UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

February 8, 2012

MEMORANDUM TO: ACRS Members

FROM: Christopher L. Brown, Senior Staff Engineer /RA/
Technical Support Branch
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON RADIATION PROTECTION & NUCLEAR MATERIALS REGULATORY GUIDE 7.7 ON JANUARY 18, 2012, IN ROCKVILLE, MARYLAND

The minutes for the subject meeting were certified on February 8, 2012. Along with the transcripts and presentation materials, this is the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc w/o Attachment: E. Hackett
C. Santos

cc w/ Attachment: ACRS Members

UNITED STATES
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MEMORANDUM TO: Christopher Brown, Senior Staff Engineer
Technical Support Branch
Advisory Committee on Reactor Safeguards

FROM: Michael Ryan, Chairman
Radiation Protection & Nuclear Materials Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE SUBCOMMITTEE ON RADIATION PROTECTION & NUCLEAR MATERIALS ON REGULATORY GUIDE 7.7 ON JANUARY 18 2012, IN ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on January 18, 2012, are an accurate record of the proceedings for that meeting.

RA **02/ 08 /12**
Michael Ryan, Chairman Date
Subcommittee on Radiation Protection & Nuclear Materials

Certified By: Michael Ryan Issued on : February 8, 2012
Certified on: February 08, 2012

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE MEETING OF THE SUBCOMMITTEE RADIATION PROTECTION & NUCLEAR MATERIALS
REGULATORY GUIDE 7.7
ON JANUARY 18, 2012, IN ROCKVILLE, MD

INTRODUCTION

On January 18, 2012, the ACRS Subcommittee on Radiation Protection & Nuclear Materials held a meeting in Room T-2B1, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was for the staff to brief the Subcommittee on staff's development of draft final revision 1 of regulatory guide (RG) 7.7 "Administrative Guide for Verifying Compliance with Packaging Requirements for Shipping and Receiving of Radioactive Material." The RG provides guidance for approval of applications for packages used to transport radioactive material (other than irradiated nuclear fuel) under 10 CFR Part 71. Mr. Christopher Brown was the designated federal official for this meeting. The subcommittee received no request from the public to make oral statements. The entire meeting was open to the public. The subcommittee chairman convened the meeting at 1:30 pm and adjourned at 3:04pm.

ATTENDEES:

ACRS Members

M. Ryan, Subcommittee Chairman
H. Ray, Member-at-Large
J. S. Armijo, Member
S. Schultz, Member
D. Bley, Member
J. Sieber, Member
G. Skillman, Member

ACRS Staff

C. L. Brown, Designated Federal Official

NRC Staff

Bernie White
Mike Waters
Earl Easton
Sara Depaula
Eli Goldfeiz
Kim Hardin
Kim Rodriguez
M. Sampson
M. Gordon

SUMMARY OF THE MEETING

Major Issues discussed during the meeting are described in the following Table.

Table 1. Major Issues Discussed During the Meeting

Major Issues Discussed	
Issue	Reference Pages in Transcript
1. Discussion of why the NRC reviews DOT's transport packages. A discussion of the MOU between NRC and DOT for package revalidations was discussed.	11-14, 31
2. Member Skillman asked about the use of industry codes that are accepted by the NRC staff to evaluate the mechanical design of transportation packages.	27-29
3. Members Skillman asked for the staff to cite the regulation that discusses the prevention of harm or compromise beyond the package design requirements. Motion in transport and ensuring that the package has not been degraded during transport were discussed.	42-57, 73
4. Members asked why NUREG/CR-3019 (welding criteria) and NUREG1609 (standard review plan) were not referenced. Member Shultz suggested that it might be useful for the staff to incorporate and appendix that lists a number of resources used by the NRC staff and stakeholders during the evalaution.	74, 77-78

Table 2. Action Items

Action Item	Reference Pages in Transcript
The staff agreed to report to the ACRS DFO on how they addressed issues 3 and 4 listed above.	

BACKGROUND MATERIALS PROVIDED TO THE SUBCOMMITTEE

1. Draft Final Revision 1 of Regulatory Guide (RG) 7.7 "Administrative Guide for Verifying Compliance with Packaging Requirements for Shipping and Receiving of Radioactive Material."

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NOTE:
Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, downloading or view on the Internet at http://www.nrc.gov/reading-rm/doc-collections/acrs/ or it can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (voice), (202) 387-7330 (fax), nrgross@nealgross.com (e-mail).

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Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Radiation Protection and Nuclear Materials

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Wednesday, January 18, 2012

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UNITED STATES NUCLEAR REGULATORY COMMISSION'S ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, as reported herein, is a record of the discussions recorded at the meeting.

This transcript has not been reviewed, corrected, and edited, and it may contain inaccuracies.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

RADIATION PROTECTION & NUCLEAR

MATERIALS SUBCOMMITTEE

+ + + + +

WEDNESDAY, JANUARY 18, 2012

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 1:30 p.m., Michael T. Ryan, Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL T. RYAN, Chairman

J. SAM ARMIJO, Member

DENNIS C. BLEY, Member

HAROLD B. RAY, Member

STEPHEN P. SCHULTZ, Member

JOHN D. SIEBER, Member

GORDON R. SKILLMAN, Member

NRC STAFF PRESENT:

CHRISTOPHER BROWN, Designated Federal Official

CHRIS ALLEN, NMSS/SFST

SARA DePAULA, NMSS/SFST

EARL EASTON, NMSS/SFST

ELI GOLDFEIZ, NMSS/SFST

MATTHEW GORDON, NMSS/SFST

KIM HARDIN, NMSS/SFST

KIMBERLY G. RODRIGUEZ, NMSS/SFST

MICHELE SAMPSON, NMSS/SFST

MIKE WATERS, NMSS/SFST

DOUG WEAVER, NMSS/SFST

BERNARD WHITE, NMSS/SFST

C-O-N-T-E-N-T-S

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Staff Opening Remarks - Michael Waters	5
Bernie White	9

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

1:30 p.m.

CHAIR RYAN: The Subcommittee will now come to order please. Now this is a meeting of the Advisory Subcommittee on Radiation Protection and Nuclear Materials.

I'm Mike Ryan. I'm Chairman of the Subcommittee. The Subcommittee Members in attendance are Sam Armijo, who will be joining us shortly, Harold Ray, Dennis Bley, John Stetkar is not yet here, Dick Skillman, Stephen Schultz, our newest member and welcome again formally on the record, Stephen.

MEMBER SCHULTZ: Thank you.

CHAIR RYAN: You're welcome, and Jack Sieber are here in attendance.

The purpose of this Subcommittee meeting is to receive an information briefing on staff development of Draft Final Revision 1 of Regulatory Guide 7.7 entitled Administrative Guide of Verifying Compliance with Packaging Requirements for Shipping and Receiving of Radioactive Material.

The Subcommittee will hear presentations by and all discussions with representatives of the NMSS staff. The Subcommittee will gather information, analyze relevant issues and facts, and

formally propose positions and actions as appropriate for deliberation by the full committee.

Christopher Brown is the designated Federal official for this meeting. The rules for participation in today's meeting have been announced as part of the notice of this meeting published in the Federal Register on December 23rd, 2011.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register notice.

It is requested that speakers first identify themselves and speak with sufficient clarity and volume so that they may be readily heard.

We ask at this time that you silence your cell phones and other electronic devices into the vibrate or no-noise mode.

No one from the public has requested time to make any oral or written statements to the Subcommittee. We will now proceed with the meeting, and I call upon Mike Waters from the NMSS staff to begin. Mike.

MR. WATERS: Good afternoon, Dr. Ryan, and members of the Subcommittee. I'm Mike Waters. I'm Chief of the Licensing Branch of the Division of Spent Fuel Storage and Transportation, NMSS, and on behalf

of NMSS management we appreciate the opportunity to be here to discuss our draft Registration Guide 7.7 and receive any feedback from the members.

I don't think we've engaged ACRS recently in any transportation guidance or regulations matters, so opening remarks, I just wanted to provide a very quick review of our regulatory responsibility and then turn it over to Bernie with regard to Reg Guide 7.7 who's done all the work on this guidance document.

In short, NRC shared responsibility with the Department of Transportation in regulating the safety of transportation of radioactive materials.

Physically NRC certifies and inspects Type B packages for the larger source materials as well as Type A-F packages which are fissile material packages.

Right now we have approximately over 90 certificates issued to different certificate holders and approximately 400 registered users in the U.S. for these packages.

To give you an idea of the diversity of the activities in package technologies, we approve and inspect packages for - you have six fresh fuel and spent fuel which supports the entire nuclear fuel cycle.

We also approve packages for shipment of

medical isotopes and powerful radiography sources, use in the construction industry as well as variety of radioactive waste packages for various types of radioactive waste forms from the users in the United States of radioactive material.

These packages not only support the private sector but also supports missions of other Government institutions. For example, the packages are used to dispose of legacy wastes - legacy waste from the Department of Energy as well as disposition of older Naval nuclear reactor missiles in return high enriched foreign fuel from foreign countries to the United States.

Finally I'd like to note that NRC and DOT collaborate closely with our counterparts in foreign countries who regulate transportation to countries' radioactive materials as an international commerce, and we strive to accept practical, to maintain consistent standards and practices in regulating the transportation of radioactive materials.

With that said, with this large diversity of technologies and uses, it's all regulated under 10 CFR, Part 71, from the NRC standpoint as well as regulatory guides. Reg 7.7 is one important component of the Reg Guide series, and to conclude, we're happy

to be here to discuss this. I'll turn it over to Bernie if there are no further questions to begin the presentation.

CHAIR RYAN: Mike, just one quick question for again introductory clarification. You deal with the packages' requirements for shipping and receiving not for disposal or are there some multiple use containers that you deal with that are for disposal as well?

MR. WATERS: Well right now we don't have - we are not certified - the multi-purpose canister known that DOE has had. We do certified canisters for spent fuel for both storage in a Part 72 and transportation of Part 71, so there's an active business we're in. It was one class of transportation packages.

As you may know, DOE is attempting to pass and get the Department of Energy to design a canister that could be used for all three for storage, transportation as well as for final disposal in a geological repository.

CHAIR RYAN: But that's all within the wheelhouse of your organization, correct?

MR. WATERS: The consideration of a disposal canister would be in conjunction with our

sister division, SFAS, as it performed under Part 63, under repository requirements, is we had Yucca Mountain for whatever future repository we have.

Right now I do not believe DOE is really actively engaged in that phase. I think they're back to exploratory work as well as exploring of the disposal options in general.

CHAIR RYAN: Thanks. That's helpful to give some of the newer members some of the breadth of the things you touch in our organization. Thank you.

MR. WATERS: Thank you.

CHAIR RYAN: Bernie.

MR. WHITE: Good afternoon. I'm Bernie White. I'm a Senior Project Manager in Division of Spent Fuel Storage and Transportation at NMSS. I've done a little bit of everything at NMSS as a Technical Reviewer for 15 and then spent five years as a Technical Assistant to our Division Director before becoming a Senior Project Manager back in August.

I've got a little bit depth of everything there.

The first slide is just some abbreviations. I tried to shorten some of the slides so I didn't spell everything out. I think most of these will be familiar to you all, so I don't plan on

going over them. If you have any questions at any time, feel free to interrupt me and ask me. I have no - I'm more than willing.

The overall presentation outline, I thought you'd give you a quick background on Part 71. Thanks to Mike, I think I can eliminate maybe - Mike Waters, I can eliminate maybe one slide, so maybe he saved me about three minutes' worth of talking.

They give you a background of Reg Guide 77, what it was prior to its current draft revision. Talk about the update to the Reg Guide, how it fits in with other documents that we have or in the future will have had, and you'll see what I mean by that when I to there.

A little more in-depth discussion then about the Reg Guide, admittedly it says Administrative Requirements. You'll notice that some of the things in there are not administrative requirements, but in certain areas, for example, like our preliminary determinations, things you do when you first fabricate a package.

Marking the package is a administrative requirement, but it's also one of three things they have to do including some testing, so I didn't want to pick and choose between what I gathered, so it's

little more than just administrative, but it does add guidance out to the licensees where there is no guidance at this point - guidance to the licensees, there is no guidance at this point.

I have quite a few public comments I included. I honestly didn't know what to expect or what you guys were looking for in public comments. We can spend as little or as much time with them as you would like.

Then I've got two slides which has some of the upcoming interactions we may have with you this year. I use the word may because we're looking at tentative dates late calendar year '12. Any delays in it would be pushed over to next year, so I've got a couple of slides on that.

As Mike said, we co-regulate transportation with Department of Transportation. Here's the differentiation. Mike talked a little bit about what they do, what we do. DOT regulates carriers, import/export of radioactive material and packages for small quantities of radioactive material, what we call Type A quantities. I'll get to what a difference in Type A and Type B quantity on either the next slide or the next, next slide.

We regulate Type B packages, the larger

quantities and Type A fissile packages. While DOT does regulate import/export, they send a lot of their packages over to us for technical review, so we would review the - do the technical review on we call them revalidations, packages that have a Certificate of Competent Authority in a different country and they want to either transport to the U.S., from the U.S., or transit within the U.S., so they want a Certificate of Competent Authority from DOT.

We would do the technical review and then make a recommendation to the Department of Transportation on whether to revalidate it or not.

As Mike said, we're the lead agency for the inspection of NRC certificate holders or actually holders of Certificates of Compliance for fabricators, licensees, shippers, carriers, etcetera.

MEMBER BLEY: So that division of responsibility is set up through some Memo of Understanding?

MR. WHITE: Yes, there's a Memo of Understanding I think dated maybe 1974 which delineates this. You know, very little has changed in the transportation regulations big picture since then. We changed a lot of the minutia of the regulations, maybe the drop test heights and, you know, things like

that. We've added some tests, but as far as the big picture regulations, very little has changed since then.

MEMBER BLEY: Okay. Thanks.

MEMBER SIEBER: Are there any state laws that are more restrictive than Federal laws or DOT or NRC?

MR. WHITE: I don't know that answer. I'm going to turn Earl Easton who's our expert on staff.

MR. EASTON: Hi, Earl Easton. I'm with the same division Bernie is. States and localities can impose additional requirements, but the requirements can't conflict with Federal requirements or there's a preemption procedure that DOT, someone can apply to DOT, and they can get the state and locals revalidated, so they're allowed to do additional things like for example, time of transit and that sort of thing, but they can't be in contradiction to DOT requirements.

CHAIR RYAN: Earl, correct me if I'm wrong, but my experience is the bulk of them are in that category, Dennis, of when and where a package can travel as opposed to what the actual package or its transport unit may look like.

MR. EASTON: Right, the states also have

a role in routing. DOT has routing criteria to pick preferred routes for high quantities, route control quantities, and the states have a role where they can go in and actually designate through a process in the regulations what routes.

Now DOT does look at the different states and makes sure the routes line up, otherwise that would be contradictory to the whole scheme.

MEMBER SIEBER: But they do not get involved in certification of packaging or external radiation, you know, external to the package itself but still part of the vehicle?

MR. EASTON: There are certain things that are sacrosanct to the Federal partners. Packaging is one. The general markings and placardings and labelings of packaging and the radiation level from packaging and contamination level. Those are all Federal standards which the states really can't go in and put something more strict on.

MEMBER SIEBER: I know that there are quite a few truck drivers who carry their own meters and do their own measurements after the vehicle is loaded to make sure that they comply. Okay. Thank you.

MR. WHITE: As I mentioned, I'll talk a

little bit about what a Type A and Type B quantity is. If you look in the back of Part 71 there's Table A-1, and this is just a very small snippet, but for each new client there is a Type A-1 and Type A-2 quantity.

Type A-1 quantity is the amount of material that's authorized up to that value for a Type A package. For example, Cobalt 60 for special form material, the Type A quantity is .4 terabecquerels or 11 curies.

If it's greater than 11 curies, it will be in a Type B package. We call that a Type B quantity. For normal form - for Cobalt it's the same. If you look down to Stronium-90 - I'm sorry, not Stronium-90, Cesium-137, the special form quantity is 2 terabecquerels whereas the normal form quantity is .6 terabecquerels, so those are two values depending upon what form of the material is.

Let me get - special form material is material that meets requirements that are in Part 71. There are certain tests that the material has to undergo by itself, drop test, fire test and I can't recall all the different tests, but maybe puncture test. It has to have something dropped on it. It has to meet these tests by itself without - leaching tests.

If it's not special form, by rule, it's normal form, so either it has a designation or it doesn't.

Background of these packets, we approve package designs. Safety is in the package design because of the way it's designed and the different tests and the criteria it has to meet after the different tests.

Part 71 contains package approval standards, so there are a lot of regulations that are - that used to be a lot of regulations were not performance-based. You had to do A, B, C, D, E. Part 71 is a performance-based regulation, so they designed the package and then showed that the performance of the package meets the regulations.

Because of the way packages are designed and the safety is in the package and how the package is used, there's a general license criteria. There's general licensing Part 71 that any licensee of the Commission can use a package if it does A, B, C, D, E, and those things are listed in Part 71.

For example, they have to have a QA program that meets the requirements of Part 71. They have to have package drawings. They have to have operating procedures and a few other things along

those lines.

CHAIR RYAN: I guess that kind of - the operating procedure is really they become an authorized user for a particular transportation package.

MR. WHITE: Right. That's another - yes, you have to write in and ask to be a registered user as we call it, so we know who's making shipment or who has the ability to make shipments.

CHAIR RYAN: Just a clarification for some of the other members, if you have an internal part of the cask. In other words, there's a special basket that contains the "waste package". The baskets and some of those kinds of things can be part of the cask itself rather than the waste package.

MR. WHITE: Yes.

CHAIR RYAN: The waste package is the thing that a licensee turns over to the shipper. I guess I'm trying to make the point there's a very clear line between a waste package and what might be holding the waste package in place in a transport unit.

MR. WHITE: Right. We would consider what's holding the waste to be - like for example, there's an inner container that the waste is in and

that's pulled out of the package and disposed of. We would call that part of the contents.

CHAIR RYAN: Right.

MR. WHITE: And then there's the packaging which is what contains the contents.

CHAIR RYAN: Got you, well said.

MR. WHITE: And they would find terms in Part 71.

MEMBER BLEY: I'm just curious. Since you approved these in kind of a generic way, is there some way that you've assured that there are no transportation routes which are not part of what you regulate that could introduce something more severe than you test for?

MR. WHITE: We - the tests that - and I had a feeling we were going to get into this, so I brought some back-up slides which have some of the different -

MEMBER BLEY: I was just out by Taos, and I want to cross the second bridge over with a U.S. highway, and I said, well, it's a lot higher than most things I've ever seen.

MR. WHITE: It's pretty impressive isn't it?

MEMBER BLEY: Yes, it is. I didn't know

there was a Grand Canyon on the Rio Grande.

MR. WHITE: The way Part 71 is set up and the fact that it's performance-based, there are - let me make sure I can save a copy for myself. There are tests that the applicant has to do before we give him the certificate.

There's tests for normal conditions of transport which is what we consider the sorts of things the package would see when it's normal - in normal route.

If you turn back to Slide 4 of the back-up slides I just handed out. These are the different tests for normal conditions of transport.

For example, they have to evaluate the package sitting out in the hot sun. They have to evaluate if it's going through North Dakota in the wintertime; reduced internal/external pressure, increased external pressure; vibration as it sits in the back of the truck going down the road; water spray. If they're picking up the thing to put it on a truck and they drop it, those normal-type things that are into the transportation.

The sort of things you're talking about accidents. You slip to the next slide, that gives the different hypothetical accident conditions tests, and

I didn't write out all tests, all the different criteria.

Like, for example, I had to do a free drop test. That's a 30-foot drop onto an unyielding surface, and correct me if I'm wrong, Earl, but these were designed to bound 99 percent of all - or 99.9 percent of all events that a package would see.

The reason for that is the energy that goes from the drop into the package because it's an unyielding surface, all the energy of the drop goes into a package.

If a package falls off a bridge, a ten-foot bridge, a 20-foot bridge, a 40-foot bridge, it's going to fall on a road surface which is not considered an unyielding surface. You have deformation of the surface it falls onto.

So those are the ways we try and get around - and I don't use the words get around, but we try to assure that a package in an accident, in a realistic accident, would not see forces more severe than in the hypothetical accident conditions.

Let me just run through the tests real quick. The crush test is only applicable for packages who float. They have a density of less than one gram per cubic centimeter.

Puncture test is a 40-foot drop onto a puncture pin. It's a six-inch diameter pin. It has to be - and all these have to be in the most damaging orientation.

Thermal test is a 30-minute test in a 1475 degree fire. It burns when the fire is put out. It needs to continue burning. You can't put it out, and then there's an immersion test for fissile packages and an immersion test for all packages.

The immersion test for fissile packages is 50 meters, 100 meters? Fifty meters for fissile material packages, and then I think it's a three-foot - is it one meter for all packages?

MR. EASTON: Fifteen.

MR. WHITE: Fifteen feet. I'm going by memory here, and my memory is not that good. I'm sorry. Immersion-type tests, Earl.

MR. EASTON: Well there's several different immersion tests depending on the packaging. Spent fuel has a deep immersion test which is 200 meters so that if you were shipping spent fuel over the Continental Shelf and wanted to recover it, the assumption is if it's not on the Continental Shelf you may not want to recover it, and then there's lesser tests, 15 feet for fissile material and there's a

number of immersion tests in the regulation depending on what type of package, what type of contents.

MEMBER SIEBER: Now my question has more to do with the construction of the package, but if you're shipping spent resins, you put it in an inner container, a high integrity container which has a shield on top of it. The package is the inner container and the shield, right?

MR. WHITE: The package is the packaging which is what the inner container goes in as well as the contents.

MEMBER SIEBER: Right, but not the shield?

MR. WHITE: If it's part of the contents, it's part of the package.

MEMBER SIEBER: Well when you ship it, the shield goes with it. When you get to the disposal site, the inner part comes out.

MR. WHITE: Right. That would be part of the contents, and the packaging is what it goes in. The package is both the contents and the packaging.

MEMBER SIEBER: Okay, so the drop test, for example, would include the shield.

MR. WHITE: Yes.

MEMBER SIEBER: And that's where the strength is. It's in the shield as opposed to the

package.

MR. WHITE: Well typically for packages like that they would have what's called impact limiters on the end, something that like different types of woods, aluminum honeycomb, and the idea there is that they would take the forces in the drop, so you have less G - less forces going into the package itself to deform it.

MEMBER SIEBER: Penetration resistance is in the shield.

MR. WHITE: Exactly, yes, it's in the package. Whatever the pin would see on the outside and what's into it through the contents, yes.

MEMBER SIEBER: Thank you.

MR. WHITE: Did that answer your question too? Okay. And the final note is that general licensees have to use the package in the manner in which it was approved, and that might seem like a minor point, but you don't know how many people come in and they say well we want to put this material in the package and they test it with that material, and then they come in for an amendment and they want to use a material that has less strength and then so then we have to ask them well how do you know how this would withstand the different accident conditions and

the different tests that it has to undergo.

MEMBER SIEBER: What can you do in the situation - you can tell me whether it's legal or not - where you have a high integrity container that has resins in it that you need to get rid of some hot thing that you put down in the middle of the package. You use the shielding from the resin plus the outer shield?

MR. WHITE: If the package is approved in that manner, that would be fine.

MEMBER SIEBER: Like it has to be specifically in the package certification.

MR. WHITE: Yes, it does. The package certification includes the contents of the package, the draw - the package drawings, so those are the two areas in which we would make sure that that was covered.

MEMBER SIEBER: So for somebody to do that when it's not in the certification, that would be a violation.

MR. WHITE: If they shipped it -

MEMBER SIEBER: Even though you meet all the external requirements.

MR. WHITE: If they shipped it and it was not in part of the contents, yes. Now you can come in

for amendments once the package is approved and people do it all the time to add different contents, different this, different that, but they have to make sure that whatever they add or whatever they change in the packaging it still meets Part 71.

MEMBER SIEBER: Okay. Thank you.

MR. WHITE: There are three basic safety functions for a package: shielding, containment, subcriticality. That might seem odd especially those of you who may be structural engineers because structural engineering is a big part of the package, but the structural engineering goes to ensure that when they do the shielding analysis or do the containment analysis or the criticality analysis that it meets those provisions within Part 71, so the structural analyst would look at the drop test, for example, look at the forces on different areas.

If there is a bolted lid closure, they would look at the forces in that area to make sure that the bolts don't break, that you don't have the lid separation, when you do a leak test or a containment analysis that it remains intact as it should.

We look for margins for the tests after - we look for safety margins relating to these three

after the test - hypothetical accident conditions and normal conditions of transport.

Now each different areas have their own set of margins. For example, in shielding, there's limits for dose rates that you have to meet during normal and accident condition transport.

Containment, there are limits within part 71 for leakage and then the package has to remain subcritical, and there is a number of ways we look at the subcriticality, flooded, etcetera, depending upon whether there's normal or accident.

CHAIR RYAN: But in terms of shielding, if there's a waste package that is somewhat smaller than the interior diameter of the cask you typically take credit for spaces that keep the package at some set distance from -

MR. WHITE: If they were going to put dunnage in there to keep it at that, yes, and some packages do. Not all of them do it.

In general, most of them that there are large gaps they do put dunnage in there to take up the space to make sure that the package stays - or the contents stays within a certain spacing within the -

CHAIR RYAN: Yes, consistent with the safety analysis of the shield.

MR. WHITE: Right, exactly, yes.

CHAIR RYAN: All right.

MEMBER SKILLMAN: Question please.

MR. WHITE: Sure.

MEMBER SKILLMAN: What are the requirements for the codes that are acceptable to the NRC for the mechanical design?

MR. WHITE: We don't specify that codes in Part 71 that an applicant has to meet. As a general rule, there are a number of codes and standards they do specify.

For example, spent fuel packages are made the ASME code. A lot of welding is done to the - it's AWS. We have packages that are made. They use ASTM standards for materials, but we don't have a set listing of codes that they are required to use. They provide us with the codes and standards they intend to use, and then we look at whether or not they're acceptable for the design, and I'm hesitating a little bit because the packages that we evaluate are so dissimilar.

Some of them are the size of a woman's purse and some of them are large spent fuel rail packages, and so Part 71 applies to both. That would be all the different codes of standard - or all the

different types of packages.

MEMBER SKILLMAN: Let me ask the question in the other form. Are there codes that NMSS will not accept?

MR. WHITE: I honestly do not know that answer. I'm looking out to see who we have in the audience. I don't believe - looking out. We have a couple of materials . I don't think we have any structural people out there.

MR. WATERS: This is Mike Waters. I think the majority of the code sets the standards we do accept, and some of those are actually defined and they have a Reg Guide series we have in Series 7 what codes we accept.

I think - as Bernie hesitates, I think there may be portions of a code -- codes we say was that really designed for transportation. We have some reg in the ANSI codes that were more specific for nuclear applications and we have some ASTM and ASME pressure vessel codes that may not necessarily had transportation in mind but just say the principles apply and accept the majority of that, so I think to some degree in review standards which are defined in the Reg Guides as well as the staff's guidance review we'll list the parts of the code that we take

exception to when we need an alternative solution. Did that summarize that, Matt?

MR. GORDON: I think so.

MR. BROWN: Hey, Matt, can you come to the mic and give your name.

MR. GORDON: I think technically speaking the staff accepts foreign codes under certain circumstances, but because we're not as familiar with those codes, they receive so much scrutiny that applicants simply do not employ them, so if I answered your question de facto, we do not accept foreign codes, but we will consider them. My name is Matthew Gordon.

MEMBER SKILLMAN: Thank you.

MR. WHITE: And we also do quality assurance inspections of the fabricators and certificate holders to make sure that they are using the QA program appropriately in the design, fabrication, and use of the packages.

CHAIR RYAN: Bernie, just on the inspection side of that point you're making, does your group do the inspections or do you have other folks that you rely on for inspections.

MR. WHITE: The answer is yes. Usually the quality assurance inspections out of headquarters,

the regions do most of the actual use inspections.

CHAIR RYAN: Okay, so it's a regional and headquarters combined effort.

MR. WHITE: Right.

CHAIR RYAN: All right. Thank you.

MR. WHITE: Just some pictures of a couple of the different tests for hypothetical accident conditions. On the left is the 30-foot drop test. On the right is a puncture test, and on the bottom is just a picture of a fire test to give you a sense for what these look like.

CHAIR RYAN: There's a guy under that 30-foot drop test in that picture.

MR. WHITE: I think that was long before that. I think he left before they dropped it.

CHAIR RYAN: Let's hope.

MR. WHITE: I can tell you it wasn't me. A little bit of background to Reg Guide 77, DOT regulations for radioactive material do not apply to all NRC licensees. There are a handful of Federal agencies that do not have to meet DOT regulations.

Back before DOT used to regulate intrastate commerce, there was a large number of licensees that DOT regulations did not apply to.

In Part 71, 71.5(b), we imposed DOT

regulations on those licensees, so we say even though you're not subject to them, you have to do the actions as if you were subject to them.

MEMBER BLEY: I'm just curious how that works then. Does DOT ensure that they're meeting the regulations or do you somehow?

MR. WHITE: I believe it would be us.

MEMBER BLEY: It would be you.

MR. WHITE: Because they're following the NRC regulation which is imposed upon them not the DOT regulations, but they have to do the actions, for example, placarding, marking, things like that.

Back before, like I said, before DOT regulated intrastate commerce, this was a very large - this is a large number of licensees. Now it's a very small handful.

The draft Reg Guide 7.7 was issued in August 1977 was never issued in final. I'm kind of getting to the whole point about the DOT. It's kind of odd the way it fits, but the Reg Guide endorsed the ANSI standard which no longer exists. The ANSI standard was withdrawn.

The ANSI standard had a method for compliance with 71.5(b). It talked about appropriate package selection, preparing the package for shipment,

and completing shipping papers, placarding, and incidents - and actions to take in the event an incident occurs.

Some of these items are now - you know, are currently under NRC. For example, the applicant has to prepare - the shipper has to prepare the package using the NRC Certificate of Compliance, the operating procedures that the certificate holder has developed based upon the operating procedures we see, a number of things that are in NRC purview, shipping papers, accidents, actions in the event of an incident occurs maybe within the state or DOT purview.

Since the ANSI standard was withdrawn, we didn't want to endorse an ANSI standard that no longer existed. In addition, we didn't just want to issue this reg guide in final with this issue in Part 77 because some of the actions in there are not NRC - are not regulated by the NRC, and we wouldn't want DOT or somebody else to put words in our mouth and visa versa. We wouldn't want to put words in their mouth.

So what we did was we took some of the guidance that was in the old standard about package selection and things like that and we updated it to include the administrative requirements in Part 71 that are within NRC purview.

We tried to make is useful for people who - or for licensees who do infrequent shipments or are new to Part 71. It only applies to packages that NRC has jurisdiction over, Type B packages, Type A fissile packages, so we had two previous reg guides, Reg Guide 7-1 and Reg Guide 7-3, that we incorporate into Reg Guide 7.7 because we thought having it all in one place would be a better, more useful tool for our licensees and applicants.

So the revised reg guide contents contains items for shipment and planning. If you're a new shipper and you have something you want to ship, how do you go about doing that. We have to figure out what's a Type A or Type B package, what kind of package - whether there's a package authorized to ship it.

If you're a new shipper and you're fabricating your own packages, what do you have to do to get those packages accepted for use, along those things, so it includes package and preliminary determinations.

We call it preliminary determinations, we also call them an acceptance tests, things you have to do when you first fabricate a package.

Loading the package, preparing it for

transport, and then reports and records are required after the shipment. You know, you have shipping papers, you have a number of different records you have to keep in the event that there is something that went wrong with the shipment, so we cover a majority - some of these items as well in the NUREG guide.

MEMBER ARMIJO: Bernie, are there literally hundreds of these packages?

MR. WHITE: The answer Is yes. We have - what did you say, about 90 certificates? There are some certificates where there are thousands of packages.

For example, UF6, there are thousands of UF6 packages.

MEMBER ARMIJO: Different types.

MR. WHITE: There are about 90, probably maybe 100, different package types. We may have a couple of certificates that have more than one package on it, very similar, but they're a little different in what they look like.

CHAIR RYAN: And out of the 90, just to give some perspective, how many are frequently used, half that?

MR. WHITE: Probably all of them, and honestly, we don't keep track of those things.

CHAIR RYAN: Okay.

MR. WHITE: If you look at the types of packages that we have, they're a radiography camera, radiography package. They're used all the time. You have six packages that are used all the time.

Pellet and powder packages for fresh fuel, to make fresh fuel assembly, are used all the time, fresh fuel assembly package.

Now the ones that aren't used all the time, we do have a lot of spent fuel packages. I can't say how often they're used.

Now we know some of them that have foreign research reactor fuel are used quite frequently. You have a couple of those, so the number that are - we have - a lot of them are used quite frequently and some that are not as frequently.

CHAIR RYAN: I can remember the days that steam generator disposal that that was sort of a unique one-off package.

MR. WHITE: Right.

CHAIR RYAN: And, you know, you have really complicated transport because you're in the open ocean and you have to go down past all the states, so that -

MR. WHITE: That used to be regulated by

NRC under the old LSA and that was pushed off the DOT in the I think the '90s when we did the rulemaking in the '90s.

I was around when we did a couple of the old steam generator and reactor vessel shipments.

CHAIR RYAN: Yes. Thanks.

MR. WHITE: Sure.

CHAIR RYAN: I guess it's important, I mean at least it seems to me that even though there are those complicated circumstances, there's really a fairly clear path kind of embodied in this reg guide and lots of other documents on how to get there. Is that a fair comment?

MR. WHITE: Yes, there -

CHAIR RYAN: Even though it can be very complicated, it's not arcane . I mean you know how to get the job done and go from A to Z because you've got some guidance documents that help everybody stay on the highway.

MR. WHITE: Right. There are a lot of guidance documents for preparing an application for a certificate whether it's NUREGs, SRPs, reg guides, we have a number of documents for those.

Admittedly we have fewer for some of the more administrative things like this, and that's what

this was intended to do. You know, if you had something you want to ship but you don't know how to do that, this kind of - it doesn't give you a step-by-step well look in this document for this certificate, but it does tell you how to go about doing that.

Another thing we recommend is if you've never done this and are uncomfortable with it, hire somebody who has done it before, so - because there are a number of companies who will go out and broker shipments and actually make the shipments for you.

So the relationship - Reg Guide 7.7 is kind on the middle there on the right-hand side. As I said earlier, we incorporated Reg Guide 7.1 and Reg Guide 7.3 into that.

We referenced Reg Guide 7.4 which is currently before the ACRS for review. Reg Guide 7.4 is - endorses ANSI N14.5 which is the ANSI standard for a leak testing of packages that we have reviewed and has been in use for many, many years in different revisions.

It endorses the I believe 2008 version of that ANSI standard, and the idea is to take some of these items from 7.1, 7.3 and incorporate into Reg Guide 7.7 and then some of the basis in Reg Guide 7.7 the applicant could use to develop their acceptance

test and operating procedures when they submit an application to us.

Reg Guide 7.1 is an administrative guide for packaging and transporting radioactive material. It was published in June of 1974. It endorses an ANSI standard which was withdrawn.

It based the contents of it where it talked about procedure for package selection and labeling. Again labeling is the DOT portion, so we talk a - we talk in this about the package selection.

Reg Guide 7.3 is procedures for picking up and receiving packages of radioactive material. We felt it best to have all of these in one reg guide as opposed to having two or three different reg guides that a licensee or a certificate holder or an applicant would have to go out and use.

It was published in May of 1975, and it was designed back then to minimize - you know, minimize exposure and contamination in the event something occurred during shipment.

Now this is back in the '70s. There were not as many shipments. We didn't have as nearly as much experience with shipments or improving packages as we do now.

It had procedures in for receipt of

packages. It talked about notification and receipt. When you get a package in, you have to notify the shipper that you've gotten it. If you're notified that you have a shipment, you know, that comes into say your front door, you want to wait a weekend or two to go get it, we've had that happen before.

It talks about monitoring of packages whether it's looking at the dose and the dose rates from the package and then whether there's any contamination on the package, and if there's a problem, who you would notify and what you would do in the event that there - say you got a package in that the dose on the surface of the package exceeded the limits in Part 71, or it had contamination that were above the limits in Part 71.

So Reg Guide 7.7, we incorporate a lot of this as well as new material. Some of the new material is in the shipment planning, and I've covered some of this already. We talk about if you have, you know, contents that you want to ship, how would you got about doing that. You look for a package that may contain or already have it authorized contents. If it doesn't you'd want to come - you or the certificate holder would come to the NRC and ask for an amendment to authorize that.

It talks about the packaging and preliminary and routine determinations you made. Routine determinations are things you would do to make sure the package in good physical condition, make sure that there are no - nothing but superficial scratches. For example, if it's got a big hole in the side of the package, things along those lines.

It talks a little bit about loading the package. Loading the package is done in accordance with operating procedures. When we get an application in for a Certificate of Compliance, it has - we call them generic operating procedures because they don't go step by step - unbolt, you know, unscrew this bolt, unscrew this bolt. It doesn't go through - it doesn't always go through the exact set of steps that are needed to prepare a package for shipment, but it gives us a sense for when they do write the detailed operating procedures we know what they're going to say in terms of the steps and what's important in terms of preparing that package for shipment, so it hits the highlights for us, and then some of the reports and records -

Some of these I'll talk a little bit more in depth about than others.

MEMBER SKILLMAN: Would you go back

please.

MR. WHITE: Absolutely.

MEMBER SKILLMAN: Let me explain two different kinds of packages. One is a package that contains material that the staff and industry does not want to have leaked anywhere in its transportation path and is described as packages a container of significant mechanical integrity that has an over pack to absorb the g-loading should the package become free, and the inspection by the receiving organization is a receipt inspection that confirms that nothing has leaked and the radiation levels are what they should be.

In that particular scenario, the receipt inspection is fairly cut and dry. It didn't leak, it's intact, has no puncture marks, the over pack seems to be pristine or in the same - if you took photographic images, it's the same as when it left the shipping point of origin.

Now I'd like to contrast that with a truckload of new fuel, GE commonly ships in wooden containers. The receipt inspection for that load, for that cargo, is different. Those containers are opened and there is a receipt fuel inspection.

MR. WHITE: Right.

MEMBER SKILLMAN: But unless there has been some intervention by somebody who is particularly alert, there may not be any knowledge of what those fuel assemblies experienced while in transit, run over a curb at 85 miles an hour, sideswiped another vehicle.

When the vehicle shows up, it might have a dent on a rim or it might have a scrape mark on the side of the trailer, but unless one is particularly discerning, one would not know whether that fuel had been subject to a different loading than that for which it was designed, particularly for transport.

So where in the reg guide have you considered that some packages simply need to demonstrate integrity where other packages may need to demonstrate that the objective of the shipment has not been harmed beyond its design requirements?

Here's an example. You have a tractor-trailer show up and you've got some bent rims and there are no accelerometers on fuel package, and you say what happened to that fuel?

MEMBER ARMIJO: Get a new fuel guy, Dick, because where I worked we always put accelerometers on them.

MEMBER SKILLMAN: And I was part of

receiving GE fuel that had none which is why I'm asking the question because -

MEMBER ARMIJO: And I also worked at GE, so it must have been a bizarre shipment.

MEMBER SKILLMAN: Yes.

MEMBER ARMIJO: Because there's too much money at stake.

MEMBER SKILLMAN: I know. That's why I'm asking the question, but I think it's just a general topic. Some packages need to arrive intact, and that's fine.

Others might need to arrive with a different set of requirements.

MR. EASTON: Let me try to address that. That the difference between the Type B package and a Type AF package. Type AF package is spent fuel. If you look at the A-1 and A-2 values - I'm sorry, fresh fuel.

MEMBER SKILLMAN: I'm talking new fuel.

MR. EASTON: I misspoke. Type AF package is fresh fuel. If you look at the table that Bernie was referring to, A-1, A-2, fresh fuel has a limited A-2, so there is no containment requirement.

In other words it's safe if it gets out. Type A package is not one that is accident resistant.

A Type B package is one that is accident resistant, and that's because of the quantity involved, so when you're down in a Type A package and you're approving a Type AF package, you do all the tests, but your criteria is that it doesn't go critical, not that it doesn't provide containment, so hopefully the idea that you're using a Type A package and a Type B package, you have enough knowledge to know that there are different contents and there are different requirements. Is that what you're getting -

MEMBER SKILLMAN: Well first I respect your answer, but let me push your envelope a little bit, so I get this package that's dandy. It's a Type AF and it hasn't leaked, and so I feel good, but I've shaken it to the core and when I finally load it in my reactor, it falls apart because it was brutalized in shipment, so why isn't part of this regulatory guide the monitoring of its, if you will, its gross motion so that the receiver knows that fuel is intact.

MR. WHITE: It's not required by Part 71. Part 71 looks at going from Point A to Point B. When it gets to Point B, if it's - if it meets the requirements of Part 71, it still must meet whatever the license requirements are at the site it gets to.

If a reactor - I would presume if a

reactor got a fuel assembly in that put it in and it fell apart, it might not meet the requirements of its Part 50 license or - and I'm not a Part 50 guy, so bear with me.

MR. EASTON: I hear you.

MR. WHITE: There's something on the part 50 side that it would not meet as opposed to Part -

CHAIR RYAN: I guess I'm taking an interesting question from Dick's comment. He's saying a package looks right, but he's not going to know something is wrong internally without accelerometer information until he's opening the package and in his fuel pool. That's a bad place to find out about it. I guess I'm taking away that you're raising a question should there be a requirement even for fresh fuel to have some confirmation that during transport there has not been abuse through over-acceleration.

MEMBER SKILLMAN: It isn't my goal to give you heat, but when I read your reg guide, when I read the draft and the mark-up, that requirement is to make sure it hasn't done and it hasn't done that, and it hasn't leaked, and a neutron absorber is in place and it's been loaded property, and I say to myself, gee whiz, I would think one of the things we'd like to do is to make sure that if the final use of the

transported commodity may have a fission produce leak in the future, we ought to make sure that it's tight.

MR. EASTON: And just keep in mind that there's another party involved in this between the NRC licensee. It's called a carrier. We exempt from NRC safety regulations carriers.

Carriers, if something happens to a load during shipment like suspected damage or leaking, they're obligated under DOT regulations to report it, but we're probably one of the only areas where we license something and then immediately turn it around to a party that's not an NRC licensee who we exempt from our regulations. That's how we do packaging.

We just assure that during transportation the package provides criticality safety shielded in containment, and we rely on someone receiving a product to have some sort of inspection in place to make sure that their product meets the specifications that they need. That's how -

MEMBER SIEBER: And that's outside of Part of Part 71.

MR. WHITE: Yes, it is.

MEMBER SIEBER: The receipt inspection, and part of that is a commercial interest, a million dollars for a fuel assembly. Put a couple of them in

a package, you don't want to spend that money foolishly. That's why there is a receipt inspection where you can detect that. If you report any physical damage there may be to the assembly, but Part 71 is just for the safety of the public with regard to the shipping from the shipper to the receiver.

MR. WHITE: And to make sure that the receiver knows what he or she is getting. When the receiver gets a package in, they want to make sure they do the measurements on it to know whether there's contamination or high radiation. You just want them to open the bolts and go, wow, and get a blast of stuff in the face, so you want to make sure that they know what they're getting on their end before they open the package and what they're dealing with.

MEMBER SKILLMAN: I understand the commentary.

MR. WHITE: And I appreciate you comment as well.

MEMBER SKILLMAN: I'm asserting my comment. I believe that if the regulatory guide is to be whole, then for a package of fissile material where future integrity is important that knowing its motion history en route is as important as knowing when it shows up it has integrity. It's not just enough to

say, gee whiz, it looks fine. The over pack is not - the over pack has not been compromised and the wall of the container is nice and shiny.

If I'm shipping a form that may be new fuel and if for whatever reason the smart people involved have not required accelerometers, it seems to me that the reg guide ought to at least point to that and say you better make sure that you've taken due diligence to ensure that you know the motion history of the package. That's my comment. Thank you.

MEMBER ARMIJO: Dick, but that - I want to get back to the fuel thing. It's really a purchasing requirement that, you know, you, as a purchaser of the fuel, that would be one of the things on your requirement that there be assurances that when you receive it, it's been shipped properly.

I know accelerometers are routinely put on. I don't know about that particular shipment. They're routinely put on and, of course, the big issue there is, you know, packages have fallen off trucks, and nobody told - the guy that was moving it didn't tell anybody, but there was - accelerometers said it was there. You do the receiving inspection, you check the spacers and make sure they're not crushed and everything else, but that's in the commercial end of

it rather than the safety end of it.

MEMBER BLEY: A couple of things about that. I sort of think, like Dick, if this stuff can end up in the reactor and you can have problems with it later. While that's probably commercial, it's borderline on safety, but I'm wondering if not having a requirement like this is because of the way we've divvied up the regulatory responsibility with some of it belonging to one agency and some to another.

This sounds like stuff that would in principle belong to the shipping which would be DOT, and I don't see anything in the cited regulations that are cited in 71.5 that would really apply to that except the accident one, and it just seems like maybe it's a gap somewhere in here.

MEMBER SKILLMAN: That's how I feel. I'm not sure it's a draconian change. It just seems to me -

MEMBER ARMIJO: I think it's being done anyway. I don't know whether it's under a regulations related to you as the operator of the power plant to assure that you're putting fuel in there that is - will meet all the functional requirements and that's why you have receiving inspections, but I know it's done, and I know the shipper at least when I was

active in it, it's one of the things you do to make sure that -

CHAIR RYAN: It seems to me that if the reg guide could be modified in some small way to just recognize that there is this connection to other requirements, be they commercial or otherwise, that might have an effect on safety.

MEMBER ARMIJO: The receiving inspection, the licensee has the obligation to assure that the -

MR. WHITE: Well if there was a tie there to some of these things we've touched on like the receipt inspection and any other measurements that might be related to, you know, confirming its quality during transport might be helpful.

MEMBER ARMIJO: I'd like to thank NMSS in advance just for considering it. It seems to me that it's something that might be worth a second thought.

MR. WATERS: I think - we will consider it and we'll talk to our counterparts to get a better a better understanding for example in the receipt of fuel. I think from a safety aspect, obviously we focused on the safety during the transportation, those who handle it. Obviously your concern, for example, is safety under Part 50 requirements, and there are requirements under Part 50 and all those requirements

that Part 50 licensed to follow to make sure fresh fuel is safe when you handle it and you put in the reactor to operate, so those licensees too where beyond fresh fuel there's all kind of sources being possession licenses for our resources, so maybe a point or two in consideration of that regulation as far as condition of the material may be something we can consider and get back to you on.

CHAIR RYAN: And I think there are like, for example, medical radiators with high concentrated cobalt pencils and so. There's other examples of high activity shipments might need this kind of extra attention.

MEMBER SKILLMAN: Yes, that's my thought. The type of logic that I'm trying to gently communicate may not be limited just to new fuel. There may be other applications where the receipt person would say, boy, am I glad I know that that thing has been shaken beyond its design basis or shaken beyond its limits so that the receiver knows I had better be mighty careful when I open this thing, and the telegraph may be the accelerometer or some other device that communicates some other physical feature that had to do with the motion in transit. Thank you. That's my -

CHAIR RYAN: Jack.

MEMBER SIEBER: I just would make a comment that my understanding of a regulatory guide is to list one rather detailed acceptable way to comply with a specific regulation, in this case Part 70 which has to deal with packaging, shipping, and receiving, and the regulations that recover - that determine what performance fuel is in a plant is under Part 50, and I don't think you can modify this regulatory guide to address Part 50 issues. You have to stick to - you can only provide advice on the regulation that the regulatory guide references.

MR. WHITE: Right, and we can go back and look at Part 71 to see if there is - I use the word a regulatory hook there to tie in with Part 71. There may be.

MEMBER SIEBER: There may be.

MR. WHITE: Off the top of my head I can't think of one, but that doesn't mean that there isn't.

MEMBER BLEY: 71.5 is close I would say if there is anything.

MEMBER SIEBER: The receipt inspections of new fuel are pretty thorough.

MEMBER ARMIJO: Very thorough, and like you say, they -

MEMBER SIEBER: Shipment damage I think -

MEMBER ARMIJO: Very expensive, things you're shipping and a lot of care is taken, and it's required. It's already required by the regulations.

CHAIR RYAN: I guess, and I appreciate that, but I'm still holding the question that I think Dick is raising is it tied together in the guidance document as tightly or as clearly as might be helpful to explain it. I don't know.

MEMBER ARMIJO: Yes, I think it is, but you'd have to look at the -

CHAIR RYAN: That's really the essence of your question, is that right, Dick?

MEMBER SKILLMAN: Well, no, not quite. What I'm suggesting is if we're going to have a regulatory guide that talks about requirements for shipping and receiving to the same extent that the receiving requirements for the package in Reg Guide 7.7.2 leakage and that type of thing, I raise the challenge should it include something having to do with motion in transit because I think while it's simple to say the reg guide really ensures that there is no leakage during shipment to protect the public, there may be a greater functional requirement to ensure that in the process of shipping that whatever

it is that's in that package has not been degraded so it's end use is compromised, so I guess I got my story and sticking to it here.

I think there is -

MEMBER ARMIJO: If that was the only regulation we had, Dick, I would agree with you, but we have other regulations that are far more restrictive in Part 50 on the responsibilities of the fuel manufacture and the responsibilities of the licensee who receives the fuel and is going to operate it are very, very demanding.

MEMBER SKILLMAN: But the staff is revising a regulatory guide that, in fact, points to this type of package, so I'm kind of befuddled why one wouldn't say there is no great intellectual leap to include at least a pointer to this type of thing in this regulatory guide update because it may apply to more than just fuel.

It could apply to medical isotopes, control blades or a lot of delicate -

MR. WHITE: Spent fuel potentially.

MEMBER SKILLMAN: So that's my point.

CHAIR RYAN: Well, maybe the members of the staff could take that away and think about it, maybe there's a simple fix to that.

MEMBER BLEY: Let me ask you a question because I'm not wholly conversant on Part 71. The three safety functions - shielding, containment, and subcriticality - are those taken right out of the rule or is that an interpretation of what you need to do to meet the rule?

MR. WHITE: The criteria that a package has to meet after the tests for normal conditions of transport or hypothetical accident conditions are - must remain subcritical.

There are dose limits or dose rate limits, I'm sorry, on the side of the package, different ones for normal accident conditions and then there is criteria for leakage from the package in Part 71.

MEMBER BLEY: But nothing there about integrity of the ship device other than those three.

MR. WHITE: There are - in Part 20 there are some receipt - there are receipt -

MEMBER BLEY: In Part 20?

MR. WHITE: I think Part 20 has some things on receipt of packages.

MR. WATERS: For the large part there are specific safety standards, and as long as the NOI's reconfiguration to the extent that those limits are perhaps affect a package you have to do that, but if

there's any other issues outside of transportation, I think that where it becomes compartmentized.

CHAIR RYAN: What are the requirements or where are the requirements spelled out that determines that whatever is in the package that undergoes the accident and gets damaged is still fit for its purpose?

MEMBER BLEY: That's a good point. A lot of times there are counterparts - I'm very confident in Part 50 it's mentioned. It applies not just to the radioactive material but just components used elsewhere and how do you know it's not damaged when you received it. Fuel is a -

MR. WHITE: See that would not be in Part 71 because that would be in the -

CHAIR RYAN: But that's really Dick's question.

MR. WHITE: Part 30 or whatever part it applies to whether it's radioactive material or fuel.

CHAIR RYAN: Dennis has asked Dick's question in a different way. If you have an accident on a transport package and whether there's an accelerometer or not or whatever else it might be for measuring devices, how do you determine, you the owner, what's going to be in transport that's fit for

purpose. Is there any reg guidance that would head you in that direction, and if there is, it seems reasonable, and I think this is what Dick is asking, is that that separate guidance under fit for purpose question ought to at least be referenced and recognized in this reg guide.

MR. WHITE: If there is, we could very easily put a pointer into that guidance. I don't know whether there is or there isn't. We can call our Part 50, Part 30 -

CHAIR RYAN: That might be a helpful tie actually if that can be done.

MR. WHITE: Sure, we can absolutely put a pointer into that.

CHAIR RYAN: All right.

MEMBER SKILLMAN: I'm fine.

CHAIR RYAN: Fair enough, but that does get to the root of your question, correct?

MEMBER SKILLMAN: It points in the right direction.

CHAIR RYAN: Okay.

MEMBER SKILLMAN: Thank you.

CHAIR RYAN: Thanks very much.

MR. WHITE: Back to Reg Guide 7.7, some of these things we've talked about it before, you know,

radioactive material identification, package selection. The third bullet, if you're going to ship to somebody, to a licensee, you just can't call and say are you a licensee, and they say yes. In this day and age you have to verify that they actually have a license for what you are going to ship to them and the quantities, and the radioactive material and the quantities you're going to ship to them.

There is a provision in Part 71 for unknown materials or quantities particularly in the contents. Some of the high integrity containers, the resin beads, you don't know exactly what's in there.

You have a sense for how much based upon maybe dose rates or based upon sampling or a number of other ways.

We've kind of given a little bit to that to give them a sense for that. Most of the reactors and the ship people that do those shipments are well versed in that, but we've seen more and more over the last six months to a year where this has been a little common than it had been in the past.

Preliminary determinations, if you fabricate a package, you have to do what we call the preliminary determinations or acceptance test to some people. We also call them acceptance test to make

sure that the package has been constructed in accordance with its design.

If it's got lead shielding, for example, and you pull the lead shielding, you want to make sure there's no air bubbles in there for radiation streaming.

You want to look for package defects, packaging defects. You want to make sure that the package - everything was fabricated according to its design.

Pressure tests, depending upon the internal pressure, there's a pressure test that the package has to be pressurized up to 50 percent greater than its - that what it's - we call the maximum normal operating pressure, MNOP, and held there for a length of time.

The package has to be marked. You put a label on it that says the model number, the gross weight, and a number of other things like that.

Leakage tests, packages are designed to have a leak rate, leak rates, depending upon what the contents are and how it's evaluated.

There are fabrication leak rates, there are leak rates that we do for periodic maintenance, and then there are pre-shipment leak rates.

For preliminary determinations, the pre-shipment leak rate, that it has to meet is depending upon the design. For example, spent fuel packages may be what we call leak tight, designed to be leak tight, and that's a leak rate of ten minus 77 cc per second.

They may form a leak rate to that standard for fabrication, and then if there are neutron absorbers within the package, some of our fresh fuel and spent fuel packages have neutron absorbers to make sure that the amount or boron, the type and form or the boron, the quantity of the B-10, whether it's enriched or not, and that the material is consistent throughout the neutron absorber.

Preparation for transport, there are routine determinations. I talked a little bit about some of these already. You look at the package and make sure there's not - that there's no defects in the package.

Sometimes they get hit by things, and there's all sort of superficial scratches which may or may not be okay depending upon where the scratch is.

You want to make sure that if there's any gaskets for leak tightness that the gaskets are free of defects and meet their standards.

You want to make sure that any part of the

packaging that may need to be replaced routinely such as a seal has been replaced upon whatever its frequency is. They load according with procedures.

As I said, we get in what we call generic procedures that kind of gives a sense for how the package is loaded, how it's used, how it's operated. We make sure that they are consistent with the packaging design and how the package and contents and how it was evaluated in a safety analysis report.

There are detailed operating procedures that are based upon the ones that we see and approve in Part 71.

CHAIR RYAN: How - just on the - I'm thinking about pool loaded gas based on a couple of your bullets up there. How often has the weeping of say fuel pool loaded gas, you know, when they're loaded in a cooler environment and they're shipped to a hotter environment, sometimes they weep and they're contaminated when they arrive as opposed to when they left or that's been a problem in the past. Has that been addressed?

MR. EASTON: Weeping?

CHAIR RYAN: Or is addressed?

MR. EASTON: Yes, in the case of weeping, that's when you load like a spent fuel cask and made

a pool that has radionuclides in it and it gets into the pores, and what you do you would clean it down to the contamination limit and during transit, some of that would work its way out of pores and result in increased contamination levels, but DOT has addressed that by allowing a weeping allowance so that once you clean it to the regulatory limit it has to arrive at its destination no more than ten times that limit.

CHAIR RYAN: So a weeping is actually incorporated in the DOT regs.

MR. EASTON: These are DOT regulations and not to alarm folks, these contamination levels are set very, very low because they apply to all packages. If I have a radioactive material package and I want to ship it with food at FedEx, these have to be low enough to accommodate those models, so when you're doing it with large spent fuel packages, the risk is probably not the same because you don't have the access, but DOT does accommodate weeping.

CHAIR RYAN: Very good. Thanks, and you've addressed that in the guidance?

MR. WHITE: Not in this guidance, no.

CHAIR RYAN: Okay.

MR. WHITE: Because that's in DOT regulations, not ours.

CHAIR RYAN: Okay. It might be nice to have an appendix to put all the things that are in DOT that you guys don't touch on.

MR. EASTON: Can I just -

CHAIR RYAN: Sure.

MR. EASTON: I'll just add one other note. From time to time there are other documents called schedules, and we did one in the mid '90s. IAEA does these type of documents that accompany the regulations.

Basically it takes a type of packaging and there are a lot of different types of packaging. It lays out what can be in each type of package and walks through all the packaging requirements and all the DOT-type requirements so it's really like a guidebook or if you're very new to is and you just have something you want to ship. You figure out what it, what's the quantity or concentration, line it up with the package, and it will walk you through all the regulations.

That's not really the intent exactly this, but there those type of documents out there also.

CHAIR RYAN: Thank you.

MR. WHITE: It talks about the dose rate and contamination measurements. Lifting and tie-

downs, there a number of - packages may have a number of pieces or parts that could be used to lift or tie down the package that was not designed to lift or tie down the package.

In Part 71 if it was not designed or been evaluated for that, it must be disabled so that you cannot use it to tie the package down.

Sometimes, you know, like for example maybe some of the impact limiters have brackets for lifting just the impact limit to put it on. So, for example, if it has not been evaluated, this tie-down has to be disabled.

Number of leak tests, the pre-shipment leak tests which must be done, and these - the leak tests that I talk about here and the preliminary leak test, this is where I have to pointer to Reg Guide 7.4 because Reg Guide 7.4 is the one that has - that endorses the ANSI standard on leak tests, so instead of elucidating it all in here, I just point to that one particular reg guide.

Reports and records, there are shipment and package records; package and shipment records on what was shipped, when, from who to where, etcetera; package records on fabrication, maintenance things.

Some are retained for the life of the

package. Some are retained for three years after - for three years after the shipment was occurred. It talks about some of those in Part 71, and then deficiency reports.

We call these back in NMMS 7195 Reports because that's the portion of the regulations that talks about deficiencies. If there has been a significant reduction in the effectiveness of a package, conditions of approval or a certificate were not observed, and this where I talked about we include the drawings and the contents in the certificate.

If there's a part in the package that was not included that should have been that's in the drawings, they would have to submit a report to us indicating why - what happened, why, and any consequences and anything they're going to do to alleviate that in the future, and then any package with a - that has a defect with safety significance, whatever that might be.

MEMBER BLEY: Can I ask you a quick question about these before you -

MR. WHITE: Absolutely.

MEMBER BLEY: I mean your next slide. The comments seem pretty benign to me. As I went through them they seemed like either things - you said, oh,

yes, we should have thought of that or the places where you disagreed, it didn't seem like there were major disagreements. It was just you didn't think there was enough need for it. Were there any areas that you folks saw a significant disagreement with the comments?

MR. WHITE: No, not at all. Most of the comments that we got in that were the second kind you talked about came from a group called -

MEMBER BLEY: They were talking about some -

MR. WHITE: It's a group that does a lot of Type A package ships, not Type A fissile but Type A package, and there's a lot of things that area absolutely appropriate if you're making a Type A shipment, but that's not under NRC purview and that's why some of those we decline to do.

MEMBER BLEY: I didn't want to take away.

MR. WHITE: You're absolutely right.

MEMBER BLEY: Any real disagreements here.

MR. WHITE: No, there wasn't. There was not any real disagreement other than the fact that while these apply to Type A packages - like there was one comment about what if you had - what if the package had dry ice. We don't have any packages for

shipment of Type B quantities if you ever have dry ice or you have Type A fissile, so those again are the ones that are more towards the Type A package that this reg guide does not apply to because it's not - NRC does not review those -

Having said that, do you want me to go through the comments? This is the part of which, I will honest with you, wasn't sure what you wanted to see here.

CHAIR RYAN: If you want to just point out one or two of the ones you think are noteworthy. There's no sense going through the list.

MEMBER SIEBER: A lot of them are editorial.

MR. WHITE: Yes, and they are. A lot of them were editorial, and that's why we accepted a lot of them, and they were - and I thought they improved the reg guide quite a lot.

CHAIR RYAN: When we have the final text, so all those are incorporated, so we don't really need to push through them all.

MR. WHITE: Like, for example, the grid size. When you do the acceptance test for a package for voids. One thing we accept is you made grids around the surface of the package, you know, with

maybe tape. You put a source inside and put a detector to make sure that you know what you're supposed to get. Now what you get on the detector depends upon your source, the thickness, the shielding, the whole nine yards, but you're looking to see if there's any sharp spikes. Like there might be an air bubble in the lead shielding.

For example, I asked what size detector should be use. They said well it depends upon what you're doing. We feel - we believe that if you're shipping a Type B quantity of radioactive material you should have and HP program that - you'll have an HP program. Your HP program will be able to tell you what to use.

Same thing for the comment about the Geiger-Mueller detector and the different kind of detector. We figure a good HP program should be able to handle those sorts of comments.

Now one thing to note, and the comment was made when I was sending the comments around within my group, Public Comment 3 talks about radiolytic decompositioning and generation of gas, and essentially in Part 71 if you can generate gas, you have to be able to make that there's voids to handle that gas.

Now having said that, we also ensure that if it's radiolytic decomposition that you get something like hydrogen gas. You can't have a hydrogen ignition when you're taking the package apart.

Now I didn't feel that that's an administrative portion. Making sure you have the void is more administrative that making sure you don't get hydrogen gas ignition. That's covered within our Standard Review Plan and other guidance documents that we have.

Again, Public Comment 5, the difference between a damaged package and an intact package that was contaminated by something else. If you have a good HP - if you're receiving or shipping a Type B quantity of receiving a Type B quantity of radioactive material, you will have an HP program that will know how to handle - if you get a package in that's wet, you should know not to touch it. You want to measure it, see what's there. Your HP program should be able to handle that.

That's really the way I see the highlights of the comments we got. Most of the comments were editorial or didn't apply, and a lot of them we accepted because they were very good editorial

comments, but there was nothing like we disagree with the analysis you did here or there because there's no analysis in this. It's very little as far as that goes.

CHAIR RYAN: Okay.

MR. WHITE: Some of the future interactions we may have with ACRS, another reg guide I wrote, Reg Guide 3.50. It's a standard format and content.

Let me back up a sec, we're here to talk about Part 71. The group I'm in, we also do Part 72 which is storage of spent fuel at ISFSI, so that's why you'll see some of that.

Reg Guide 3.50 is a standard format and content guide for a licensed application for an ISFSI. If you submit an application to us for a specific license for an ISFSI, there are a number of pieces and parts that have to be in that license.

A Safety Analysis Report showing that, you know, for the facility, an environmental report, physical security plan, finance report, etcetera, etcetera, this lists some of those and how - and what we expect in each of those reports.

As you probably remember, we revised our standard review plan for dry storage casks during the

process of revising our Standard Review Plan for dry storage facilities, so this is for - this is the staff's guidance - guidance to the staff for reviewing the Safety Analysis Report that comes with the license application for an ISFSI.

Both of these documents still need to go out for public comment. We're expecting ACRS interaction later this year, probably early, mid, fourth quarter of calendar year 2012, October/November time range - time frame roughly, and again, as I said earlier, it could be pushed back depending upon whether or not we meet our internal goals for getting it out to public comment, addressing, and what public comments we get and how long it takes us to address those.

We're working on a number of ISGs, three of which may be - well one of which will be to the ACRS this year, ISG 8 on burnup credit.

There's a tentative date, and my understanding is an ASC meeting in June on that. There's been some discussion as to whether the committee may need more time to review it, but there's a tentative date for June on that.

The other two, again like the other two documents for - we talked about previously, still need

to go out for public comment, address public comment, but again, we're looking at late calendar year 2012 for these, probably the November time frame to meet with the committee.

CHAIR RYAN: Sounds good.

MR. WHITE: Okay. Path forward on this. We take any comments we get from you both informally and formally and address them as we can, hopefully get a recommendation from you that we can move forward and then publish it in final.

MEMBER SIEBER: I still have a couple of questions.

MR. WHITE: Absolutely.

MEMBER SIEBER: There's a NUREG written in the late 1980s that talked about preparing procedures for shipping packages, but that's not referenced in this reg guide. Is there a reason why you didn't reference it?

MR. WHITE: Actually I thought it was referenced.

MEMBER SIEBER: I didn't find it. It's CR-4775.

MR. WHITE: You're right, it's not.

MEMBER SIEBER: 1988.

MR. WHITE: No, it's not that we don't

think it's poor or anything. Maybe with the reg guide - I'm familiar with that NUREG.

MEMBER SIEBER: Okay.

MR. WHITE: It might be a good thing to do.

MEMBER SIEBER: You might want to look at it.

MR. WHITE: Oh, I have. I have it on my desk actually. I had assumed that it was written, so -

MEMBER SIEBER: Okay.

CHAIR RYAN: I would suggest -

MR. WHITE: Yes, exactly, and I'm following his comments.

CHAIR RYAN: So that's a second comment I think we've offered to you, and the first is Dick Skillman's comment on how do we know that the contents of a package has survived in transport and the accelerometer part of that and so forth.

MR. WHITE: And I've heard that from Den as well.

MEMBER SIEBER: There is also a NUREG on welding and how it's applied. I think it's 3019, NUREG/CR-3019, and it's welding criteria.

MR. WHITE: I'm familiar with that as

well.

MEMBER SIEBER: That wasn't referenced either.

MR. WHITE: Right, because I felt that that was more of a technical nature versus an administrative nature, and I realize that some of these are -

MEMBER SIEBER: But this regulation sets the boundaries on the package design also.

MR. WHITE: It does, right.

MEMBER SIEBER: And so maybe that should be one of the boundaries and use that with welding procedure.

CHAIR RYAN: That's an interesting point, Bernie. I think there are others that are in that category of fabricator-kind of guidance that probably ought to be referenced as guidance to fabrication issues and just list them in the back. That way it's all in one place for the user and maybe some more in there. That's not a bad idea.

MR. WATERS: Yes, I think that Bernie said with the use of judgment here where we draw the line. Again, the reg guide is focused on primarily the administrative aspects for loading and preparing a package, what does the package user do, not just the

person who fabricates it. There is some kind of cross over there.

Again, the design as specified in the certificate user to verify the design that they have to use a package and use certificates. It's up to them to verify that their package meets the design requirements which may specify weld mints and other standards.

MEMBER SIEBER: Yes, that's more in the actual certification.

MR. WHITE: Right, and Reg Guide 7.9, I haven't read it recently to be honest with you. We have Reg Guide 7.9 which is the standard format and content for an application for package approval would probably reference the operating procedures reg guide.

MEMBER SIEBER: You might want to check that, and also in there should be included restrictions on things like insolation or shock absorbers.

MR. WHITE: Insolation.

MEMBER SIEBER: Insolation.

MR. WHITE: Like in sunlight, insolation. That's what I'm asking to make sure I understand you, and that would be -

MEMBER SIEBER: Not containing chlorides.

A lot of these packages are extinguished.

MR. WHITE: Right.

MEMBER SIEBER: But that's more -

MR. WHITE: That's more of a technical nature would be in the actual -

MEMBER SIEBER: In the certification.

MR. WHITE: Right.

MEMBER SIEBER: But you may want to check that it's some place.

MR. WHITE: And it should be, I agree. My guess is - I know the reg guide is not - the standard format and contact reg guide is not that detailed. If it's in anything, it's probably in the Standard Review Plans that we have for packages.

We have two standard review plans, one for spent fuel and one for non-spent fuel packages, and I know a couple of things - I know the welding reg - the welding NUREG and the operating procedures reg guide are in both of those.

MEMBER SIEBER: Well I defer to your judgment.

MR. WHITE: I appreciate that. Thanks for the comments.

MEMBER SCHULTZ: Bernie, with regard to the NUREG referenced in the document, is the Standard

Review Plan document in NUREG 1609, is that referenced in this document, the one that was produced in the '90s? It seemed like a lot of the questions that were coming -

MR. WHITE: I don't believe so.

MEMBER SCHULTZ: And comments that were coming in were based upon information from that document.

MR. WHITE: Yes, I don't believe so, and part of the reason for that is it's a fine line. And SRP is guidance to the staff. This is guidance to the applicant - to the licensees or applicants, so we have to be very careful what we put in and what we reference to make sure that we're not saying that something that is guidance to the staff is now guidance to the applicant, but that's a point well taken to look and see whether they should be.

MR. WATERS: Yes, I think - there's interface again 1609 we're certified on the primary package design, how we meet the packaging requirements for certification. There's interface because part of that application does include operating procedures which is often a requirement to the certificate Bernie mentioned, so there are these interfaces connections based on the comments.

What we need to consider carefully is given the - all the players here from the designer to the fabricator to the user, general licensees, and DOT and NRC and make sure there's at least coverage and continuity to the extent practical but I think we'll have to use our judgment because there's several dozen NUREGs and several dozen standards that we could all reference in this one guide.

We have to kind of use our judgment where is the best fit here and recognize and it may apply to more than one reg and maybe in that case we do do that as well, so I think it's a good thing to consider from our standpoint.

MR. WHITE: And, as I said earlier, this reg guide can be used - should be used along with the NUREG for operating procedures to develop the operating procedures that go into the application that we get for package approval.

MEMBER SCHULTZ: Because of all the players here, it might be useful to have an appendix that lays out a number of these resources that are really available from the NRC to be utilized by all of the different players.

CHAIR RYAN: Any other questions? Dennis.

MEMBER BLEY: No, sir. No more.

CHAIR RYAN: Harold.

MEMBER RAY: I've been pondering this thing about the contents of - the integrity of the contents. I guess I'm wondering if this were not a radiological shipment, it was something else, would we say the same thing? In other words would we have the same concern about - I'm trying to figure out what makes it particularly appropriate here as distinguished from anything else that is vulnerable to damage during shipment, and I guess I haven't come up with an answer to that myself, so I just offer that as a thought.

CHAIR RYAN: I would defer to our -

MEMBER RAY: Maybe it is -

CHAIR RYAN: A little different question. That's not radiological. It was a critical component.

MEMBER ARMIJO: It could be a control blade that gets damaged in shipment. It's the same sort of thing. It's an important component. You've got to do a good job of inspecting it and that's covered by Part 50.

MEMBER RAY: Yes, I mean I think it's just not clear to me why if there was something different that would cause us to think it's necessary to address this here.

CHAIR RYAN: Well, I guess I don't think it needs to be included necessarily in this reg guide. I think the only point is if there's a pointer to some other place where that issue is covered.

MEMBER RAY: I don't know that it is. I'm not suggesting that. I'm just saying that -

CHAIR RYAN: Yes, but all I'm saying is I think if there needs to be a pointer in this guidance to point to these other - to the issue of integrity in shipment in other guidance, then so be it. Let there be a pointer to say -

MEMBER RAY: I don't object to that. I'm more thinking is there some reason for us to feel like it's needed in this case that doesn't apply -

CHAIR RYAN: I guess my own view is I think it carries its own value of making sure something has integrity in shipping, whether it's a control rod blade, a fuel element, or anything else, and if there is guidance that gives you some help in thinking that through on how to do that, fine. Reference it.

MEMBER RAY: I don't have anything else.

MEMBER SCHULTZ: All set.

CHAIR RYAN: All set? Any other comments? Chris, anything?

MR. BROWN: No.

CHAIR RYAN: So, Dick, anything - do want to add anything?

MEMBER SKILLMAN: No, thank you.

CHAIR RYAN: Okay. I guess.

MR. BROWN: Mike, do you want to see this before it's issued, before it goes out final or no full committee on this?

CHAIR RYAN: I defer to the Committee members. Do you think we're done with this and we can go forward with it as is?

MEMBER RAY: I do.

CHAIR RYAN: I assume that you'll think about it and address the comments we've raised during this meeting.

MR. WHITE: Absolutely, yes.

MR. WATERS: We'll get back to Chris on the three comments we heard, just let Chris at least informally know how we're going to address -

CHAIR RYAN: Okay, great, and then the next step will be then if we're - the Subcommittee is satisfied with those - that feedback then we'll have a briefing just to inform the full Committee of where you are and where this is and we'll go from there, and I guess all that we've heard today -

MEMBER SIEBER: Do you want to go around the table?

CHAIR RYAN: Sure. Jack. I thought we did already, but we'll go around again.

MEMBER SIEBER: I think it's very good.

CHAIR RYAN: Okay. It's good. Dennis is good. Harold is already good. I'm good.

MEMBER ARMIJO: It's really good. I agree with Jack.

CHAIR RYAN: So then the path will take us and tell the full Committee and give them a short briefing on it, and on we go. Nice job. Thank you very much for the thorough briefing and lots of detail. It helped the discussion. Thanks very much.

MR. WHITE: Thanks for your comments. I appreciate them.

CHAIR RYAN: With that, we will - are you prepared to adjourn, Chris?

MR. BROWN: Yes, we are.

CHAIR RYAN: Any motion? We're adjourned. Thank you all very much.

(Whereupon, the above-entitled matter was concluded at 3:04 p.m.)

Briefing on Draft Regulatory Guide 7.7

Administrative Guide for Verifying Compliance with Packaging Requirements for Shipping and Receiving of Radioactive Material

January 18, 2012

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U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Abbreviations and Acronyms

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Admin. – Administrative
- ANSI – American National Standards Institute
- Ci – Curies
- CFR – Code of Federal Regulations
- Co-60 – Cobalt 60
- Cs-137 – Cesium 137
- DOE – Department of Energy
- DOT – Department of Transportation
- GM – Geiger Mueller
- NRC – Nuclear Regulatory Commission
- QA – Quality Assurance
- RG or Reg. Guide – Regulatory Guide
- Sr- 90 – Strontium 90
- TBq – TeraBecquerel
- U – Uranium

Presentation Outline

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Background
  - Part 71
  - Reg. Guide 7.7
- Reg. Guide 7.7 Update
- Relationship to other documents
- Reg. Guide 7.7 Discussion
- Public comments
- Future Interactions

Part 71 Background

- DOT regulates
  - carriers (road, rail, air, etc)
  - Import and export of radioactive material
  - packages for small quantities of radioactive material – Type A Packages
- NRC
  - Regulates Domestic Type B and Type A Fissile Packages
  - Technical Review & Recommendation to DOT on Revalidation of Foreign Packages
  - Lead agency for inspection of NRC holders of Certificates of Compliance, fabricators, licensee shippers and carriers

Part 71 Background (2)

U.S.NRC
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Part 71 Table A-1—A_1 and A_2 Values for Radionuclides

Symbol of Radionuclides	A_1 (TBq)	A_1 (Ci)	A_2 (TBq)	A_2 (Ci)
Co-60	$4.0X10^{-1}$	$1.1X10^{1}$	$4.0X10^{-1}$	$1.1X10^{1}$
Cs-137 (a)	2.0	$5.4X10^{1}$	$6.0X10^{-1}$	$1.6X10^{1}$
Sr-90 (a)	$3.0X10^{-1}$	8.1	$3.0X10^{-1}$	8.1
U (enriched to 20% or less) (g)	Unlimited	Unlimited	Unlimited	Unlimited

[a] A_1 and/or A_2 values include contributions from daughter nuclides with half-lives less than 10 days.

[g] These values apply to unirradiated uranium only.

Part 71 Background (3)

- NRC Approves Package Designs - Primary safety is in package
- Part 71 contains package approval standards (performance-based regulation)
  - Any licensee can use NRC-approved package
  - Agreement state licensee, DOE, and international shippers also use NRC-approved packages
- Approve packages via certificate of compliance for use with General License provisions
- General licensees must use the package in the manner in which it was approved

Part 71 Background (4)

U.S.NRC
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- Three safety functions
  - Shielding
  - Containment
  - Subcriticality
- Margins for safety functions after tests for
  - Normal conditions of transport and
  - Hypothetical accident conditions
- NRC approves the package design that was evaluated
- QA Inspection for package fabrication

Part 71 Background (5)

U.S.NRC
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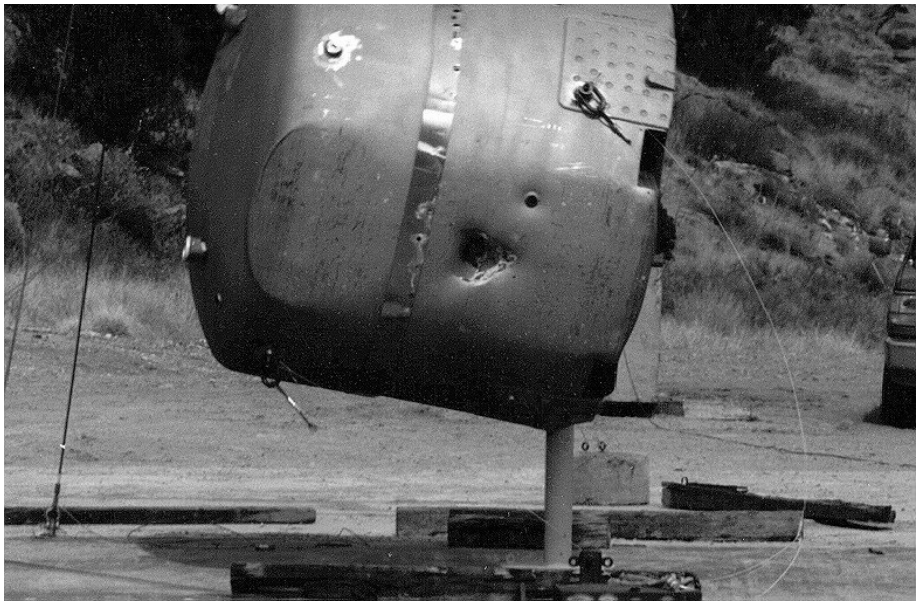

Reg. Guide 7.7 Background

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- DOT regulations for radioactive material shipment do not apply to all NRC licensees
  - Mainly some federal agencies
- 10 CFR 71.5(b)
  - imposes the actions in DOT regulations on NRC licensees not subject to DOT regulations
  - applied to a larger number of licensees prior to DOT regulating intrastate commerce
- Draft Reg. Guide 7.7

Reg. Guide Background 7.7 (2)

U.S.NRC
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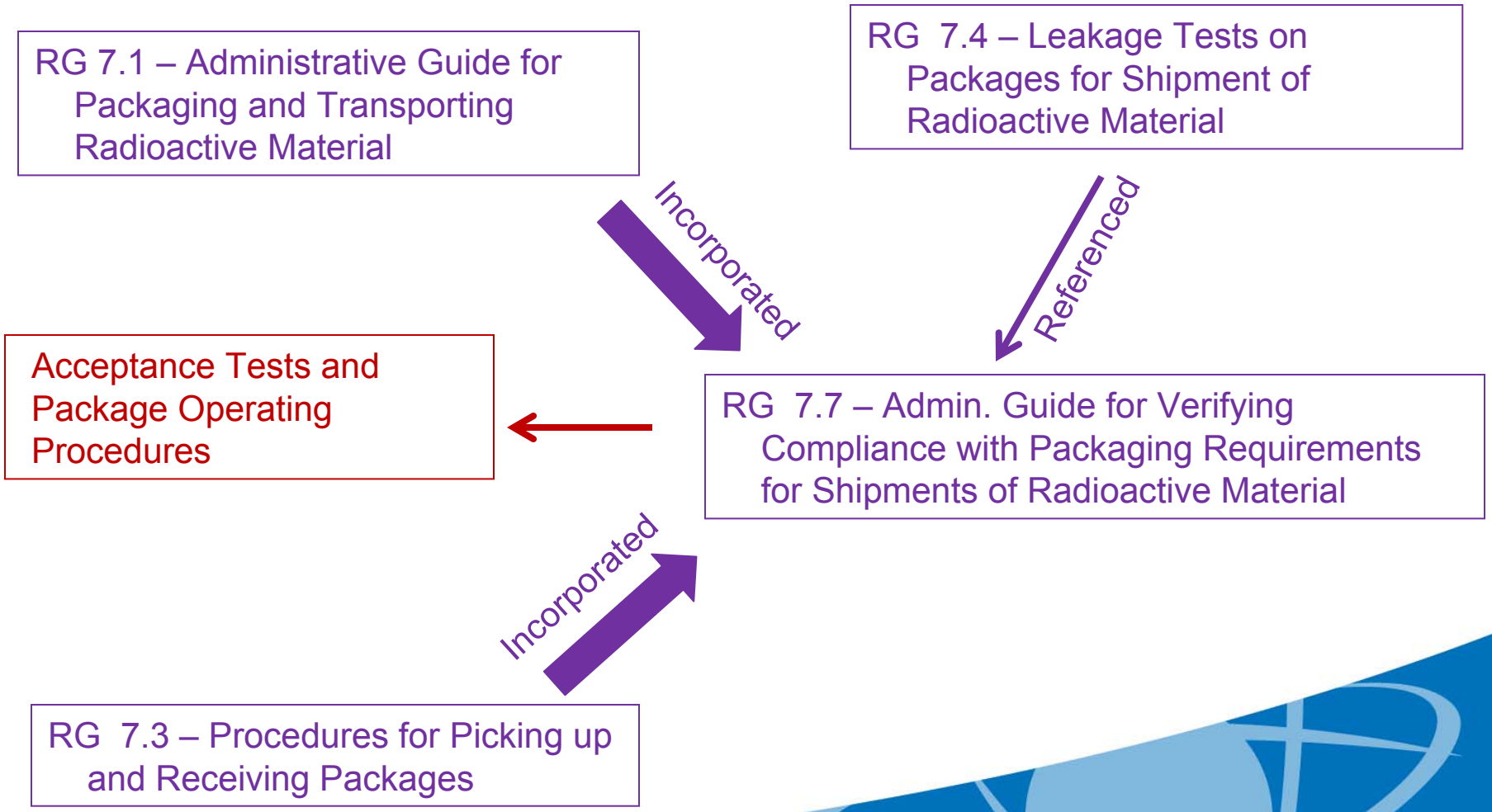
- Draft Reg. Guide 7.7 was issued August 1977
  - Never issued in final
- Reg. Guide 7.7 endorsed ANSI N14.10.3-1975
- ANSI standard contained method for compliance with 10 CFR 71.5
  - appropriate packaging selection,
  - preparing the package for shipment,
  - completing shipping papers and
  - Actions if incident occurs during shipment.
- ANSI N14.10.3-1975 withdrawn September 1984

Reg. Guide 7.7 Update

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Guidance useful for new or infrequent shippers
- Provide information on administrative requirements for transporting radioactive material in Type B or Type AF packages
- Incorporated two Reg. Guides and added new information
- Revised Reg. Guide Contents
  - Shipment planning
  - Packaging and preliminary determinations
  - Loading package
  - Preparation for transport
  - Reports and records

Relationship to other Documents



Reg. Guide 7.1

Administrative Guide for Packaging and Transporting Radioactive Material

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Published in June 1974
- Endorsed ANSI N14.10.1-1973
- Procedure for package selection and labeling
- ANSI N14.10-1973 withdrawn

Reg. Guide 7.3

Procedures for Picking Up and Receiving Packages of Radioactive Material

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Published in May 1975
- Designed to minimize exposure and contamination
- Procedures for receipt of packages for
  - Notification and receipt of packages
  - Expeditious pickup of packages
  - Monitoring of packages, and
  - Immediate notification of problems

Reg. Guide 7.7

Administrative Guide for Verifying Compliance with Packaging Requirements for Shipping and Receiving of Radioactive Material

- Shipment planning
- Packaging
- Preliminary determinations
- Loading package
- Preparation for transport
- Reports and records

Shipment Planning

U.S.NRC
United States Nuclear Regulatory Commission
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- Radioactive material identification
- Package selection
- Verification that recipient's license authorizes possession of material
- Assessing unknown materials or quantities

Preliminary Determinations

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Elimination of voids
- Package defects
- Pressure tests
- Package marking
- Leakage tests
- Neutron absorber tests (if needed)

Preparation for Transport

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Routine Determinations
- Loaded in according with procedures
- Dose rate and contamination measurements
- Lifting and tie downs
- Leak tests

Reports and Records

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Records
  - Shipment
  - Package
- Deficiency Reports
  - significant reduction in package effectiveness
  - conditions of approval or certificate not observed
  - Package defect with safety significance

Public Comment Resolution

U.S.NRC
United States Nuclear Regulatory Commission
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- Received 25 comments from 2 organizations and 1 certificate holder
- Mostly clarifications and improved wording
- 65% of comments were accepted in part or in full

Public Comments (1)

U.S.NRC
United States Nuclear Regulatory Commission
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Comment:

•Guidance is given for portioning the surface into a grid pattern. Further guidance on establishing the size of the grid should be given.

NRC resolution:

•Agree, the document has been revised to state "The size of the grid pattern should be such that the detector being used can easily measure essentially the entire area of an individual block of grid at one time."

Public Comments (2)

U.S.NRC
United States Nuclear Regulatory Commission
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Comment:

•Suggested that the scope of licensees' responsibility, unless the licensee is the certificate holder, should be limited to the information provided in the certificate, and for registrants to meet the conditions of the package and package SARP.

NRC resolution:

•Agree. The wording was changed to match that in §71.107 to state that the licensee, certificate holder or applicant for a certificate must establish measures to assure the package is fabricated in accordance with the packaging drawings.

Public Comments (3)

U.S.NRC
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Comment:

•Licensees should also be advised that radionuclides in liquids, such as organic solvents, undergo radiolytic decomposition generating gases. There needs to be sufficient headspace to ensure the gas pressure is minimized and contained.

NRC resolution:

•Agree, the regulatory guide has been revised to read "Ensure that any system for containing liquid is adequately sealed and has adequate space or other specified provisions for expansion of the liquid, and, if appropriate, any gas that may be generated due to radiolytic decomposition."

Public Comments (4)

U.S.NRC
United States Nuclear Regulatory Commission
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Comment:

•Consider adding the recommendation that licensees should be aware of the package configuration prior to ordering radioactive material to ensure they have the safe means for opening the package and accessing the contents.

NRC resolution:

•Agree, the guide has been revised to add “Additionally, for first-time receipt of a package, licensees should have discussions with the certificate holder to be aware of the package configuration prior to ordering/receiving radioactive materials to ensure they have the safe means for opening the package and accessing the contents.”

Public Comments (5)

U.S.NRC
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Comment:

•It would be useful for receivers if they were provided guidance on how to differentiate between a damaged package leaking its radioactive contents and an intact package that has been contaminated by liquid from another non-radioactive package that was damaged in the transport system or that is wetted by rain or condensation (common for packages that contain dry ice or water ice coolants).

NRC resolution:

•No change needed. Care should always be taken when handling any package prior completing both the radiation measurements and contamination surveys. When properly performed, contamination and radiation surveys will detect whether material on the package is contaminated or not.

Public Comments (6)

U.S.NRC
United States Nuclear Regulatory Commission
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Comment:

•Consignees also need guidance on the detectors that are suitable for measuring surface radiation. Shippers commonly recommend using a side-window, energy compensated GM detector to measure radiation fields from gamma and beta emitting radionuclides because this has a suitably flat energy response for commonly shipped radionuclides and the detectors are small enough to not seriously underestimate the surface dose rate.

NRC resolution:

•The guidance was not changed. Since the regulatory guide only applies to Type B shipments and fissile radioactive material packages, (Type AF packages) the receivers should have sufficient knowledge of measuring radiation levels to distinguish between suitable measuring equipment.

Public Comments (7)

U.S.NRC
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Comment:

•Consignees and carriers should be advised to take precautions to maintain exposure to ALARA when finding high radiation levels that may indicate a failure of the shielding. They may need to isolate the package, warn others in the vicinity and minimize their time and proximity to the package.

NRC resolution:

•Agree, the guide has been revised to state that “Note that radiation levels higher than expected may indicate damage to the package or contents have shifted and ALARA and good radiation safety practices should be used at all times.”

Future Interactions

U.S.NRC
United States Nuclear Regulatory Commission
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- Regulatory Guide 3.50 “Standard Format and Content for a License Application for an Independent Spent Fuel Storage Installation or a Monitored Retrievable Storage Facility“
- NUREG-1567, “Standard Review Plan for Spent Fuel Dry Storage Facilities

Future Interactions (2)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Interim Staff Guidance Documents
  - ISG-8 – Burnup Credit
  - ISG-19 – Moderator Exclusion Under Hypothetical Accident Conditions and Demonstrating Subcriticality of Spent Fuel Under the Requirements of 10 CFR 71.55(e)
  - ISG-26A – Risk Informed Shielding & Radiation Protection Review

Path Forward

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Finalize comments to ACRS Feedback
- ACRS recommendation for publishing
- NRC issue final RG 7.7

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Questions/Comments

Backup slides

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Series 7 – Transport Reg Guides

U.S.NRC
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Guide Number	Title	Rev.	Date
7.1	Administrative Guide for Packaging and Transporting Radioactive Material	W	2009
7.2	Packaging and Transportation of Radioactively Contaminated Biological Materials	W	2009
7.3	Procedures for Picking Up and Receiving Packages of Radioactive Material	--	1975
7.4	Leakage Tests on Packages for Shipment of Radioactive Materials	--	1975
7.5	Administrative Guide for Obtaining Exemptions from Certain NRC Requirements over Radioactive Material Shipments	W	2010
7.6	Design Criteria for the Structural Analysis of Shipping Cask Containment Vessels	1	1978

Series 7 – Transport Reg Guides

U.S.NRC
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Guide Number	Title	Rev.	Date
7.7	Administrative Guide for Verifying Compliance with Packaging Requirements for Shipments of Radioactive Materials (for Comment)	--	1977
7.8	Load Combinations for the Structural Analysis of Shipping Casks for Radioactive Material	1	1989
7.9	Standard Format and Content of Part 71 Applications for Approval of Packages for Radioactive Material	2	2005
7.10	Establishing Quality Assurance Programs for Packaging Used in Transport of Radioactive Material	2	2005
7.11	Fracture Toughness Criteria of Base Material for Ferritic Steel Shipping Cask Containment Vessels with a Maximum Wall Thickness of 4 Inches (0.1 m)	--	1991
7.12	Fracture Toughness Criteria of Base Material for Ferritic Steel Shipping Cask Containment Vessels with a Wall Thickness Greater than 4 Inches (0.1 m) But Not Exceeding 12 Inches (0.3 m)	--	1991

Package Tests

U.S.NRC
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- Normal conditions of transport
  - Heat
  - Cold
  - Reduced external pressure
  - Increased external pressure
  - Vibration
  - Water spray
  - Free drop (0.3 t 1.2 meters depending on weight)
  - Corner drop
  - Compression test

Package Tests (2)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

- Hypothetical accident conditions
  - Free drop
  - Crush test
  - Puncture test
  - Thermal test
  - Immersion – fissile
  - Immersion – all packages