identify, put a marker in this in the comments as part of the process issues in addition to potential QA checks on the numeric values that are in here at the moment, to make sure that there are the opportunities to do the same thing as dose coefficients are changed and otherwise so we can all reach agreement.

Because legally here, we will have to go

through that process. And in fact part of the reason in the discussions that the agencies are having, for example what the NRC is looking at in terms of possible update of our regulations, part of our timing is driven by the fact that we need to have those values and be able to publish them and go through public comment and review before putting them in place.

So this ends up being a fairly sensitive process issue for us as well as a QA check to validate the numeric values versus what's in place today. Thank you.

DR. BOAL: And I think the agency also -- we consult through our committees. RS-G-1.7, the numbers which have been brought into the BSS, that took a long time to develop and again it went to member states for comment.

I'm not sure where the -- what process we'd have to follow for an addendum, but again it might be -- an addendum needs member state consultation, it possibly will, this is something I'd have to follow up on.

But again, that document -- those new numbers either went to the Board of Governors, even though a safety guide is normally not reviewed by the

Board of Governors, so that was seen through the Board of Governors and who advised that they should be taken into account in the next revision of the BSS because it was considered such an important.

But I'm not quite -- we have to clarify that process in the future, but it would involve member state consultation.

MS. BOWEN BERRY: Okay. Do we have any additional questions or comments from the audience? We'll go back to the phone line, do we have any --

OPERATOR: To ask a question on the phone, press star one. At this time there are no questions.

MS. FOLKERS: Okay. This is Cindy Folkers again from Beyond Nuclear. Len Ehrle had referenced the KKiKK study, which was a study done in Germany of childhood leukemias, five kilometers from operating nuclear reactors.

The data was from 1980 to 2003 I believe. I think that it would be an interesting comparison to look at the data in that study versus what the ICRP recommendations were and the IAEA recommendations were for an effective dose in milisieverts to the public at the time.

Because apparently something, and the dose levels may have been changed in 1990, I'm not sure

I'll have to look at that. But, at some point the standards were obviously not protective enough for children in Germany at that time and so it would be an interesting thing to follow that up.

But I have something more pointed to say on the Schedule 1 issue. As far as our organization is concerned, we don't think that any of these materials should be exempted out of hand because for childhood leukemia, and I want to get this language correct, ionizing radiation is the only established environmental risk factor for childhood leukemia. That's number one.

We know, and part of the reason I'm so interested in the tritium issues is that the low energy beta that comes from tritium is more damaging than X or gamma rays and it causes not only DNA double strand breaks, but complex DNA double strand breaks.

And that's the low energy beta so you're talking about from 5.7 keV, I believe it is, to 18.3, if memory serves that that could be wrong. But it's 5 to 18 approximately.

Further, studies are also showing that incorporated radio nuclides, and radio nuclides taken into a system are four to five times more damaging in utero than exposure from external radiation such as

your x-rays for medical procedures.

So we're dealing here with something that's quite complex with something that can affect children who are developing or either in the womb or outside just, you know, just born from ages.

The KKiKK study was ages I believe five and under that showed a greater than two times leukemia increase five kilometers from the reactors.

And, you know, we're also looking at not just individual dose, which is important in some respects, but population dose as well.

Because a lot of the work that I've looked at for genetics, question is not only just individual changes and mutations, but population wide mutations which can actually be over time much more damaging than anything that registers on the individual level.

So it is for these reasons and sort of we're not absolutely sure what we're exposing ourselves to so to speak, that we really need to take a very precautious approach when dealing with these materials.

And I don't think that any of them should be exempted because 10, 20, 30 years down the road I'm not sure we're not going to have some horrible surprises.

MS. BOWEN BERRY: Okay. Thank you, Cindy. Don, would you like to comment?

DR. COOL: Yes. I want to go back briefly to the first of your two points and I'm going to look at Mike Boyd to make sure, because I'm actually going to speak for EPA at the moment, or at least tee-up the item for you.

Because in fact in the United States, EPA has been looking at a reexamination of their radiation risk perimeters and estimation and have gone through a process, which in fact amongst other things, has been specifically looking at the risk of some of the low energy x-ray and beta and a possible change to that RBE.

So, separate from the consideration of the IAEA, just to note in the record here that there is in fact in the U.S. an ongoing examination of that exact issue. So I appreciate you just noting that, thank you. Mike, did I get it right?

MR. BOYD: Thank you. Yes, we had asked our Science Advisory Board about the RBE issue for low energy photons and beta emitters. And they have advised us to do a peer review examination and, you know, once the peer review process is complete then we would move forward with whatever changes to the RBE

were warranted then.

But that's an ongoing process and I don't want to presuppose what the peer review process is going to conclude, but certainly the data is out there that shows that -- I think it's been known for a long time that the low energy photons and beta emitters might have a higher than unitary RBE. So, thanks.

MS. BOWEN BERRY: Thank you. Anymore comments? All right. Then our panel is going to do a final wrap-up.

DR. COOL: I think now what we should do is go back to any other general issues, because I know we had at least one individual on the phones who said they had a final point that they wished to raise.

And I think now it's probably appropriate, because I think we've gone through the basic text and see if there's any final questions or cross-cutting issues that we haven't already managed to touch upon.

MS. BOWEN BERRY: Are there any final questions from the audience and do we have any general comments? All right. Then we're going to go to the phone line. Operator are there any individuals on the line who want to make general comments?

OPERATOR: Yes. Len Ehrle, go ahead.

MR. EHRLE: I wish to express my

appreciation to the NRC for establishing this forum. I think it's been instructive, it has given us an opportunity to present issues that I think years before have not been addressed adequately and I certainly appreciate this opportunity.

For those in the audience who may have a copy of this draft, and I don't know, Mr. Cameron, did the people get copies of my draft?

MS. BOWEN BERRY: Yes, they did Mr. Ehrle.

MR. EHRLE: Okay. In that regard, I just point out in my haste to finish the draft yesterday and on short notice, I had neglected to put my contact information in there. I would appreciate any critical commentaries and critique of what -- of my remarks and anything that was printed in the document.

I always look for issues that I can engage in and improve on my own particular evidence that I have. And if there are those then my e-mail is my last name, E-H-R-L-E bird after it because you might say Ehrle. So it's EhrleBird@organicconsumers, all one word, dot org.

So I would close with one issue that I came upon in my readings that I leave you with. In March 1988 the government of Belorussia decided to release information on radiation contamination against

the wishes of the central Soviet government.

This immediately causes a problem. The government of Belorussia establishes in fact that in the radiation doses of 250 milisieverts or more during the coming years, if these persons do not move, it is following this that the Soviet Minister of Health decides to raise the maximum permissible dose of radiation from 250 to 350 milisieverts.

This is the typical of government response when they find out that these emissions are well beyond any so-called acceptable level. And of course, there are no acceptable levels.

In fact, I would call your attention to PNAS in 2003, November issue in which a team of 15 cancer expects throughout the world came up with a conclusion that, and I'll read it to you, good epidemiological evidence for increased cancer risk at a 10 to 50 milisievert acute dose and 50 to 100 milisievert protracted exposure.

Many people were surprised by that because they've always said these low doses don't have any effect. And indeed, this document, which really hasn't been given much plan either in the media or in medical journals in terms of the ones I've been reading and looking for references.

So these kinds of issues demand attention because they do go to the very heart of the public health and safety.

So again, I wish to express my appreciation to the NRC for establishing this forum and would look forward to any further contacts from any person where I might be able to sharpen my focus.

And I always appreciate critical commentaries on the statements that I make. I set that up with my students in high school and appreciate any comments that causes me to rethink the conclusions that I've drawn. With that, I bid you adieu.

MS. BOWEN BERRY: Thank you, Mr. Ehrle, we appreciate your participation. Does the panel want to make any comments?

DR. COOL: On behalf of the Interagency Steering Committee on Radiation Standards, a number of folks here in the room, we do appreciate everyone really taking the opportunity to spend a day with us here, endure a bit of cold temperatures this morning and provide us a number of very useful things to think about as we work to assemble some comments, some areas that need to looked at a little bit further.

Some places where I do think there may well be a scope to try and prepare some comments that

would go back to the IAEA as part of the ongoing process as we develop our comments.

We appreciate everyone's participation. As I said earlier, if, as you go home or as you sit at home and log off and then you get this, oh I wish I had done this or that, we would certainly accept some of those bits of information.

If you send it to us, we will make sure that it is distributed around to the various agency representatives so that it can all be included in our ongoing consideration development of the U.S. Government's set of comments.

I'll briefly look to my Federal Guidance Subcommittee Co-chair, Mr. Boyd, to see if he has any closing remarks, he might wish to make. Mike is saying no. Rob?

MR. LEWIS: I'll comment in closing on behalf of the NRC and personally. I just want to thank everyone for participating today. I know it's a significant investment of your time and that's a very valuable commodity to us.

I think as many times as Don and I have gone through this document and earlier versions of it, I think it's fair to say that both of us heard things today that we hadn't thought about before.

So that's a good thing. And these open forums are our best tool we have to turn the best product over to IAEA so they can resolve comments.

And even though there were some disagreements today, I think it was pretty clear to me that everyone -- well, first of all, thank you everyone for your professionalism, but even though there was disagreements, I think it's very clear to everyone in this room and on the phone had a common goal of ensuring that people are safe from radiation and the environment is safe from radiation.

So, in that, hopefully we find some common ground in moving forward. And we will, as Don mentioned earlier and Trevor as well, all of the comment resolution IAEA has promised will be done public through their website.

So the same website that was in our Federal Register notice as they move forward will be updated with the updates and the comment resolutions that the IAEA gets on this document. So thank you.

MS. BOWEN BERRY: Trevor, did you have anything to add?

DR. BOAL: I would just to thank you for the opportunity to be here and to engage in this meeting, get comments for than just from our member

states.

We look forward to getting comments from the U.S.A. as part of the member state process and as Rob has said, we try to be as transparent as possible.

All the resolution tables from the comments received during the -- when the draft leaves the committees are on the website now and after we deal with member state comments again, the how each comment was dealt with will be placed on the website and whether the text was changed.

And so as each draft, the revised draft goes to the committees there on the committee websites and when it goes to the CSS it will go to the committee website, so each draft as developed is placed on our websites for our committee members.

But they're open to the -- they're not just closed to committee members, they're open to all the community. So thank you for inviting me here.

MS. BOWEN BERRY: Okay. With that, I think we can adjourn the meeting. Make sure that you signed in and thank you all for participating today. And thank you to the panel.

(Whereupon, the foregoing matter went off the record at 3:25 p.m.)