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NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON NUCLEAR WASTE

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ADVISORY COMMITTEE ON NUCLEAR WASTE

MARCH 27, 2000

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE

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118th ACNW MEETING

U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Conference Room 2B3
White Flint Building 2
Rockville, Maryland

Monday, March 27, 2000

The above-entitled proceedings commenced at 1:31 p.m., pursuant to notice, the Honorable Dr. B. John Garrick, Chairman, presiding.

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PRESENT FOR THE ACNW:

Dr. B. John Garrick, Chairman, ACNW

Dr. George M. Hornberger, Vice Chairman, ACNW

Dr. Raymond G. Wymer, ACNW Member

Mr. Milton Levenson, ACNW Consultant

Mr. Howard J. Larson, Acting Associate Director, ACNW/ACRS

Dr. John T. Larkins, Executive Director, ACRS/ACNW

Mr. Richard K. Major, ACNW Staff

Mr. John Randall, ACNW Staff

Mr. Amarjit Singh, ACRS Staff

PARTICIPANTS:

Mr. Wayne Hodges, Deputy Director, Spent Fuel Program Office, NRC

Ms. Janice Owens, EDLOW International

Mr. Rob Lewis, Spent Fuel Program office, NRC

Mr. Earl Easton, Spent Fuel Program Office, NRC

Mr. Richard W. Boyle, Department of Transportation, Research and Special Programs Administration, Hazardous Materials Safety

Mr. Keith Brown, EDLOW International

Ms. Amy Shollenberger, Public Citizen, Critical Mass Energy Project.

P R O C E E D I N G S

[1:30 p.m.]

DR. GARRICK: The meeting will come to order. This is the first day of the 118th meeting of the Advisory Committee on Nuclear Waste.

My name is John Garrick, Chairman of the ACNW. Other members of the Committee include George Hornberger, Raymond Wymer, and Consultant, Milton Levenson.

During today's meeting, the Committee will discuss planned ACNW reports on a number of topics such as the NRC's proposed High Level Waste Regulation, 10 CFR Part 63, a Joint Letter with the Advisory Committee on Reactor Safeguards on the Defense-in-Depth philosophy, the ACNW Year 2000 Action Plan and Self-Assessment, and comments on site sufficiency strategy.

We will also discuss Committee activities and future agenda items, and we'll hear a review of the activities underway in the NRC Spent Fuel Project Office.

Richard Major is the Designated Federal Official for today's initial session. As usual, this meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. We have received no written statements from members of the public regarding today's session.

Should anyone wish to address the Committee,

please make your wishes known to one of the Committee Staff.

It is requested that each speaker use one of the microphones, identify himself or herself, and speak clearly.

Before proceeding with the agenda items, I would like to cover some brief items of current interest:

Number one, a review of risk assessment practices for a Congressional Committee will include the use of risk at the NRC, and may be used to shape federal legislation. Representative Tom Bliley of Virginia, Chairman of the House Commerce Committee, has asked the General Accounting Office to conduct the study for the Committee, which intends to review the strengths and weaknesses of federal risk assessment practices.

In his February 2nd request, Bliley asked the GAO to identify and compare general policies and practices across federal agencies on risk assessment, including such details as the treatment of uncertainties and the use of distributions versus point estimates.

As a minimum, the GAO study should include EPA, the Food and Drug Administration, the Occupational Safety and Health Administration, the Consumer Product Safety Commission, and the Nuclear Regulatory Commission.

Number two: The International Commission on Radiological Protection will soon publish two documents that may be significant because they use the new individual

risk-based approach to resolve two of radiation protection's thorniest questions: Addressing issues of long-term protection around solid waste repositories and protection from prolonged exposure to both background and artificial radiation.

The documents are said to be a halfway point in the ICRP's transition, uncertain transition to a very different rad protection system than the one in use today.

Like the new system recommended by ICRP Chairman, Roger Clark, they emphasize individual dose and/or risk, rather than collective dose and societal risk as the basis for regulatory decisionmaking.

I guess there is no reason to get too excited because it is indicated that these recommendations may not be implemented in ICRP recommendations for another five years.

But at least it's an attempt to address an issue that has probably been ignored much too long.

Third: Energy Secretary Bill Richardson recently assigned a task force to review DOE policies governing the release and recycling of contaminated metals and other materials. At the same time, Richardson also announced he will continue a moratorium on the release of volumetrically contaminated metals at Department facilities, at least until the Nuclear Regulatory Commission decides whether to set a

standard for the use of such materials.

A fourth item of interest is that a conference on DOE's draft solicitation for its waste program recently attracted more than 150 individuals representing 65 companies.

The meeting, held in Las Vegas, was to provide potential bidders with information on DOE's plans to hold a competition for a five-year, $3.1 billion contract to run the Agency's Office of Civilian Radioactive Waste Management.

Comments on the draft were due March 6th. DOE plans to post the comments it receives on the Internet.

The final RFT is scheduled to be issued March 29th, and proposals will be due June 8th.

So, with that, I think we will proceed to the item on our agenda that's scheduled for 1:30 to 4:00 p.m. It's Activities of the NRC Spent Fuel Program Office.

The Committee's Consultant, Milt Levenson, is going to lead the discussion on this topic. Milt, I turn it over to you.

MR. LEVENSON: Okay, thank you, John. While there are probably a number of activities under the Spent Fuel Office, this afternoon's session is primarily focused on some of the issue related to transportation.

I think the Committee recognizes that this is a

very complex issue, in no small measure due to the fact that various legislation has made it clear that no one agency has complete responsibility. That makes it a little difficult to get at some or all of the details.

So this afternoon's presentations are aimed at helping to update us on what some of the players in this complex issue of transportation are up to.

Our first presentation was going to be from Bill Brach, who unfortunately couldn't be here today, and Wayne Hodges is filling in for him. Wayne?

MR. HODGES: Thank you. I'm Wayne Hodges. I'm the Deputy Director for Technical Review in the Spent Fuel Project Office, and I am filling in for Bill Brach who was called away for a funeral in his family, and so you get me instead.

The purpose of the briefing is to provide the Committee with an overview of our activities in the Spent Fuel Project Office. And here we have just an outline of the presentation.

I'll be going through the first half of the discussion, talking generally about the activities, and Mr. Rob Lewis will talk about the transportation portion of it. We will be followed then by Rick Boyle, who will be talking about the Department of Transportation activities.

Many of our activities are closely coordinated

with them, and I suppose that he should speak as well.

First, we'll provide a brief summary of the SFPO responsibilities for storage of spent fuel and for the transportation review of all nuclear materials, including spent fuel transportation.

I have a couple of slides that give a picture of the U.S. and we show the location and type of currently operating spent fuel storage facilities, and the planned and -- facilities.

Then I will discuss initiatives we have taken to improve the cask certification and review process; the status of casework completion over the past year; and initiatives we are currently developing to further improve the certification process.

As I say, Rob will talk about an overview of some transportation activities, and two studies we have underway to address spent fuel transportation issues, and then I will conclude with a brief summary of our status of ongoing activities.

The first two bullets here summarize the SFPO's primary responsibilities which are to review and to certify packages for the transportation of nuclear materials, including spent fuel, under the requirements of Part 71, and to license spent fuel storage facilities and certify storage casks under Part 72.

We additionally have the responsibility to develop and maintain the inspection program for both transportation and for storage; to provide technical support to the Regional Offices on these inspections, and we conduct a limited number of inspections of cask and package vendors from our SFPO headquarters office.

The third bullet notes our significant involvement with the U.S. Department of Transportation and the International Atomic Energy Agency on both storage and transportation activities, and a later slide will address our activities in this regard in a bit more detail.

We also review and approve licensees' and vendors' QA program for both Part 71 and Part 72 activities.

This slide and the next one give a picture of the current and planned independent spent fuel storage facility installations in the U.S.

There are currently 15 operating and licensed facilities in 13 states. There are 10-site specific licenses noted by the triangle on this diagram, and five generally-licensed ISFSIs noted by the circles.

Basically a site-specific license requires that an applicant for an ISFSI, that an applicant must describe in detail, all aspects of the planned ISFSI, a site description, the cask system design and operations, and the ongoing controls and programs to be in place to ensure safe

operations.

This process includes opportunities for hearings, and requires NRC licensing decisions and actions. A general license is conveyed to all holders of Part 50 power reactor licenses to use a currently certified cask listed in Part 72 without application to the NRC.

The reactor licensee must assure that their site, planned use, and programs are all bounded by the cask design parameters. Since the cask design is actually listed in the rulemaking process, the opportunity for public comment on that comes through the rulemaking process, rather than through a hearing process.

Also note that the ISFSIs are for dry storage of spent fuel, except for the one at G.E. Morris in Illinois, which has the spent fuel pool for storage.

There are also two existing DOE licenses for storage of spent fuel, the TMI II fuel debris ISFSI in Idaho, and the Ft. St. Vrain ISFSI in Colorado.

There are approximately planed ISFSIs over the next five years or so in 14 additional states. So that once that's completed, essentially half or more of the states will have ISFSIs in them.

The mix of type of ISFSIs is changing as the slide shows, but the most planned ISFSIs will be generally-licensed ISFSIs, not requiring NRC issuance of a

license.

This shows five site-specific licenses and 15 general licenses. Note that this information is based upon meetings with applicants and licensees and general informational future plans.

There is also a third DOE site to be licensed by NRC, and this will be another ISFSI located in Idaho to store Peach Bottom shipping port and trigger fuel. The application is expected from DOE later this calendar year.

Before we leave this page, I want to note that you will see a number of decommissioning reactors which are trying to have a general license for the storage of spent fuel, for example, Maine Yankee and Connecticut Yankee and Big Rock Point.

This will require that these reactor licensees maintain and not terminate the Part 50 license.

The matter of how to transition from a general license to a site-specific license is a topic that we have been having discussions with the industry on.

In the next several slides, I will briefly cover a recently implemented initiative to improve the process and our current review status and initiatives under development.

We have implemented changes to Part 72 cask-specific rulemaking process this year, and all of these changes have markedly improved our efficiency and

timeliness.

Perhaps our biggest changes and gains have been in effectiveness and efficiency and have been due to some of our internal process improvements.

Through our rules of engagement, we have developed review schedules with clear identification of dates and expectations for both NRC review activities and for the applicants.

We have met these dates and expectations, and in so doing we have brought both stability and predictability in the cask review and certification process.

The remaining bullets identify some of the more important tools that we have developed and implemented in this process.

Our efforts to standardize our process and provide clear review guidance have assist both the staff and the applicants. Our use of interim staff guidance documents provides a means for us to implement early technical closure on issues.

Now I will discuss the use of ISGs a little bit more as we discuss the high priority technical issues.

The information on this page covers our fiscal year 1999 and first quarter of fiscal year 2000. Note that there is a shift from the single-purpose storage cask to dual-purpose storage and transportation casks, and we have

been extremely busy. We have had four dual-purpose casks and one single-purpose cask specifically in the rulemaking now, and we expect them to be completed in the next few months, and two applications are under review, and a third application is scheduled for later this fiscal year.

The transportation statistics include both spent fuel and non-spent fuel casework, and the bulk of the transportation reviews are for non-spent fuel cases, and the bulk of that work is for amendments to currently-certified transportation packages.

I have already mentioned the two DOE ISFSIs for TMI and Ft. St. Vrain that were completed last year, and the third was completed also for Trojan.

These three ISFSIs under review include Ranch Seco, which is very near to completion now, and Private Fuel Storage, which we report on the status monthly to the Commission and the Congress, and the third review is to support DOE Naval reactors.

We are performing a technical review for their planned Naval Reactor Fuel ISFSI in Idaho.

The technical support to the Naval reactors is being done under a reimbursable agreement and will not result in an NRC license. I want to draw your attention to the footnote which highlights the shift in casework from reviewing new cask designs to amendments of

currently-certified cask designs.

You can see that the workload shift and the number of cases, each cask amendment will result in a rulemaking to amend the certificate, and I will discuss this more on the next slide.

I want to focus on the NRC Staff activities that are underway to streamline and improve the certificate process. First, we're working to assure that certificates only contain conditions that are required; for example, where the technical basis exists, to support parameters or bounding numbers, we're using the data in the certificate, instead of individual point numbers.

And you may have heard a phrase called "smarter certificates," and that generally refers to this effort.

Secondly, we are standardizing the technical specifications and building on the reactor initiatives in this area.

Again, a goal is to assure that the tech spec contains only what is truly needed, and that other information stays in the safety analysis report.

Third, these efforts support the implementation of the changes to 72.48, which will allow licensees and certificate-holders to make changes to the cask systems without NRC prior approval and review, as long as the specific change does not result in a change to specific

conditions or technical specification.

As noted in the slide, we are working with the industry to develop guidance for the implementation of 72.48. I believe that, collectively, these actions will improve the effectiveness of the amendment process.

We recognize that alternative approaches to specific amendment rulemaking need to be examined. One suggestion is to revise Part 72 to specifically identify the types of amendments which can be implemented through direct rulemaking.

As long as an amendment falls within these limitations, the amendment could be issued as a final certificate change and final rule, and other options are also being examined.

Another process area of high SFPO activity is the preparation for license renewal. We have a group that we have formed to develop guidance and the technical basis to support renewal, and we will be ready for the first dry cask license renewal, which will be submitted early fall of this year, and it will be for Surry -- excuse me -- early fall of 2001. Excuse me, I got the year wrong. It is for Surry and their actual license expires in 2006, and I think they are required by law to come in two years ahead of that, but since this is the first one, they wanted to come in early enough that there would be no particular problems, and so

they are coming in in the fall of 2001.

And we, basically, we have a group that we have formed to develop guidance for that and discussing with them this summer what we need to see in an application.

We had a meeting or a workshop in mid-December with the industry and the purpose was to identify and discuss the prioritization of technical issues needing resolution to support dry cask reviews, and there were two issues that stood out well above all the others. One was for high burnup fuel, which was the industry's highest priority. Plants have had fuel in reactors up to 62 gigawatt days per metric ton.

Our current limits have been up to 45 gigawatt days, and we, as a part of the review that has been done just recently for both the westflex design and for the MAC design, we have come to a mechanism for approving for higher burnups, and that will be issued fairly soon in an ISG revision to be used generally by all the applicants. And this is one of our highest priorities that we are working on as well. In addition to the information that can be used in short-term, there is also a long-term research effort, a research effort to get more data in this area, and it is a cooperative program with DOE and EPRI.

Now, we will probably point out, the slide here says 60 megawatt days per ton, it should be gigawatt days,

not megawatt days.

And the other issue, the second highest issue on their list was for high burnup fuel -- high burnup credit, and, traditionally, the cask reviews have proceeding assuming fresh fuel for the purposes of doing criticality analysis, and we have been exploring ways to give some credit for the burnup that actually occurs, and we issued two revisions, first an ISG last May, and then a revision to that ISG in September which gives some credit for the actinides in order to give some credit for the burnup. And there is still work going on, we see other revisions coming down the pike.

We think this is a success to be able to do that. We are proceeding towards more realism in what we do and it allows putting more assemblies in the cask. There is still more to be done on both high burnup and burnup credit, and from our meetings with industry, we are working to develop additional revisions to our internal -- interim staff guidance and we think we are making good progress.

At this point I will turn it over to Rob Lewis to talk about transportation.

MR. LEVENSON: Before we do that, I have two questions about what you have covered so far.

MR. HODGES: Sure.

MR. LEVENSON: One is a matter of my not

understanding, I think, what you said. You said that for operating reactors, or people with a Part 50 license, if they use preapproved casks, et cetera, they did not have to apply specifically for an NRC license, is that right?

MR. HODGES: That is correct. They already have a license under Part 50.

MR. LEVENSON: But then why do they not show on your chart for existing licenses, if they already all have them? Is there something different about those sites that show on your map?

MR. HODGES: Well, it is a Part 50 license as opposed to a Part 72 license.

MR. LEVENSON: Okay. So this is not all of the operating spent fuel license sites, this is --

MR. HODGES: Well, the ones in triangles are site-specific Part 72 licenses. The ones --

MR. LEVENSON: Right. I am talking about the circles.

MR. HODGES: The ones in the circles are where they have a Part 50 license, but have an ISFSI to store fuel under a general license.

MR. LEVENSON: I thought you said that every site has that general license.

MR. HODGES: Well, --

MR. LEVENSON: That is what I am trying to clarify

is, what is different about these circles from other reactor sites?

MR. HODGES: These are ones where they are storing spent fuel.

MR. LEVENSON: Yeah.

MR. HODGES: The other reactors in dry storage. The other reactors, I mean all reactors have a Part 50 license, but if they don't have dry storage of fuel there, then they don't have a circle.

MR. LEVENSON: Okay. So this is just ones that are now doing it, not the ones licensed to do it? That is what I am just trying to clarify.

MR. HODGES: In a sense, they are all licensed because they all have a Part 50 license.

MR. LEVENSON: Right.

MR. HODGES: And if they choose a cask it is listed in the Part 72.

MR. LEVENSON: So they don't need your approval to add circles to this map.

MR. HODGES: That is correct.

MR. LEVENSON: Okay. The second question, this is one of ignorance, is on your Figure 5, what is the Owl Creek site in Wyoming?

MR. HODGES: That is a private -- I think it is private -- private storage facility that is left from a

consortium of utilities.

MR. LEVENSON: Oh, okay.

MR. LEWIS: Okay. This is slide -- I am Rob Lewis, I am the staff lead for one of the transportation risk studies that you wanted to hear about today, and the other staff lead, John Cook, is in the crowd, so, hopefully, we will be able to answer any questions you have about those studies.

But this slide gives an overview of my talk, the transportation part of today's talk, and I will start off with a single slide on our role and activities that SFPO has for transportation, and they will complement the talk that DOT will give later. Then I will have a couple of slides on one of our major activities we have underway, which is revisions to Part 71 for international compliance with the IAEA regulations. And then we will have several detailed slides about the transportation risk studies. Then I will turn it over to Wayne to summarize the SFPO part of the talk and then Rick Boyle will come up to talk about DOT's roles.

In SFPO we have the agency lead for all transportation matters, whether it be reactor of materials, and as that, we are the single point of contact with DOE -- DOE, excuse me, and we support DOT in the activities at the International Atomic Energy Agency with respect to their periodic revision of their transportation standards.

We have -- one major part of our role is to assist other NRC offices. As an example of that, we recently participated in the review of the Yucca Mountain EIS, the Draft EIS from the Department of Energy, and we also participated in the Environmental Statement that was prepared in support of the nuclear power plant license extension rule, which were changes to 10 CFR Part 51.

We daily receive calls from inspectors or regional offices that may be out in the field and see something they are not to sure of, and they call us to find out what the transportation requirements should be.

One of our major roles is to certify transportation packaging designs for large quantity packages and for fissile packages. And, as Wayne mentioned, we have 50 transportation casks in-house under review.

We issue quality assurance program approvals and instructions -- inspections in support of the transportation program, as well as the storage program for spent fuel. And we do reviews of the routes that are selected. With respect to those routes, physical security, physical protection aspects. We look at the routes to see where the safe havens have been identified and, in some cases, we actually have regional staff that drive the routes.

And we also are the agency lead for resolving generic issues. Wayne mentioned high burnup and burnup

credit. Burnup credit started as an issue for transportation casks. We currently -- the standard has been that fresh fuel assumption is used in analyzing criticality for the transportation casks. DOE has for several years tried to get a topical report approved on burnup credit and, also, more recently, we have issued an interim staff guidance on burnup credit.

As for Part 71 rulemaking, periodically, the IAEA transportation standards, which appear in a document called ST-1, are revised. That occurs on a 10 year cycle currently. The U.S. regulations, as well as the regulations of the rest of the world, are currently compatible with the 1985 versus of the IAEA standards.

The entire world is in the process of revising their requirements to be compatible with the 1996 version. Now, the nature of those changes that were undertaken in this revision cycle are fairly minor. There is no change to the overall approach to transportation safety or the cask certification scheme. There are some changes in details, for example, certain packages transported by air, large quantities by air have a higher package standard. There is some additional fissile material standard for transportation by air, and there are some additional requirements for uranium hexafluoride packages. Those affect more the DOT, I am sure that Rick could elaborate on that.

The thing we have done so far in our rulemaking process is we are in the process actually of identifying the provisions in Part 71 that will need to be changed in order to be compatible with the ST-1 standard. And so far we have identified about 13 topics that paragraphs in Part 71 would need to be changed to bring us up to international compatibility.

The implementation date, I should say, for 1996 ST-1 is -- the worldwide implementation date is January 1st of 2001. Very few countries are on pace to meet that date, but certain mobile organizations like the International Civil Air Transport -- International Civil Aeronautics Association are on pace to adopt it in that time.

There is also in Part 71 some non-IAEA changes, and this is the second bullet, second main bullet. For example, we recently revised Part 72 to include a change process that allows for small changes to be made to casks without NRC proapproval, similar by reactor facilities, similar to the existing authority reactor facilities have to make changes to their plant without NRC proapproval if there is no safety questions involved.

Another change is we have an outstanding petition on the double containment of plutonium. We currently have a requirement in Part 71 that says that any packages bearing greater than 20 curies of plutonium must, first of all, the

plutonium must be in solid form and, second of all, a double containment system, basically, a package within a package has to be provided for that system. We have a petition that asks us to remove that requirement and, as part of this Part 71 rulemaking, we intend to resolve that petition.

We want to expand the scope of Part 71 to include certificate holders. This is an issue that we have already changed in Part 72, and what it amounts to is, under the Atomic Energy Act, we have, we believe, the authority to issue notices of violation to certificate holders. But right now there is no mechanism in Part 71 to do that, so we have been issuing these notices of non-compliance or something like that. So this is the intent of that change, to allow us to write notices of violations.

And, finally, in 1997, as a result of some material being returned from the former Soviet Union that contained beryllium, we recognize it though as a nonconservatism in our regulatory approach, and we changed that with an emergency rule. That is called the Fissile Exemptions Rule. And the effect of that rule was that there were certain requirements that beryllium is being a better moderator than water, and the rule is being based upon water moderation, the rules didn't handle it well, so we added emergency, a final rule in 1997 to change that situation, to correct that nonconservatism.

And that rule had some unintended impacts upon the industry and we solicited comments when we issued the final rule, and as part of the Part 71 rulemaking, we intend to resolve those comments.

As far as the process for Part 71, the staff would like to use an enhanced public participatory approach for Part 71, similar to the approach that was used in 10 CFR Part 63 for Yucca Mountain, where we went out and actively did meetings and got people's comments at the meetings and brought them back and included that in developed the proposed rule, and also in resolving comments to the proposed rule.

Part 70 rulemaking recently was -- the proposed rule was issued and a final rule is pending, but that also used the enhanced participatory approach. We haven't -- we have to describe in the near future to the Commission, I think we owe them, in May, a plan that will describe the approach we plan to use for Part 71. So that is why I leave it, we plan to do this, not we intend to do this, at this point.

We are, of course, coordinating changes with Part 71 with DOT. The DOT requirements and the NRC requirements need to be consistent. They both -- they overlap in a lot of respects and we would promulgate our rule in concert with them promulgating their rule so there is no period of dual

regulation that isn't consistent. And our current schedule would have us issuing a proposed rule next March.

Now for transportation studies that have been studying since, basically since NRC was created back in the 1970s. In 1977 we published the first comprehensive evaluation risk study of transportation safety. I should say I have a detailed slide on each of these studies. This just shows the overall picture of how things have evolved.

Based upon the 1977 EIS, in 1981 the Commission issued a finding that the current regulations provided an adequate level of protection and no immediate changes were needed but they stipulated that prudence dictated that we continue to look at these issues of transportation and subject them to close and continuing review, and that is what we have been doing ever since.

In 1987 the next major study was issued. It is called "Shipping Container Response in Severe Accidents" but everybody knows it as the Modal Study, because it looked at the different modes of transport including highway and rail modes. That study was prompted more or less in response to some questions that were raised regarding return of fuel to reactors due to the closing of the West Valley Reprocessing Facility. That study looked in greater detail at the accident portion of the Environmental Impact Statement assessments.

That brings us to today and shortly I guess -- it is in publication right now -- we will issue this document called "The Re-Examination of Spent Fuel Risk Estimates," which is akin to a revalidation of our conclusions from 1977 based upon the newest technologies, not only the newest analysis tools but also the changes that have occurred as a result of larger, dual purpose casks being used, shipment instead of to a recycling facility, shipment to a repository and changes of that nature.

The next step in this ongoing process will be the package performance study which we have just begun, and we are in the scoping study phase of that project. By the end of this fiscal year we plan to move beyond the scoping study.

NUREG-0170 once again was the first comprehensive look at the transportation safety using the existing NRC and DOT regulations. This is not an EIS done in support of a change to regulations. It looked at the existing set of regulations which for package certification purposes really haven't changed all that much, but it looked at the existing regulatory structure and decided what level of safety that provided.

It assessed both public and transportation worker impacts for both incident-free transportation and for accidents, transportation accidents, for all radioactive

materials -- spent fuel is only one of 25 different materials. Medical shipments I think are the biggest fraction of number of shipments and it included all those too.

This document is still used as the basis for NRC's and DOT's regulations and the studies since 1977 have continually affirmed that its conclusions are valid, that being that NUREG-0170 will have predicted a certain amount of personrem. In 1981 the Commission concluded that that amount was acceptable and the subsequent studies have always predicted lower personrem because of the conservatisms that were built into the original project, because they didn't understand or they didn't have good data on things like accident response of casks and stuff like that.

So regarding spent fuel, the spent fuel was one of five 25 materials studied. The 0170 report assumed a reprocessing economy and predicted shipments in 1978 and predicted shipments in 1985 of about 2,000 per year -- 1500 truck and 600 rail or something like that. Those of course were never realized because the reprocessing economy was abandoned, and the total population dose is from spent fuel that NUREG-0170 predicted in personrem are stated in the last line.

Very simple accident release was used in NUREG-0170 and there was no modeling. It was just if there

is an accident of this severity "x" amount will be released. I think the maximum release was something like 300 curies of cesium or something. It was just based on engineering judgment alone.

The Modal Study, which was finished in 1987, only looked at spent fuel and it was done, as I said, partially because of the shipment, the questions that were asked during the return of shipments from West Valley to the utilities. The Modal Study took advantage of some new tools that were available, finite element analysis became more feasible to do. The computer power had increased enough and so what we did in the Modal Study looked at some historical accident rates, tried to calculate severities of those accidents based upon developing a fault tree type thing of what could go wrong in an accident and what fraction of the route length would involve hard surfaces along the roads and stuff along those lines, and looking at the impact forces and the thermal forces that could be created in accidents that tried to predict releases from casks, from spent fuel casks using a finite element analysis of the cask wall.

It didn't try to model the seal mechanism, the lid, because the computer power wasn't available at that time and the cask wall was presumed to be an adequate representation.

Also, one other thing it did was it related the

Part 71 hypothetical accident tests which are the 30 feet drop onto an unyielding surface, the 40 inch drop onto a mild steel bar, six inch mild steel bar, and the 30-minute fire immersion at 800 degrees, and it tried to see where you stood in the real world realm of accidents if you minimally met those tests.

The conclusion there was that those tests encompass about 99.4 percent of accidents that could occur, whether they be rail or highway.

It also did some case studies of some historically very severe accidents and postulated what would happen if the spent fuel casks had been involved in those accidents. The Caldecott tunnel fire I think is one of the most famous severe fires and they concluded that had spent fuel casks been involved in that fire it would not have been damaged to the point of releasing its contents.

The final conclusion it drew was it did compare its results to -0170 and determined that the risks were about one-third of those from NUREG-0170, so that brings us up to the current study we have underway, about to publish. Actually it is, the study is done.

Once again this looks only at spent fuel shipments, only at normal risks, and accident risks, transportation accident risks, and instead of looking at reprocessing economy this looks at possible combinations of

storage and repository locations and route length from reactors to those locations, and it looks at current cask designs, modern fuel properties like higher burnup, more realistic cooling time than was used, a 90-day cooling time in -0170 was assumed.

One of the things it does is also models, explicitly models the closure, the cask closure system, with a finite element model to see what the cask closure system response is to impact and thermal forces, because the cask closure system appears to be the most likely place were a release path could be created in an accident.

It used RADTRAN 5. RADTRAN 1 was the risk code that was developed to perform NUREG-0170. It is up to RADTRAN 5 now and it is a much more detailed code, with many different input parameters that can be chosen and actually for this study we did do a little bit of sampling of some of the key variables to see what the sensitivity of those variables were to the result. Some variables like the package radiation level, the regulatory limit is 10 millirem per hour, two meters. That was a variable that was sampled in this study to look at the effects, because not all shipments are expected to be done at the regulatory limit, especially as the cooling time of the fuel increases.

That turns out to be one of the most important variables. Population density is an important variable.

Duration of truck stops is an important variable, and that is one we sampled to see -- it is kind of adding a little bit of probabilistic aspect to the study but by no means is it a probabilistic study. It is still a very deterministic analysis. The LHS sampling method was used for that.

The result that we are getting for this report which we are about to issue is that the risks that this study calculate are in a best estimate type analysis less than the risks represented by the Modal Study, which are subsequently about three times less than the risks represented by NUREG-0170.

We have just started, as a matter of fact next week we are going out to Sandia to help them in their efforts to write a plain English complement to the technical report that we are about to publish.

MR. LEVENSON: Would you be willing to make a guess as to what percent of the reduction in risk is due to the fact that changes in the properties of the fuel, longer cooling, et cetera, are a significant part compared to improved methods of analysis?

MR. LEWIS: The age of the fuel has an effect in the accident risk but it is not as much a big effect in the incident-free risk, which tends to dominate the overall risk anyway because the incident-free risk is really only based on the dose rate at two meters from the package.

MR. LEVENSON: But that comes down also with longer cooling?

MR. LEWIS: Right, but the RADTRAN code doesn't calculate based on the cooling time of the fuel. It just assumes that it is 10 millirem --

MR. LEVENSON: It assumes the limit.

MR. LEWIS: -- or in our case we might have gone down to 8 or something, but it assumes that everything is at the limit so the normal risks tend to dominate by a factor of 10 or so the accident risks.

The accident risk though does change with the different cooling time because of the source term change.

I could not give a quantitative guess off the top of my head.

MR. LEVENSON: No, but I think the important comment was your one that the normal risks dominate.

MR. LEWIS: Yes, because the 10 millirem per hour, two meter exposes many people. It exposes a greater number of people along the entire route as compared to the accident risk you have to calculate the probability of an accident occurring in the first place and the probability of it being in an urban area falls in there too.

MR. LEVENSON: Would you care to comment on the recent French decision to stop decontaminating casks because yet more people are being exposed decontaminating casks than

would be exposed if they shipped them that way?

MR. LEWIS: Well, when you look at arguments like those, the contamination limit on the cask is going to be something, so there is a certain amount of exposure you get, that the workers at the power plant will get to determine the contamination level, whatever it may be.

I think that even if the Europeans are not entertaining raising the contamination level that has been in existence, that contamination level, by the way, is not really meant for spent fuel casks, it is meant for the materials package that maybe a thousand packages a year goes through some FedEx facility and the same guy handles each one, and that is where the basis for that contamination limit comes from.

So the short answer is that I don't buy into those arguments. I don't think it is a big impact. Nobody in the U.S. -- we have had also experience with casks. I don't think it's been an issue that has raised a lot of alarms.

DR. GARRICK: Excuse me. If you were to exclude collective dose as a consideration and only look at it on the basis of individual dose, would you change anything that you are doing?

MR. LEWIS: Well, I don't believe we would. We did look at the maximally exposed individuals for normal transport and for accident transport, accidents that could

occur during transport and those values I don't have on the top of my head but they are definitely less than like 100 millirem per year for the incident-free.

You get into a lot of, you have to make a lot of assumptions like the amount of time -- say you are stuck next to it in a traffic jam. Theoretically if you are stuck there you get 10 millirem per hour. Say you are two meters from the cask. Well, how many hours would you be stuck in a year and if there's multiple shipments, how many traffic jams would you be stuck in next to a cask? You have to make some assumptions and I think that we are comfortable with the assumptions we made and the doses we got.

DR. GARRICK: Yes, but those are pretty reliable assumptions. I mean there's tremendous amounts of data on traffic and traffic delays and of course it is coming at us with much greater abundance now than ever before, so there shouldn't be a great deal of uncertainty associated with being able to represent and characterize how a cask would move over a particular path, it would seem.

MR. LEWIS: Yes, I don't think -- I wasn't making that point. What I was trying to say, I think, is you could take a very simplistic assumption. I think that the state of Nevada maybe has tried to analyze this and for example using the 10 millirem per hour they assumed a person could be stuck in traffic for four hours. Therefore, their dose

is 40 millirem from that traffic and I think that neglects a lot of factors that you could debate whether you should include, like shielding that is between the people, the actual distance, whether it is two meters or 2.5 meters tends to impact that a lot.

It's an argument that you have to justify what you do. Although you might not want to be ultra-conservative, you want to be on some middle ground there.

MR. LEVENSON: Let me ask a slightly different question. Since all of these shipments are monitored, the data must exist. What fraction of the shipments actually are at the 10 MR limit? What fraction of them are significantly below that? This is a case where we must have a very large database. Why do we continue with a hypothetical number? We have a database

MR. LEWIS: And I don't know the answer to that. Maybe Earl does.

DR. GARRICK: Microphone. Identify yourself first.

MR. EASTON: Earl Easton. I am with Spent Fuel Project Office.

A lot of the newer casks have not been used yet. The ones that are going to be optimized to go to the repository are being designed right up to the limit to get the maximum amount of fuel in, so a lot of the data, yes, we

have is very good, but we are anticipating an optimization of casks to lower the number of shipments, to lower the expense. It might be right up against the limit.

MR. LEVENSON: But do you have any data on historically what it has been? That was really my question.

MR. EASTON: I think there is some data. I think there is -- actually there was a NUREG done by the NRC that tried to predict the average TI. That is the limit from transportation casks that the Department of Energy tried to use in its Rad Protection Program. I think it is referenced average.

Do you know the number, Rick?

MR. BOYLE: No, I don't.

MR. EASTON: No? Well, we could probably get that to you but I think --

MR. LEVENSON: My question is really a very simple one. All of these casks you have calculated would come out 10 MR and now they have all been measured, the ones that have been used in the past. The question is a very simple one. How good was your modeling? Is the radiation from the casks one or two orders of magnitude less than calculated or is it more?

I am not sure -- I am not asking in pejorative way whether it is less or more, but certainly by now every cask that has moved has been monitored "x" times. Don't we have

any data, real numbers compared to the postulated numbers?

MR. LEWIS: We did sample the dose rate that comes from the casks. It is not a variable that varies orders of magnitude. It is going to be between like five millirem per hour, 10 millirem per hour, in that area, because the cask is designed to hold its maximum contents and be 10 at that point. That is one of the criteria we have in Part 71. There's other criteria that may actually be more limiting on it, but that is one of the criteria, but what we have done in risk assessments is two things.

First, we assume that all the casks are at the limit of 10 and that gives us a data point if you will -- this is what, this would bound the risk certainly, and then we have also looked at the distribution of the more realistic cask dose rates and decided how that variance has a sensitivity effect on the answer, and all that is wrapped into this overall conclusion that risk is lower than -0170, it is lower than the Modal Study.

MR. LEVENSON: Go ahead.

MR. LEWIS: Any other questions?

DR. GARRICK: Well, I just wanted to pick up on one thing before we get off the fuel cask business and onto the regular transportation issues.

The studies that you have done, the risk study, the Modal Study, these have been based basically on finite

element methods and risk assessment methods, fault tree methods and so forth.

In the '70s there was a great deal of testing of casks at Sandia -- railroad crash tests, truck crash tests -- and I realize the design of the casks have changed with time, but how much of that experience has been brought forward into these particular analyses? How much --

MR. LEWIS: Explicitly --

DR. GARRICK: -- are these analyses test supported, I guess?

MR. LEWIS: There was no explicit attempt to incorporate that test information into the re-examination study. One thing we are doing, and it is a good segue into the next slide, is the package performance study will consider the benefits of testing and it has as part of its scoping study to look at what testing had been done in the past and how that could help us, but what I should say is that that testing was done in Sandia Labs. Sandia Labs has done the re-examination and they are also our contractor for the package performance study, which is the next one I will talk about, but the NRC did not sponsor that testing, and the testing was done for illustration purposes, in the colloquial saying. It was done for illustration purposes. It wasn't done for the intent of demonstrating any degree of safety quantitatively against our Part 71 approach, so we

are incorporating what they have done insofar as they could assist us.

We asked Sandia to include that in their issues report they are going to give us at the end of the scoping study, but in reality I don't believe that testing will give us very much useful information in terms of these new products.

DR. GARRICK: So, are you saying that the designs really haven't had an evolution or much of an evolution? I would think that people that are in the cask design business would have relied very heavily on those tests.

They were very convincing, and there was a large series of them and they were very expensive tests. I'm a little surprised that they're sort of just set aside as not being applicable to Part 71 specifications when what we're talking about here is the physics of failure of cask design that can be reduced to some pretty fundamental considerations, it would seem to me.

As a risk analyst, I would -- the first place I would go to to get a sense of how to model these casks and what kind of input to put into my model would be those tests. And I would look for differences between the design and the way in which those casks were designed and the ones that we're trying to analyze.

From a risk assessment standpoint, that's an

enormous insight with respect to the kinds of failure mechanisms that can take place, and the consequences of impact forces and heat and what have you.

So I'm a little surprised that in all of this, there seems to be such a little tie with what at one time was a very intense activity of tests performance at a time when there were hearings and debates between the railroads and the utilities and law suits and tremendous amounts of information brought forward to try to correlate train accidents, for example, and the kind of severities that you could get with these kinds of accidents, with cask failures and the consequences of those failure.

MR. HODGES: Well, I'm not aware that those tests were well implemented to get them the data you might need. As you say, they were used more to demonstrate that the casks were robust than to get that kind of data.

But I think the number of non-spent fuel shipping casks are tested and are analyzed with the same computer codes that are used specifically for the spent fuel casks.

If you look at the crash tests that the automobile industry does on automobiles, they analyze them with the same computer codes we're doing for spent fuel casks, and so there is a fair amount of validation of the physics that is modeled in those codes.

DR. GARRICK: Well, maybe what you're doing here

is not taking credit for that kind of knowledge and information base that exists.

MR. HODGES: Right.

DR. GARRICK: And you're maybe not doing yourself as much justice as you should, because the impression here is that these are just analyses.

MR. HODGES: These specific analyses were not based -- were not supported by testing, though.

DR. GARRICK: Well, I don't believe that. I don't believe that. I think the people that were doing the hard work were very much aware of the results of those tests and the documentation that supported those tests, of which I've still got some -- it's that much -- as being extremely valuable in the way in which I would model these casks.

So I think that's a wrong statement. I just don't accept that, as an analyst. I think that there is a continuity here at the analysis level and the modeling level that probably exists that you're not manifesting in these kinds of presentations.

Or else the analysts that are doing it are not taking advantage of it. That's my only point.

MR. HODGES: Okay.

MR. LEVENSON: Let me just comment. My view of such things is normally quite different than John's because I'm of the old school of engineering which makes any

analysis suspect if it isn't supported by a test.

And even though the tests were completely different kinds of casks and different conditions, it seems to me that benchmarking what you now think is a proper code against those tests would certainly give a large amount of credibility to your current analytical methods and so forth.

If you can't benchmark them against the newest designs that haven't been tested yet, but if you're code doesn't predict what really happened in the old ones, then I think you've got a suspect code that I think you better take a look at.

MR. LEWIS: Maybe I could address that in the context of when I talk about package performance studies. Because, I didn't mean to leave the false -- it is a false impression that we don't think there's anything useful to gain from the tests that were done in the past.

That was one of our reasons for selecting Sandia. Some of the people that are on our team at Sandia were involved with those tests.

DR. GARRICK: That's my point, that I suspect that there is a continuity of knowledge here that is very beneficial to this whole process, and that there is a stronger tie with fundamental measurements and observations than maybe you're taking credit for.

MR. LEWIS: In the package performance study,

again, we'll only look at spent fuel truck and rail packages. In this case, we will focus on the accident portion of the risks, not the incident-free risks.

And what we intend to do is, as the reexamination was built as a logical followon to the 0170 project, the package performance study is the logical followon to the Modal Study component of that.

And people say -- people have called this Modal Study II, including myself, call it Modal Study II. We're not redoing the Modal Study, because we don't believe that anything is inherently wrong with the original Modal Study.

What we are doing is, we're building upon that, and we're building upon the 2000 reexamination study as an additional tool to make the safety case.

The goal of the package performance study will be to assess severe accident cask performance and fuel performance. We may look at the behavior of the fuel inside the casks in greater detail than we have in some of the previous studies.

Of course, that would have to assume that the cask already has a leak path due to the accident.

One of the major points of this scoping phase that Sandia is currently contracted to do is to consider the need for and benefits of physical testing, whether it be partial scale or whether it be full scale, and not only physical

testing at the hypothetical accident conditions in Part 71, the 30-foot drop and so on, but physical testing beyond that realm into the 90 mph collision, say, to see that our risk codes and estimates in that realm are representative. Therefore, we could determine the risk significance or insignificance in that very severe accident realm in greater detail.

And we are, as I mentioned, using an enhanced public participatory approach, which is the subject of a slide in a second, so I will get to that.

But where we are today, we have a contract with Sandia Labs to do --

MR. LEVENSON: Excuse me. On the previous slide, I've got the question of -- are the packages by which the vitrified Defense wastes will be shipped from Savannah River to Yucca Mountain, if that's where they go, are those licensed shipping containers, by NRC?

MR. LEWIS: Yes, they will be certified by the NRC because the Nuclear Waste Policy Act requires all high level waste --

MR. LEVENSON: So it isn't only spent fuel? That's my question, where do those casks fit into this picture?

Your slide says spent fuel only.

MR. LEWIS: Well, we focused on spent fuel because

it's the larger component of the risk of the shipment in an accident.

MR. LEVENSON: But you also have a responsibility for those. Part of what we're trying to do is sort out who's responsible for what.

MR. LEWIS: We would certify any high level waste package that would be going to Yucca Mountain. That's my reading of the Nuclear Waste Policy Act.

Sandia is working, and as we speak, they're working on the scoping study phase. We've gone out to the public and collected public comments on the package performance study.

We made up a bunch of issues, and got roundtable of experts and kind of did a brainstorming, all-day roundtable session to find out what could be and what maybe should be done.

The second part of the scoping study is to do a literature review and determine what tests have been done in the U.S. and worldwide, because there are some tests in England and Japan, I understand, that have also been done on spent fuel cask performance against the IAEA standard.

Of course, there is a lot more experience in shipping spent fuel internationally than in the U.S., and the international standards are essentially the same as the U.S. standards for Type B spent fuel type packages.

And the product of this first phase is going to be the Issues and Issues Resolution Options Report, which is due to NRC at the end of next month. It will take us a month or maybe a month and a half to turn it around and give it out to the public.

Our intent is to share that Issues Report with the public. This issues report is akin to a proposal for followon research. It's kind of a joint proposals from NRC to the public and from Sandia to NRC.

And it will describe the approach by which we plan to proceed for the next phases. We currently do not have any contract for anything beyond this scoping study phase.

MR. LEVENSON: I have one other -- sorry, going back -- clarification question on what's in your scope. Does NRC license the casks that are used to ship spent fuel back to this country from overseas reactors?

MR. LEWIS: We issue a revalidation of a foreign competent authority certificate through a request from the DOT, which is kind of yes.

I mean, we do look at the casks, any import/export casks for spent fuel.

DOT wanted to add something.

MR. BOYLE: Yes, both. If they are domestic, there are certain casks that are manufactured in the U.S. that are licensed by the NRC first, then revalidated by the

Department of Transportation, which then are shipped overseas to retrieve the research reactor fuel.

There are also foreign packages that get foreign certification first, are sent to the Department of Transportation. We ask for the NRC's review and recommendation before we issue a license, so there are both types used for that research reactor shipment.

MR. LEVENSON: Thank you.

MR. LEWIS: Thanks, Rick. Like I said, we are using for the package performance study, this intense public involvement process, not only in describing how we're proceeding with the study, but designing the study itself.

We have a website established which has study information on it, and a forum for interactive communication on the project.

We have held workshops last year. At these workshops, we had DOE, DOT, the nuclear industry and the transportation industry, all collected at a roundtable, as well as others like the International Atomic Energy Commission came to one of them.

As I said, we had this session where we presented some ideas and Sandia presented some ideas, and we just kind of brainstormed on what should be done.

We held some public outreach meetings in Nevada. We had a workshop in Nevada, like I just described, and we

also had some more traditional public meetings in Nevada, kind of town hall type meetings in the December timeframe.

We have a study mailing list which we haven't used much because we don't have any products yet, but we do have this mailing list we're compiling.

We have planned for additional workshops, once we get this first phase product, the issues report. We're going to go out to the public and present it in workshops this summer.

At those same workshops, we'll also present the results of the reexamination study that will be published this month, and hopefully between this month and the public meetings, we can let the public have a chance to digest it, as well as get the public consumable brochure, the plain language version out in time for those meetings as well.

And so that's all I had, and unless you have questions, I'll turn it back over to Wayne for the summary.

MR. HODGES: In summary, we think the reactor licensees will have more options for dry cask storage available. There should be four dual-purpose casks available by the end of this calendar year.

We have established rules of engagement and schedules for review, and as a consequence, the FSPO staff has met all schedules.

We have introduced a stability and predictability

to the review process.

There are areas for improvement, both in the process, procedural improvements such as amendment process, and for resolution of technical issues such as for high burn-up fuel and burn-up credit.

We're actively engaged with both the industry and the public in discussing the issues related to spent fuel storage decommissioning and transportation.

As far as the transportation studies themselves, we're positioning ourselves to be better prepared to address questions on the large shipment campaign when it does come, and we're actively seeking public participation as we go along.

That concludes the presentation, and we're open for questions.

MR. LEVENSON: Yes, for clarification on this last point, there is a large shipment campaign. I'm just trying to sort out who is responsible for what.

It's clear that the NRC licenses the shipping container. You say that you review routes; you earlier mentioned that.

But exactly what is your responsibility in the overall transportation picture, other than licensing the casks?

MR. BOYLE: You might want to let my presentation

go first.

MR. LEWIS: You might want to hear from DOT, but our responsibilities are specified in Section 180 of the Nuclear Waste Policy Act, and they are limited to certifying the packages for high level wastes that go to Yucca Mountain, and DOE must also use our advanced notification procedures in shipments to Yucca Mountain.

DOE has the responsibility to do training along the route. That particular paragraph of the Act doesn't mention anything about NRC's role there.

MR. LEVENSON: What is covered under what you call physical protection that you said you were responsible for? Are those guards? What does physical protection mean?

MR. LEWIS: Physical protection is the term we use when we talk about our 10 CFR Part 73, which is prevention of theft of the material, as well as that provision also has the safeguards rules in there.

Our requirements involved armed escorts through cities, immobilization devices in the truck, yes, constant communication capabilities, and one that's slipped my mind -- oh, safe havens be identified along the routes and things of that nature. It's not safety; it's our safeguards aspect of the Agency's role.

MR. LEVENSON: Oh, so it's safeguards, not safety.

MR. HODGES: Safeguards.

DR. GARRICK: Wayne, NRC has just finished risk assessment, spent fuel pool risk assessment.

Has there been anything -- I haven't -- I have just barely glanced at that, but has there been anything in that study that has been of any help to your studies?

I'm thinking primarily of any special work that was done to quantify the source term and the integrity of the fuel and what have you.

Is this providing you with any additional source material that enhances the quality or reduces the uncertainty of some of your analyses?

MR. HODGES: I haven't personally even looked at that one yet, but some of the staff may have.

DR. GARRICK: Okay.

MR. HODGES: But I'm not aware of anything at this point. We are having some work done in the Office of Research now to help out with the study that we're starting on risk in dry cask storage. And that should be done soon.

DR. GARRICK: Well, the other thought I had there is that I don't know how far you're pushing the risk-informed methods. But I would have thought that on that particular study, they would have pushed them pretty far.

And it's possible that there would be some.

MR. HODGES: Yes, but it's a different set of

issues that you deal with. Our failures tend to be things like cladding creep over a number of years as opposed to the kinds of things you might have in a pool, and so it's a different kind of a technical issue.

DR. GARRICK: Yes. One final question: Have you attempted to characterize the importance of what one might call the accident risk versus the routine risk or the acute risk versus the chronic risk?

There are a lot of people that believe that there are very important tradeoffs with respect to those two, especially if you don't get too hung up on the collective dose angle.

MR. HODGES: Right, and I think the Modal Study and this more recent study would tend to show that the normal risks are larger than the transportation and the accident risk.

DR. GARRICK: Yes, yes. I think it's important for --

MR. HODGES: Both of them being small.

DR. GARRICK: For some sort of information to be put out there that allows people to trade off between the two and appreciate the fact that there is a tradeoff. The whole waste field seems to be suffering from the syndrome of compromising the operating risks in order to reduce what is believed to be, but a highly uncertain accident risk, highly

uncertain in terms of timing, and highly uncertain in terms of consequence.

MR. HODGES: Some of the work is being done by the Office of Research for this dry cask storage PRA, and it is aimed at trying to get best estimates on, one, the likelihood that one of the casks will leak at all, for example; and, two, if it does leak, looking at leakage fractions and release rates and things of that nature.

DR. GARRICK: The other thing that's important, it seems to me, to keep in mind, at least in the short term -- I'm not talking about thousands of years timeframes -- is the recovery angle.

One of the little known facts of reactor risk assessment is the high dependence upon accident recovery to keep the risk low. And you don't really see a great deal of emphasis on recovery scenarios with respect to the analysis of transportation risks.

And yet the opportunities there are probably much greater than what you would find in a reactor case. And the risk is greatly affected in reactor risk assessments by recovery, accident management activities.

MR. HODGES: Right, right.

DR. HORNBERGER: I'm interested in when you certify, the certification process for a new cask. What kind of testing data are required and what kind of analyses

are required? I know you can't give it to me in great detail, but can you give me a little bit of a mental picture, at least?

MR. HODGES: Why don't you start?

MR. LEWIS: In our certifications, we do accept analysis, testing, comparison, or combinations of those in determining whether or not they pass the four hypothetical accident tests, and the normal condition test as well.

The spent fuel casks typically will use analysis, and if -- they will have an impact limiter on them as well. Often the impact limiter is tested, but the cask itself is done with analysis.

That's my understanding, that that's the typical approach. That's not to say that somebody couldn't come in with a scale model and test it.

MR. HODGES: It really also depends upon the kind of testing you're talking about. With fire testing, for example, the regulations allow explicitly to either do analysis or by test, and for something the size of a spent fuel package, it's not very practical to stick it in an oven and do a test, and so it's generally done by analysis.

For smaller shipment or transportation packages, it's a mixture. Some are done by analysis, some are done by tests.

Whenever there are new materials that are

introduced, for example, for neutron shielding, we would require testing for those materials, looking at things like the distribution of the boron and how it changes as it ages.

So there are tests that have been required, but a lot of the stuff is done by analysis.

DR. HORNBERGER: That's good, thanks.

MR. WYMER: The only thing that occurs to me is that the doses from a cask are so strongly dependent on the cooling time of the fuel before it goes into a cask, that it seems to me that you're not adequately or realistically taking advantage of that wide variation.

You could have a whole series of cask types graded to cooling, but it seems to me that you're not really capitalizing on that.

MR. HODGES: That's really by choice of the vendor when they come in with their design. We don't preclude them from doing that.

And in fact, it has been proposed that for some of the high burn-up fuel, they may actually need to do some of that, but it's generally cheaper if you can live with it, to analyze for a kind of uniformity there.

MR. WYMER: I see. I have just one last question on clarification of responsibility. NRC licenses the WIPP shipping containers.

You also have a role in the safeguarding of those shipments similar to spent fuel?

MR. LEWIS: No, I don't think we get involved with that. We did certify the TRUPAC package, though.

MR. LEVENSON: Okay. I want to thank you very much.

MR. HODGES: Rick Boyle will come and talk about DOT activities.

MR. LEVENSON: Thank you. I also want to thank you for finishing up five minutes early.

MR. BOYLE: I want to thank you for offering me the opportunity to come speak to you today. My name is Rick Boyle and I am with the Department of Transportation -- rather than run through the litany of abbreviations that would follow, I think as I give you an overview of the Department you will figure out exactly where I sit and it will make more sense to you than just giving you a bunch of initials.

I was asked to come in to give you an overview of the Department of Transportation, primarily focusing on hazardous material or radioactive material transport and who is involved, which parts of the Department are involved, and then give you a brief overview of the Department of Transportation and the NRC's relationships. If I have oversimplified I was told I had about 10 or 15 minutes

because they didn't expect to finish early so they said keep it brief and if they have more questions they certainly are not afraid to ask, so interrupt me at any time you would like to.

I could have put an org chart up that would show the Office of the Secretary and the six Associate Secretaries he has, and the Inspector General, but rather than that I dropped right to the bottom of his organization chart, which lists the 10 DOT operating administrations. Even that, when you get into hazardous material, is a little bit large so we will jump right down to who is involved with hazardous material administrations. We will also get into a little more pictures.

As you can see, this is a little bit idealistic. RSPA stands for Research and Special Programs Administration and that is where I work. One branch within that administration is the Office of Hazardous Material Safety. Now I see everyone is writing "Research and Special Programs Administration, Hazardous Material Safety" -- the technical office houses the Radioactive Material Transport Branch and that is the branch that I head up.

This is a little bit idealistic and hopefully this is the way the Department is going, I believe it should be going, is that the Research and Special Programs Administration, by housing the Hazardous Material Office,

will coordinate the entire Department's hazardous materials efforts. I think you can easily see that administrations such as the FAA, the Coast Guard, Federal Rail, and Federal Highway are much larger than the Research and Special Programs Administration, so I think you can understand the politics of the situation, that the small, minor funded agencies usually do not drive the whole process, so that is where this is a bit idealistic but they do defer to us to develop all of hazardous material regulations, which the radioactive material regulations are part of it.

To give you name for the pictures that we see, the train of course is the Federal Railroad Administration and our counterparts are in the Office of Safety Enforcement, and they had a Hazardous Material Branch and then something we'll touch on later but I think was very important, the other offices in that safety deal with track, making sure that the tracks are safe, making sure that the railcars are safe and then a special branch is for -- I think they call it Method of Power. I would call it the Loco Section -- the locomotives to make sure they are safe, so they have four branches.

The airplane you see on the top right is for the Federal Aviation Administration. Our counterparts are in the Civil Aviation Security and Intelligence Section, certainly a misnomer like Defense Intelligence. Our

counterparts are definitely in the Dangerous Goods and Cargo Security Section.

The cruise ship you see is really a Coast Guard cutter, but I couldn't find a better picture, and we work with the Marine Safety and Environmental Protection Group and then that is what you would see in our organization chart reflects the Coast Guard at Headquarters. We also get many calls from the individual ports representing the captains of the ports and what is going on out in the field, so they are much broader than you would really see at Headquarters, where more of the other administrations are more what is at Headquarters.

Lastly, the truck represents the Federal Highway Administration and their Motor Carrier and Highway Safety Office. I am sure you are following around here Congressman Wolf from Virginia has been working with the Department of Transportation and that office will be split out separately. I personally believe he was correct in saying that somebody that is overseeing safety should not be in the same group that is promoting trucking, so you would look to see our organization change and see a Motor Carrier and Highway Safety Office formed. It has already formed but all the positions are TBA since it hasn't finally come through, I think, the budget process, so I left them under Federal Highway.

Radioactive Material Transport in the Federal Government -- a little bit of the who does what to whom, the regulatory role, which I will define more as I go through the memorandum of understanding between the two agencies. The regulatory role falls within the Department of Transportation and the NRC and something I knew you would be interested in, somehow I thought I would throw in the Department of Energy, who is the primary shipper of most of the spent fuel and certainly would be the shipper were Yucca Mountain to open.

We have a little bit different role or probably a very different role than the NRC has with the Department of Energy. We treat them as a person. They are subject to the regulations of the Department of Transportation and that is listed in our regulations in Part 107.3, which is where we define what we mean as "person." Rather than just read it to you -- it is kind of dry, regulatory text -- I can provide a copy to the administration or administrators here and you can see where that comes in and that one of the subparts is also that any Federal agency is also subjected to our regulations, so I will just pull that out. It is a little bit dry legalese, but I will leave it with you.

The one exception to that policy, which is in 173.7 of our regulations, which I will also leave -- it says if they are making a shipment for national security, they

can be excepted from our shipments. Those are SST shipments and those would not be spent fuel or their waste products. Those are not national security, and there is a whole list of special provisions they have to take to sign off paperwork beforehand that that is what they are doing, to have armed escorts along with it.

My understanding is that was the issue when they just took the MOX fuel pins up to Canada is they were bringing it in SSTs and when it got to the Canadian border those SSTs were not allowed to go into Canada, that I don't think the Canadians liked the armed guards or anything else, therefore the shipment was picked up by helicopter and taken the rest of the way to Chalk River.

The great dividing line, which I also did bring more copies of so I can leave them for four or five members as well as one for the copy -- I think you will be interested in the memorandum of understanding between the Department of Transportation and the NRC. That truly defines the who is responsible for what and fortunately for my office, which is very small, most of it is you are talking about spent fuel transport and certainly if you are talking about transportation domestically above a Type A quantity most of those responsibilities fall to the NRC, even though you can see our column is a little bit longer than the NRC's as far as the MOU is given.

Our responsibility is we serve as the competent authority. That means the IAEA safety standards -- we are the lead agency in the United States but in my recollection we haven't been over there where we haven't had an NRC representative right beside us because the regulations do form the basis for both Title 10 and Title 49 of the Code of Federal Regulations.

One of the biggest projects we have taken on to bring into the next revision cycle, which is in 2003 for the IAEA, is a more risk-informed basis. We have been working to have actual proposals submitted which are instead of -- usually it is little more than here is the problem and they do a very brief problem statement, here are the regulations that are affected and what they should be changed to.

Working with your staff from the SFPO we have developed a little lengthier format that says you have to give a little more justification and provided guidance to say you do have to look at cost. You do of course look at safety first, but then there is cost, and there is dose, and there are a lot more factors to consider other than your particular country has a problem with a set of the regulations. We have also switched to a two-year -- I think it is more of a never-ending rule cycle -- rather than the 10-year process where there is a bigger push, because you weren't going to have a chance for another decade to push a

lot of ideas in.

I think switching to a two-year cycle, which is in line with the way the UN does it and the Modal organizations do it, would better suit the review and the development of risk-informed documentation because you didn't feel if I don't get it in today, I will have to wait 10 years, so I think those have been some big changes internationally that will benefit the way the regs are developed.

Classification -- that would mean defining what we mean by radioactive material and we switched from, we used to call it a below regulatory concern limit, to radionuclide specific exemption values for the regulations, as well as conveyance limits, and that would determine when, as we know, everything is radioactive but to what point you would have to be covered by the radioactive material transport regulations.

The dividing line -- you will see Type A materials on our side of the chart, Type B materials on your side of the chart. It is the same limit. When you reach that threshold you become the property of the NRC and their packaging requirements. Below Type A standards are ours. Low specific activity materials, surface contaminated object material, non-fissile excepted, UF-6 are also DOT's responsibility. Hazard communications are shipping papers, labels, marking, emergency response phone numbers, the

emergency response guide book, things of that nature that go along with the shipment are our responsibility.

Radiological controls, which would be the surface contamination allowed on packages, radiation levels for routine transport, and we do have employee training requirements which I think are minimal. Their are function-specific to the job that you perform and you also are required to have an awareness of what is the hazard you are transporting, and I think you have to remember for us we have nine hazard classes from flammables and compressed gases, poisons, all the way through radioactive material, so just an awareness of what you are carrying and if you have more than one hazard to know not only is it radioactive, you may have a flammable hazard or it could be a compressed gas or it could be corrosive, so you have to be aware of all the hazards, not just the radioactive, and then we do have emergency response training or emergency awareness training I think is a better term, to say if there is an accident at your facility or with one of your shipments you would know what to do or some general advice to give people.

We do have many Modal requirements, but I am going to get to those later because they aren't part of the MOU.

Briefly I think the previous presentation with Rob and Wayne went over the NRC responsibilities very well. The technical support for competent authority -- they come to

all the meetings with us. The dividing line is if it is a domestic package the NRC will certify it and go through the entire revision process and then we will take second action to authorize it for import and export purposes. If it is a foreign design it comes to us first and when it is for fissile material it is sent over to this office with a request for review and recommendation, and when that review is granted then they would get the approval for import and export for foreign packages being used in the U.S.

The same would be true for most Type B packages and that -- it is written in. I think you have to understand it is written in the MOU that we do not have to follow that. That is I think I would say a good practice. I think we ran into trouble a little over five years ago with not sending enough things to the NRC for their review and where there were more and more foreign packages. I think we have really changed that and it has put a lot of burden because fortunately because of the MOU we don't have to pay the NRC so those are done gratis and we really appreciate that, but it does put a burden on their time.

Safeguard standards were covered. Quality assurance -- we do reference yours. Inspection and enforcement -- I can get into the small role that we have later, but you primarily do package fabrication and use, your physical security and you also enforce DOT regulations

on your licensees.

MR. LEVENSON: Let me ask one question for clarification.

MR. BOYLE: Certainly.

MR. LEVENSON: On materials I don't know whether I misunderstood or whether you didn't intend to have it come out that way, but I interpreted what you said to mean if it was Type B materials the container, what have you, had to meet NRC requirements only. It didn't necessarily have to meet DOT requirements -- that there was a division of responsibility here, that if it is Type A materials, it is DOT requirements. If it is Type B materials, it is NRC requirements.

MR. BOYLE: I certainly misspoke there if that is what I said, that there are baseline packaging standards for all packages containing hazardous material and those are found in our regulations in 173.24, then there are baseline standards for packaging for radioactive materials that are found in 173.410 and these are all building, these are all cumulative. You follow those, then you would first hit your Type A standards, which are in our regulations in 173.465 and then you would drop out to the NRC Type B, so they would all be cumulative until you get into LSA, SCO which are excepted out from some of them as well as the excepted packages would be dropped out of some of them, but it is

cumulative into the NRC packaging standards.

DR. GARRICK: Before you take that off, Rick, I can't help but comment on this. As I think back on some of the public meetings we have had and the training that we have had in risk communication and I look at that list. I can just hear the public looking at that list and saying, well, really, all I want to know is who is responsible for safety, and trying to figure out what this really says.

How would you answer a John Q. Public question that says, okay, I don't understand all of these terms and what have you. What I want to know as a person living on a highway through which all kinds of materials transport who is responsible for the safety of those transports?

How would you handle that? How would you answer that?

MR. BOYLE: First, I want to say the training that we require is of only carriers to train their own people or shippers to train their own people. We do not require them to go out to their community and say I am running a radiopharmacy here and these would be the risks to your community, so we don't do that as a fixed facility is not required to go out and train the community.

As far as that is, I think we would have to go back and as we have participated at the NRC meetings is use the same modal studies and risk studies you are using as

well as we may pull some international studies together or our own studies to say the regulations provide for the safe transport of radioactive material.

My experience is that doesn't always cover it because one of the things you can't define is what "safe" means. What I feel is safe transport certainly is different than what somebody that maybe lives right along the highway or lives in a different part of the country would think.

My familiarity with the regulations also is quite different than everyone else. We have had to in the past drop back to the same type of public outreaches that's been done through the NRC. We try to do quarterly outreach meetings for hazardous material as a whole, which somebody from the Radioactive Materials Branch goes out.

Those are held regionally throughout the country just trying to explain the regulations and what they mean and how they are implemented.

DR. GARRICK: I know, and that is a real problem, because we have heard a considerable amount of emotional rhetoric about transportation and who is responsible for transportation safety and that there's a variety of agencies involved and there is a great need, it seems, speaking of simple English, for some simple English explanations to people who view this as a major issue.

In fact, I would say that in some instances that

we are dealing with they view it as the major issue -- how to assure the public that there is accountability and responsibility for the safe transport of these things, but the public is definitely struggling with who is accountable. We don't need to dwell on that anymore --

MR. BOYLE: It is a hard point, and I think a lot comes down --

DR. GARRICK: And I don't think you get there by just listing these kinds of things.

MR. BOYLE: Correct. I think a lot does come down more to the shipper than it does to the regulator to explain that role because our standards are always seen as the minimum, which are certainly far exceeded in many cases and if you would look at the larger campaigns, be it a pharmacy or anything else, a lot of it is your perceived risk is. Somebody gets their pharmaceuticals, the tend to think that those are less risk and the shipments proceed without much thought.

You get to larger reactor components, which is one of the things we are working on is their going to waste repositories. You raise a little more concern, and we had seen the utilities holding a lot more public outreach than they had in the past, and if you would look at some of the larger DOE shipments now, the work that they do to explain to everybody along the route and to train more people. It

has fallen more as the shipper responsibility to -- I don't have the right words for that.

MR. LEVENSON: Just to follow up on that for one minute, from what you have said the shipper responsibility -- I'll put some words in your mouth maybe -- would you say that any responsibility not on this list for potential shipments to Yucca Mountain would therefore all be DOE's responsibility?

MR. BOYLE: No, I wouldn't say that that is an all inclusive list. I would have to throw the book at you and say here is the all-inclusive list and follow this, and it certainly would be more requirements and much more detailed requirements than five or six bullets on a page.

MR. LEVENSON: But you have defined the things you are trying to cope with, which is to sort out -- I mean if we can't sort out who is responsible --

MR. BOYLE: Right.

MR. LEVENSON: -- how can the public sort out who is responsible?

MR. BOYLE: These would be the basic -- that is the starting point. I am sure if we went around the room and brainstormed we may come up with three or four more bullets for each chart, but each bullet may refer to a whole section of the regulations and our book is tabbed so you can see the whole -- the table of what properties we are looking

at as well as all the shipping papers and everything else, so there's whole sections of regulation on each portion, each bullet that is shown.

MR. LEVENSON: But that is --

MR. BOYLE: That is a basic and as I said it is rather dated but it is the only one we have is in the 1979 Federal Register copy that said this is what the MOU between the two agencies is. I think it would be helpful if you're -- I didn't realize that is what you were looking for. I just coincidentally brought it along with me to look at who is responsible for what.

You are ahead of me.

MR. LEWIS: Thank you.

MR. BOYLE: The Modal responsibilities throw one more little quirk of who is responsible for what routing. I think the only routing we can really be concerned with as far as who is responsible for it within DOT is the highway routing.

Certainly, the rail routings, those are private railroads and the Department cannot come in and tell them, you may not use this.

The highway routing is primarily uses the interstate highways system, beltways wherever possible. If you vary from that, you justify it, get it approved by the states, and use highways as much as possible.

The inspection and enforcement role, we do leave it to the -- it's a combination at the Department that we have enforcement in the Research and Special Programs Administration to look at the packaging efforts.

But once it is, if you will, on the road, or carrier, the conveyance, that would be the responsibility of the modes. We certainly inspect the locomotives, as we said, or the train or the rail cars. That's the federal highway and we don't inspect the track bed; that's the -- those were both the federal rail -- highway, we don't check the roads and bridges. That would be the Federal Highway.

We don't inspect the trucks; that would be motor carriers safety, so those types of responsibilities are at the modes where the packages themselves, we would inspect them up to the Type A, and once you exceed the Type A, as the previous presentation said, the NRC would look at those.

I believe, for NRC licensees, they'd also look at their Type A and below standards as well, as they have the right to enforce Title 49, so upon their licensees, they would.

Then, finally, there are additional operator training requirements. I'm sure everyone is familiar with commercial drivers licenses. And you'd have a hazardous materials stamp to show you'd been trained for commercial vehicles as well as for hazardous materials. That would be

what we're talking about there.

MR. LEVENSON: Excuse me, before you leave that slide, routing, what's the interface or what is the role between DOT and the states in the area of routing? My understanding is that the states have a rather major role in that for highways.

MR. BOYLE: I'm not from Federal Highways, so I can't really speak too much to the exact role and who can preempt whom. My understanding is that Federal Highway's position is that you're to use interstate highways, and the states are to designate the approved routes that they have.

Certainly, you're going to have to work between the states, because if one state says I want to use this highway and it's much farther north than the other state wants to, you're going to have to work out how you go state to state.

You know, you have to select the state -- the major interstates and what your alternates are. But I don't believe that the Department of Transportation dictates that it has to be one or the other. I'll say they offer an opportunity to mediate such disputes, but I think you're correct that it's between the states to determine what the route, state-to-state, is, as well as Indian tribes as well.

MR. LEVENSON: Among the states, there are over 500 laws that have some effect on routing.

MR. BOYLE: And probably more since the time that article was written there. There will be even more; they just keep growing.

Just some of the current activities, as I said, and you saw a previous slide on it: We have a large program for the adoption of the current IAEA regulations which were issued at the very end of 1996, and are to go into effect at the end of this year.

They will go into effect, if you're transporting by air, if you're transporting internationally, or if you're transporting by water. Your surface mode, which is primarily the U.S. and Canada, both the two countries are delayed in implementing them, so we'll stick with our Title 49, your Title 10, the Canadian regulations, or the older versions of what they call Safety Series 6 instead of ST-1.

The revision of the IAEA regulations, as we said, the 2003 revision kicks off in September of this year. We're in the process now of taking the comments that we've received on ST-1. We're not doing the -- we're doing an old-fashioned rulemaking, if you will.

We went out for an Advance Notice of Proposed Rulemaking which closes in June of this year. We're taking those comments and trying to, wherever we can, change the regulations to address those comments.

We also went out last week with a call for papers

or change proposals, if you will, so we'll wrap that effort up by mid-May for a September kickoff to the entire process, which should lead to a new white book, Safety Series 6. Actually, they have a whole other number that's coming out for the 2003, and that will come out then.

Current events, in quotes: I think you're all familiar with all the legislation that's been going on, Senate votes and the like. We have a very small office, and very few people know about radioactive material in that office, so we get to do a lot of the question and answer for all those programs.

So I guess I could have said that's Congressional, but if it's states or anything else, we do all the current event answers, questions, and everything else.

Program coordination and outreach: We've had a series of public meetings, as I said, quarterly, just to explain the regulations. We've been participating at the NRC's studies when they have their public meetings. We try to do public meetings around whenever we go overseas and give regulatory reviews or changes to that. Those try to go out, as well as just as you have here, if you will, an open door policy where applicants and industry can come in, as well as the public can come in.

If I can skip down to package case work, we're seeing more of that in what we're calling our special cases.

We're seeing large reactor components, primarily steam generators that are being shipped to Barnwell.

The public is much more interested in that than our previous efforts, so we're seeing more outreach and more interest in those, and running those special cases.

But our other case work is the international revalidations as the competent authority, which is Import/Export, and we see quite a bit of those.

Our case work -- we don't do the Type A and below packages as the NRC does. those are done on an enforcement case basis. Since they are self-certified, we would go out and verify your records and your QA and your documentation, so that work is also done at the Department.

Again, that's all I had as an overview, and kind of decide who's responsible for what, but I am free to answer any questions. If you'd like me to come back in a couple months when you have another meeting, with more detailed information, I'd be happy to do that.

Again, I just appreciate the opportunity for being invited to come out and talk to you.

MR. LEVENSON: John, do you have any questions?

DR. GARRICK: No, I don't think so; thank you.

MR. LEVENSON: George?

[No response.]

MR. LEVENSON: Ray?

MR. WYMER: It's too much for me.

MR. LEVENSON: I have one more: I don't like to repeat rumors I've heard, but for the casks that come from overseas, the accusation has been made that it's okay that spent fuel can be shipped from anywhere in the world to one of the U.S. sites, but that same cask cannot be used to ship it from one U.S. site to another, the same fuel; is that true?

MR. BOYLE: I don't believe so. If I can review the two types of casks, if the NRC, if it's a domestic design, the NRC is going to approve it.

MR. LEVENSON: If it's a domestic -- no, it's a foreign design.

MR. BOYLE: A foreign design is going to come into my office first.

MR. LEVENSON: Right.

MR. BOYLE: And we're going to get the same -- well, we're going to ask for the safety analysis report, and it's certainly going to be in a different format than the NRC is used to seeing, since they don't have to follow internationally -- doesn't have to follow the NRC guidelines.

MR. LEVENSON: I understand that.

MR. BOYLE: But if you get a safety analysis report, it's going to be sent to the NRC for their review

and recommendation. Once we receive that, we're going to approve it for use into, out of, or through this country.

So as far as the package being approved for it, I believe that that's true.

MR. LEVENSON: But into or out of or through does not cover from one place in this country to another place in this country.

MR. BOYLE: I'm not familiar, and this is not my specialty, to get export licenses as, can you export?

MR. LEVENSON: If I have an export license, if it comes from overseas to Idaho, for instance, and subsequently the same cask cannot be used, I have been told, to ship it from Idaho to Savannah River.

MR. BOYLE: That's correct, that you get an import/export, if you will, permit, and that does not allow you to use it domestically, and that comes from -- I have my own opinions. Probably the NRC could better explain. When they give us a review and recommendation, that is not equivalent to getting a full transport certificate, and they could explain the differences between the two reviews and what they're really doing.

I know I can't license domestic use.

MR. LEVENSON: For somebody in the public, it's hard to explain that it's safe to ship this cask halfway around the world, halfway across the U.S., but it's not safe

to ship it the other half way.

MR. BOYLE: I think that that's an unfair characterization to say it's unsafe. I think the truth of the matter is that nobody has asked to do it domestically; that in my opinion, the casks you're talking about, there is no reason that the couldn't be used from Idaho to Savannah River, except nobody has asked, nobody has come in and made the application to the NRC and gone through the -- if I can, and I know I'm outnumbered here -- the expensive review. You do have to pay for --

MR. LEVENSON: I think you just answered the question as to why it requires a completely new set of reviews and licensing; it economically isn't worth it. Okay.

Any other questions?

MR. BOYLE: I just have one. Who should I turn the paperwork over to? They can do with it what they will. Thank you for your time.

MR. LEVENSON: Thank you. Do we have a representative from EDLOW?

MS. OWENS: Yes, I'm here.

MR. LEVENSON: Are you Janice Owens?

MS. OWENS: Yes, I am.

MR. LEVENSON: Good. The floor is yours.

MS. OWENS: Hello, my name is Janice Owens, and

I'm with EDLOW International Company, and with me is Keith Brown. He is a former DOE contractor, and he's now working with EDLOW on our foreign research reactor spent fuel shipments into the United States.

I would like to begin my remarks by asking a few questions to emphasize what I believe are some of the key issues.

First, did you know that according to IAEA data, that on an international basis, over the last 25 years, more than 88,000 tons of commercial reactor spent fuel has been shipped either by sea, road, rail, away from the reactors where it was generated?

Do you realize that some form of spent fuel is being transported on a routine basis in the United States?

While the general public has been led to believe otherwise, that spent fuel is rarely moved, this simply is not the case. I believe that it's important to recognize that the world is already engaged in a substantial amount of spent fuel transportation, and there is quite a bit of international cooperation to make this possible.

So what's the big deal about shipping spent fuel? The big deal is that it's being done all the time and very safely.

I'd like to tell you a little bit about my company and our views on shipping spent fuel, if you haven't gotten

an idea of where I'm going. Then I will provide you with the description of some of the key planning considerations in arranging a spent fuel shipment.

And I will finish by briefly describing the international regulatory framework, although I think you've had a very good presentation on that framework already.

EDLOW International Company's primary business expertise is arranging for all types of international nuclear materials shipments, not just spent fuel.

Our business is very interesting and unique, and we interact regularly with people all over the world in all facets of the nuclear fuel cycle.

We have offices in Washington and Australia, the United Kingdom, and in Russia.

Sam Edlow, the founder of our company, was an early pioneer in spent fuel transport. He built the first spent fuel cask and arranged for the first shipment of research reactor spent fuel back to the United States in 1963.

My message is simple: We have the ability in the United States right now to make arrangements and begin moving commercial spent fuel. As Keith and my colleagues in Washington can tell you, we are currently arranging for foreign research reactor shipments to the United States on the order of three to four campaigns a year, serving up to

as many as 12 reactors.

So I ask you, what is the problem about shipping spent fuel? Is it the lack of a stable, effective, international regulatory framework? Is it the lack of cooperation among international organizations to coordinate and establish standards for public protection?

Is it the lack of a stable, effective domestic national regulatory framework? Is it the design and licensing of transport casks? Is it the performance of the cask in accident conditions?

Is it threats of sabotage and terrorism? What is it, exactly?

Well, if you ask me, I'd say the problem is, we're not transporting enough of our commercial spent fuel in the United States. Experience has shown that the technical issues associated with spent fuel transport are not the problem; the technical issues are not causing the delays and the consolidation of spent fuel at fewer sites.

The safety record for 40 years of spent fuel transport is nothing short of exemplary. I have every reason to believe that this record can and will be maintained and strengthened in the future.

So what is the big deal? I think it's fair to say that, based on our experience to date, the political and public acceptance issues are truly the most difficult issues

to deal with.

As we all know, in the United States and in other countries, there is widespread concern about the safety of spent fuel shipments, and the possibility of a severe accident.

Some knowledgeable parties seem to imply that it will only be acceptable to begin shipping spent fuel when the repository is licensed for operation in the United States.

Other use the term, "mobile chernobyl" when talking about spent fuel shipments to evoke images of great disaster comparable to an atomic bomb explosion.

So, in the United States and in other countries as well, sensationalism is a fact of life, and any mistake is going to become a media event.

Are people wrong to be concerned about spent fuel shipments? No, certainly not. Concern and scrutiny are constructive parts of the oversight process, and particularly if such activities serve to enhance the safety of these shipments.

It would be helpful, of course, for more people to understand how rigorous the protective measures are. The stellar safety record of the nuclear transport industry is not just a fluke; it's a product of a well-established regulatory regime that has served the public for more than

40 years.

I must admit, if you've not guessed it by now, that I'm one of those who favor moving spent fuel to a centralized interim storage facility prior to disposal. Without it, instead of reducing the number of sites where spent fuel is stored, we're looking at having somewhere close to 75 interim storage facilities throughout the United States.

As has been explained earlier today, we have 15 independent spent fuel storage installations, ISFSIs, operating in 13 different states in the United States.

Twenty additional ISFSIs are planned in 14 additional states.

Now, in terms of planning spent fuel shipments, all of the key parameters must be identified and considered. Of course, the most important question to address is where is the spent fuel going?

Answering this question in the United States has been the big challenge. It means addressing the daunting series of public and political acceptance hurdles.

In my experience with foreign research reactor spent fuel, once the environmental review process is completed and the court challenges are resolved, we have found that everything tends to fall into place very rapidly thereafter.

So once the political will is mustered to decide to ship spent fuel, I believe it is bound to proceed.

In the preparation and planning phase, the questions that one asks oneself are, is the shipment part of a larger campaign, or will it be a one-time unique arrangement? We've had experience with both arrangements.

How much spent fuel is to be transported? Is it too much for one shipment; that is, one physical shipment, or will it involve several shipments?

What modes of transport are necessary and can be utilized, given the location and the ultimate destination of the spent fuel?

Typically, a shipment of the foreign research reactors' spent fuel will involve all modes of transport: Sea, road, rail, and we've even done some shipments by air.

What is the total radioactivity level of the material? What is the condition of the fuel? Is it damaged? Is it in a pool?

Most likely, our experience has been that, yes, it is coming from a pool, but more and more in the future, I suspect we'll be looking at dry storage.

What is the schedule that needs to be met? When must the spent fuel be picked up at the reactor and when must it arrive at its destination?

Are there weather considerations or other major

contingencies or factors to consider in selecting the routes, equipment, and shipping mode?

What are the liability insurance needs, and how is responsibility shared among the parties involved in the shipment?

What kind of transport casks are needed? Are they available? Are they approved by all of the various regulatory authorities involved in an international shipment?

Are they single-purpose or dual-purpose? If they're single-purpose transport casks, which we routinely use, arrangements have to be made for their return.

What is the weight of the cask, and how much spent fuel does it carry? With respect to weight, does the reactor have the crane capacity to lift it? Does it meet heavy-haul rail and road restrictions or are special arrangements necessary?

What are the emergency response plans for each leg of the shipment?

What are the physical security requirements? Is an escort required? Is the communications tracking system in place? Is it acceptable? What notifications must be made prior to the shipment? To whom? When? And how?

Answering all of the questions involves the preparation of a transportation plan. This is an iterative

process requiring extensive interaction among all the parties involved, the owner of the spent fuel, the shipper, the regulatory authorities in all of the countries through which the spent fuel will be shipped, and the recipient of the spent fuel.

The transport plan is likely to be changed several times. Importantly, however, I think it's very clear that the regulatory framework for international spent fuel shipments has evolved over many years and continues to evolve in a generally constructive manner to meet new challenges or address unforeseen issues.

Numerous spent fuel shipments have been made and are still being made all over the world. Although there have been some transport accidents, none has resulted in a serious radioactive release.

Nevertheless, there will continue to be intense public scrutiny of all spent fuel shipments. As others have indicated, the IAEA regulations for the safe transport of radioactive material has served as the basic guidelines to promote safe transport of spent fuel worldwide.

These regulations establish the fundamental standards for the safety of the industry. The regulations are not legally binding, but may be adopted by IAEA member states for use in their national regulations with respect to their own activities.

Because the regulations have been widely adopted all over the world and applied, a very high level of safety has ensued.

The IAEA has also long been involved in the development of non-binding international standards for physical protection. The first publication, entitled Recommendations for the Physical Protection of Nuclear Materials, was issued in 1972. It has been periodically revised and updated since then, with the fourth and latest version conducted in 1988 and published in 1999.

There is, of course, also an International Physical Security Convention governing nuclear materials in international transport. It's up to each nation to decide how physical protection requirements are fulfilled, however, there is a dynamic international dialogue underway in this area of physical protection, and many in the U.S., in particular, believe further initiatives are needed to get all nations to upgrade their physical protection standards.

For international organizations the International Maritime Organization incorporate the IAEA regulatory standards. For sea shipments, for example, the IMO adopts in whole the IAEA safety series. It also sets forth its own requirements for establishing three classes or categories of ships for transporting spent fuel. The ships must meet to varying degrees certain requirements for stability in the

event of damage -- fire protection, temperature control of cargo spaces, structural considerations, cargo securing arrangements, electrical supplies, radiological protection of equipment, management training, shipboard emergency plans and notification in the event of an incident involving the nuclear materials.

I hope the message is clear that shipping spent fuel requires advance planning and application of the rigorous protection standards.

The international and national regulatory frameworks have required the industry to meet very strict safety standards and they have been very effective in promoting public health and safety. In summary, from a so-called technical perspective my colleagues and I continue to have high confidence that the nuclear industry can move spent fuel, high level waste and any sensitive nuclear materials globally without adverse effects on the public safety or environment.

If there is a clear political will, a mandate, to move the materials and continue adherence to the strict regulatory standards and criteria including those of physical security, then the industry will be ready, able, and willing to respond and to meet the challenges.

While I am optimistic about our industry's ability to ship spent fuel, that does not mean there aren't

challenges that need to be overcome.

First, the location of the centralized interim storage facility must be established. The public must be convinced that the shipments will be conducted safely. In the U.S. we have quite a bit of work to do on transportation planning and preparation. I am optimistic that the studies that are now underway by the NRC that we have heard about today will help resolve some of the outstanding questions and will get the process moving.

I think the pressures are increasing to establish centralized interim storage. I don't think that pressure is going to diminish, and I think the planning will have to begin soon to engage in any major transportation campaign in the United States.

I would be happy to answer any questions and Keith here can help with specific questions on our foreign research reactor spent fuel shipment.

MR. LEVENSON: Okay, thank you. You have identified a large range of topics and a large range of things that have to be done. Our previous speakers identified that certain things were the responsibility of the shipper. Could you briefly summarize from that big list of things that have to be done that you covered what you consider the primary responsibility of the shipper?

MS. OWENS: The primary responsibility of the

shipper is to develop the transportation plan -- that is, according to the regulations that have been promulgated by all of the agencies. There are guidelines on what types of equipment can be used, how the equipment can be used, and there are regulations that govern the selections of the routes that can be used.

This, too, is an iterative process and it requires a great deal of interaction with the states and we have been involved in the planning of our shipments. It has taken quite an effort to interact with the states and to agree on the acceptable routes.

MR. LEVENSON: You are implying that your responsibility is basically limited to conforming to regulations? Identify yourself.

MR. BOYLE: Thank you. I am Rick Boyle with the Department of Transportation.

The first thing I think I want to comment, EDLOW is not the shipper of research reactor fuel, nor would they be the shipper of any high level waste that were to go to any repository. They are an agent or a broker that would work between the owner, in this case the Department of Energy and research reactor, owns the fuel and is the shipper. They contract out to various companies to arrange the transport or broker the transport so in this case EDLOW is neither the shipper or the carrier or the receiver of the

material, so the question you are getting at -- what is the shipper's responsibility -- would be better addressed to the Department of Energy.

MR. LEVENSON: Okay, thank you.

DR. GARRICK: That sort of brings us to a question that Janice asked at the opening, having to do with who is in charge here. I think that my observation of the anxiety of the public about transportation is a very simple one. That is, they are frustrated by not getting a clean answer on who is accountable -- single point accountability is what they are looking for and they don't get it.

They get multiple agency responsibility. They get carrier responsibilities and lists of items and things as we have seen here this afternoon, but they don't get the satisfaction evidently that they are looking for as to who is in charge. Of course, if you look at specific cases like the shipment of transuranic waste to the WIPP facility, the states play a critical role in there, so there is another player, so if you ask me what the problem is, the problem is one of resolution of accountability.

In a time when we are preaching the gospel of taking a total systems approach and a total integrated risk assessment, being able to pinpoint responsibility and accountability is extremely important to that, and I think that is what is causing a great deal of frustration among

the citizenry, and speaking of citizenry, we have Amy Shollenberger, who wants to make a comment, and I will ask her to introduce herself and her affiliation, but I would like to give her a chance while we are in the middle of this discussion to make her comment.

MS. SHOLLENBERGER: First of all, thank you, Chairman, for the opportunity to speak. My name is Amy Shollenberger and I am a Senior Policy Analyst with Public Citizen's Critical Mass Energy Project. Public Citizen is a consumer and Government watchdog organization founded in 1971 by Ralph Nader, who I am sure you have all heard of.

The Critical Mass Energy Project deals particularly with energy issues and we follow this issue, I follow this issue particularly of Yucca Mountain high level waste nuclear waste transportation.

I just have a few comments, most of them geared specifically to the most recent discussion happening but a few that will go back to this morning's session as well, which was not on the record.

First of all, I find it ironic just seeing who you have invited to speak at your meeting to you to give you the information that you are looking for. I am always encouraged by Chairman Garrick's attempts to bring in the public's concerns to your meetings and I am continually grateful that he tries to keep that in the forefront and the

focus of your discussions. However, I have noticed that at lease in all the meetings that I have attended you have never actually asked a member of the public to come in and speak to you the way you ask EDLOW Incorporator or the Department of Transportation of the Department of Energy to speak to you and to raise the concerns and the questions that happen.

Now I am aware that you do have workshops and roundtables. I have participated in those, as has EDLOW and the Department of Transportation and Department of Energy. However, I think that if you really want to get a clear picture it might be good to bring that discussion into a more formal place, into your meetings, so that is just the first thing that I would like to say.

Related to that is it is interesting to me to have a company like EDLOW come in to give you the information about how safe nuclear waste transportation is. I feel that there's somewhat of a conflict of interests there, because of course as the Department of Transportation pointed out, they are not the shipper of waste. The Department of Energy is the shipper of Waste, and they will own the waste that is being shipped, but it says in the Nuclear Waste Policy Act that the waste will actually be transported by a private company which will bid on it, and of course the more opportunity that EDLOW has to assure you that their waste

shipping is safe and all of the associated public relations that goes with that, the more likely it is that they may get the contract or that the waste will be shipped in the first place, so I would just like to point that out, that that is definitely something that the public is concerned about.

Also I would like to comment on something that Ms. Owens said earlier about all of the shipping campaigns that have happened in the past and I would encourage you to ask the question of what is the average distance of any one of those transports. The records that I have looked at that list out all of the nuclear waste transportation shipments often include shipping waste from a spent fuel pool to a dry cask storage area, which could be 100 yards, okay? -- so you can say you shipped 200,000 shipments but if they are all at 100 yards, when you look at that on a bigger perspective of shipping waste from Maine to Nevada it is a much different story.

I have seen pictures of the Calvert Cliffs shipments going from the spent fuel pools to the dry cask storage area where they have armed guards all around the trucks and they are walking really slowly and the roads are all closed off, and that is a lot different than shipping waste along Route 80, so I would just like to encourage you to keep that question in the front of your mind as well.

Also, I would like to go to the question of

accountability. Again I really appreciate Chairman Garrick's insistence on bringing that up because that is a big concern of the public and it is true that we do want single point accountability, and what is interesting is I don't know if you all had a chance to watch the debates when S. 1287 was being voted on in both the Senate and the House recently but Mr. Markey from Massachusetts gave some interesting comments about liability and what is interesting to me is that -- the truth is that the taxpayer is really the one that is accountable for the shipment because in fact the Department of Energy will own the waste. It will be the shipper. It will be liable for any accident. The Department of Energy is funded by taxes, so again an accident happens in a community, who is liable for cleaning it up? The Department of Energy. Who pays for the Department of Energy's ability to clean up the accident? The taxpayer. So it is a double burden to whoever is affected by any kind of an accident.

The shippers are not liable and Mr. Markey pointed that out pretty eloquently and I would encourage all of you to look at the Congressional Record for his statements.

Also, related to that is -- I asked this earlier in the day, but I would like to say it on the record as well. I am interested in how the "take title" provisions would be -- would affect liability, and I know that at the

last minute when S. 1287 was getting voted on in the Senate they took the "take title" provisions as far as taking title to the waste onsite, so currently even if S. 1287 is signed into law by the President, DOE will not be allowed to take title to the waste onsite. It will only be able to take title to the waste when it will be shipped.

However, there is a strong push for that, both by the Administration and by several members of Congress, and it seems like it would be an important question to ask -- what happens when DOE owns the waste as opposed to the licensees.

Also, as far as shipping is concerned, I think the question that Mr. Levenson brought up about the preemption of state laws and who sets the routes is a very important question, and I think it is one that was not adequately answered nor I am not sure that it ever will be adequately answered in the public's viewpoint.

Anytime I have ever been in a meeting where it has been asked, well, who is responsible for saying which routes will be chosen and who is responsible for making sure that the routes that are chosen are safe, there is a big circle that goes between DOT and NRC and DOE and it is never quite clear to the public who is responsible for that.

Several states have put in alternate shipping plans that can be approved by DOT. However, it seems to me

that there is a pre-emption of DOT regulations over state plans and so if the DOT does not approve the state plan, then the state plan does not go into effect, and I think it is really important to make it clear to the public who gets to pick the routes and why they are picked and what the implications of which routes are picked are.

Just one more point I would like to make -- oh, two more points, excuse me. As far as interim storage goes, I would just like to point out that it is not only the public that is against interim storage. The Administration is opposed to interim storage as well, and so I don't really think it is fair to characterize that as only, you know, crazy people out in the public opposed to interim storage. The truth is that the Administration has taken a strong stance against interim storage including Secretary Richardson and others in the Administration, and it is really important to recognize that it is not a bunch of crazy people opposed to that.

That interim storage provision was taken out of S. 1287 because the President showed that he was opposed to it and when Mr. Murkowski was trying to make the bill palatable to the President they removed interim storage and they put in a provision called "Backup Storage" which only allows temporary storage at the site after a license is granted by NRC.

Finally, I would just like to make one final point. That goes back to the Modal Study question that you were discussing earlier. I participated in the roundtable. I believe that Mr. Boyle was there as well, and Mr. Edlow himself was in the meeting as well, on the performance package scoping study, and at that time, if I understood it correctly, it was explained that those tests that were conducted in the 1970s were actually not used as the basis for modeling in the 1987 Modal Study and that is one of the reasons that they are re-looking at the package performance study -- if I understand it correctly. In fact, Lawrence Livermore did the 1987 study, not Sandia, so it was two different groups that did the two different studies.

Sandia at the meeting said that they definitely wanted to look at whether tests should be the basis of the analysis for the new studies, so I just wanted to also point that out, that it is not necessarily true that the tests were used in the modelling for the 1987 study.

Thank you.

DR. GARRICK: Thanks, Amy.

MS. OWENS: Could I respond? On one of the questions or one of the points that you raised, Amy, the amount of miles -- I don't have the data with me here right now, but it is on the order of hundreds of millions of miles. There have been several shipments from Japan all the

way to Europe, spent fuel shipments, so it is not trivial. It is not a trivial amount of miles.

With respect to interim storage, I would like to point out that we already have more than 75 interim storage sites in the United States and even though the Administration may oppose it, I believe that it makes sense to begin slowly, to move spent fuel into centralize it in a single -- at fewer locations than where it is located now.

MS. SHOLLENBERGER: Were the shipments from Japan to Europe by truck or rail or by boat or plane?

MS. OWENS: A combination.

MS. SHOLLENBERGER: That is my point.

MS. OWENS: Yes --

DR. GARRICK: If you are going to talk, you have to use the microphone.

Any comments from the committee members? Let me just turn it back to you, Milt, to wrap up?

MR. LEVENSON: Do you have any comments, John?

[Laughter.]

DR. GARRICK: Lots of them. The only overriding comment that I have is that speaking of the taxpayers, the taxpayers are paying a terrible price for decisions that are being made in the name of the high risk of transportation, not only in the shipment of nuclear materials but in the shipment of all kinds of hazardous materials.

As I have said before, maybe the classic example of the response to the fear of transporting hazardous materials is in connection with the Army's Chemical Demilitarization Program, where rather than utilizing centralized disposal facilities for destroying the chemical weapons, the decision was made on the basis of a very shallow risk assessment that is full of holes to, rather than centralize the destruction of these weapons, to build a $500 million to billion plant at each of the storage locations in the United States, and again, who is paying for this? The taxpayer. It was a decision that was made on the basis of very limited information.

I see that whole attitude being repeated with respect to transportation in the disposal of or the destruction of hazardous materials over and over again, and yet on the other hand we keep hearing and we keep being told that the risk of such transportation is extremely small, so something doesn't hang together, and here we are with the nuclear, about to perhaps make the same stupid mistake, and again who is stupid here? The taxpayer will have to be accused of being so because they are tolerating it.

I think that we need to really be careful about what we do in the name of safety and risk assessment, and have to be on our toes to make sure that that information is indeed getting in the right place and that the decisions

that are being made have the benefit of such information.

I don't think that is happening very effectively and that is why it concerns me when I hear presentation after presentation about transportation of nuclear materials and do not see a tying together of all of the supporting evidence of the risk associated with the transport of nuclear materials, and so -- any what we have heard here today just continues in my mind that legacy.

MR. LEVENSON: George, any comments?

DR. HORNBERGER: No.

MR. LEVENSON: Ray?

DR. WYMER: I just have one sort of small observation. I am certain that it is true that there's been many, many miles of transportation of high level waste of various kinds around the world, but there is also something I haven't heard much discussion of, which I guess I would refer to as an intensity factor, by which I mean that if you have a central repository then from all parts of the country. They focus there and as they get near there they tend to all run down the same road, and small though the frequency of accidents may be, the likelihood of them happening at all increases as you focus, as you intensify. I have not heard much discussion of that, and I don't think that is particularly very important in a real sense. I think it is in the sense of having accidents. I think it is

important for the public perception point that people out there in Nevada are really concerned about that focusing effect. You don't get much discussion about that. Just an observation.

MR. LEVENSON: Amy, this is partly in response to your comment. I don't know what the data is on internationally. NRC two years ago in NUREG-0725 did publish a survey of fuel shipment and by and large, by a factor of three or four, the quantity of fuel was shipped at the range of 200 to 400 miles rather than just a few hundred yards and a lot of it is shipments of up to 600 or 700 miles. That is all tabulated there, and I have no idea how this relates to foreign data, but at least in the U.S. it doesn't look like they are mostly short shipments.

One other comment. I will bring your history up to date, because I am not sure -- Sam may have done the first commercial shipping cask, but the first shipments of spent fuel were done in 1944 and they were flown by air from Hanford to Oak Ridge, and while it wasn't high burnup fuel, it was only cooled two days. I know that because I arranged it, so this shipping of spent fuel including by air goes back quite a ways.

Other comments? I want to thank you.

MS. OWENS: Thank you very much for the opportunity.

DR. GARRICK: Thank you. We are only ten minutes off our agenda? That is excellent. All right, unless there's further comment or discussion, I think we will take a break, and I guess for the meeting following we don't need to have a record -- we don't need to have it on the record, so we will adjourn.

[Whereupon, at 4:10 p.m., the recorded portion of the meeting was recessed, to reconven Tuesday, March 28, 2000, at 8:30 a.m..]

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

NAME OF PROCEEDING: 118TH ADVISORY COMMITTEE ON NUCLEAR WASTE

PLACE OF PROCEEDING: ROCKVILLE, MD

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Mark Mahoney

Official Reporter

Ann Riley & Associates, Ltd.

Activities of the Spent Fuel Project Office

Briefing of the Advisory Committee on Nuclear Waste
March 27, 2000

Overview

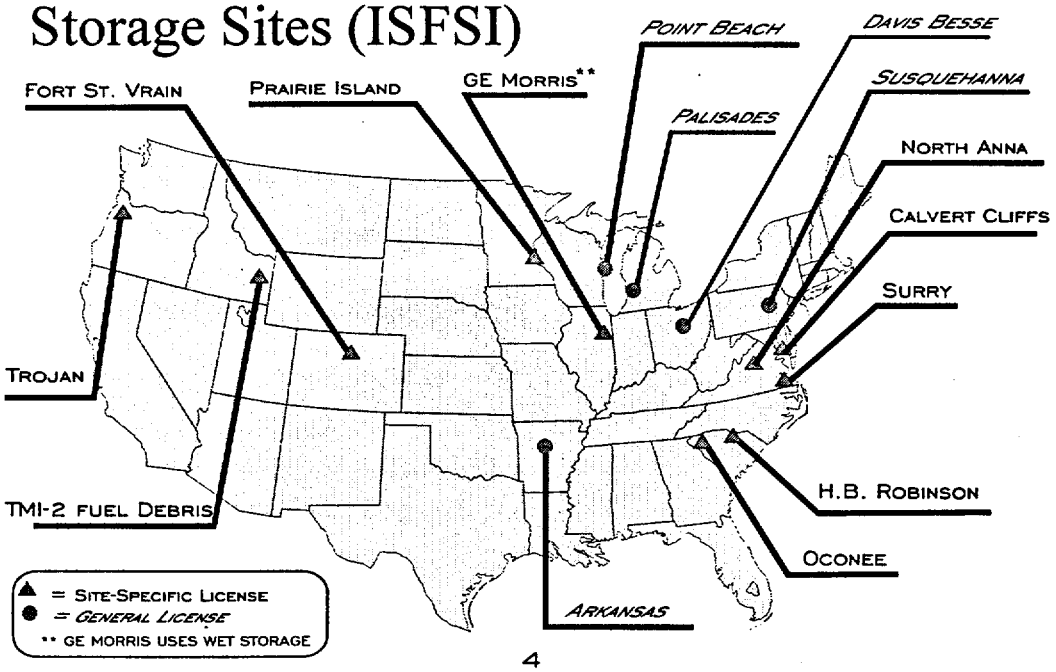
- SFPO Responsibilities
- Current/Planned ISFSIs
- Storage Certificate Review Issues/Status
- Transportation Activities/Studies
- Summary

Spent Fuel Project Office Responsibilities

- Independent Spent Fuel Storage Installation (ISFSI) Licensing, Inspection Program Development, and Project Management
- Storage and/or Transport Cask Certification for Spent Fuel; Transport Package Certification for other Radioactive Materials Packages
- Regulatory Program for Safe Transportation of Licensed Radioactive Materials; DOT/IAEA Interface
- Quality Assurance Program Reviews and Inspections

Operating Spent Fuel Storage Sites (ISFSI)

March 27, 2000



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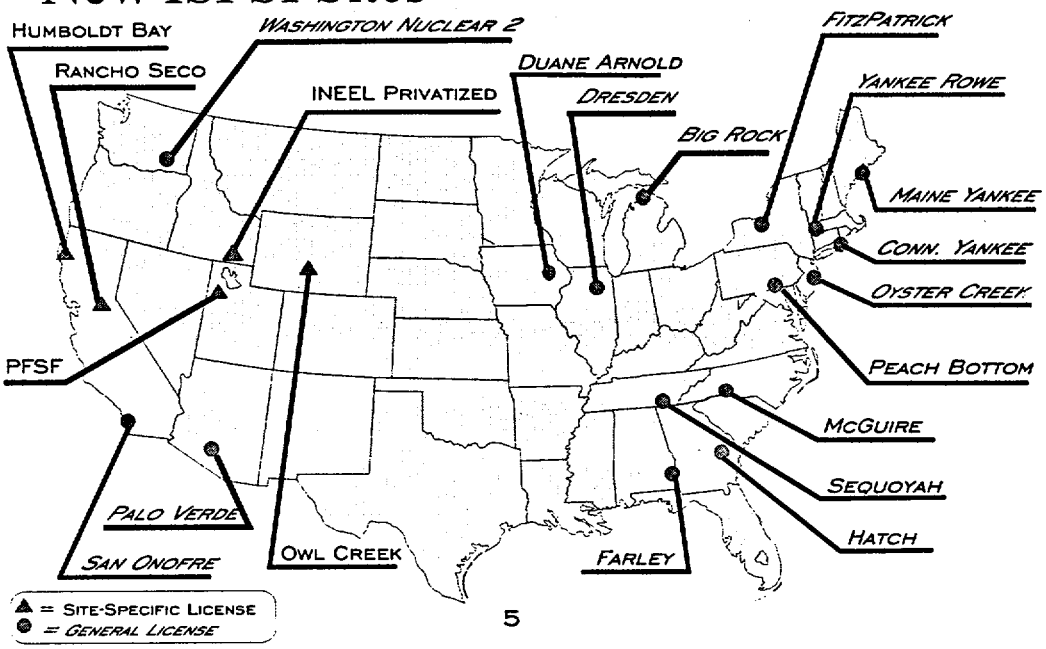
Potential Near-Term, New ISFSI Sites

March 27, 2000



Storage Certificate Review Issues/Status - Implemented Activities

Rulemaking Initiatives

- Certificate rulemakings signed by EDO
- Standard rulemaking plan for certificate rulemakings
- Direct final rulemaking for certificate amendments
- Developed standardized rulemaking packages

Storage Certificate Review Issues/Status - Implemented Activities

NRC Review Process Improvements

- Rules of engagement (schedules and templates)
- Internal procedures (e.g., standardized RAI and SER formats)
- Standard review plans
- Interim staff guidance documents
- Lessons learned process

SFPO CASE WORK STATUS

Oct 1998 - Jan 2000

Spent Fuel Storage Casks[1]

	Dual Purpose Casks	Single purpose Casks
Completed	**1**	**0**
In Rulemaking	**4**	**1**
Under Review	**2**	**0**

Transportation Certificate Reviews (Spent Fuel & Non-Spent Fuel)

Completed	**141**
Under Review	**51**

Independent Spent Fuel Storage Installations[1]

Completed	**3**
Under Review	**3**

[1] Additional certificate/license amendments are under review and in rulemaking to address site specific issues (10 amendments pending / 20 amendments projected in FY00)

Storage Certificate Review Issues/Status - Initiatives

Certificate Review and Approval Process

- Minor changes not requiring NRC approval
  - Improved certificates
  - Improved standard technical specifications
  - Guidance on new 72.48 change control process
- Alternative certificate amendment process
- Areas for improved effectiveness and efficiencies (e.g., review times, staff guidance)

Storage Certificate Review Issues/Status - Initiatives

ISFSI Dry Cask Storage License Renewal

- SFPO task group developing staff guidance and process
- Considering NRR and NMSS license renewal experiences
- Surry lead plant for renewal (license expires in 2006)
- ISFSI renewal process and guidance will be in place to support renewal

Storage Certificate Review Issues/Status - Initiatives

High Priority Technical Issues

- High Burnup Fuel (Industry Highest Priority)
  - Currently reviewing basis for up to 60 MWD/MTU
  - NEI forming industry working group to coordinate and develop technical basis
  - Technical concern is embrittlement, cladding creep
- Burnup Credit
  - Past practice no credit allowed for burnup credit
  - Issued two ISGs in 1999 which provide limited burnup credit
  - Developing technical basis with RES for expanded burnup credit

Transportation Activities/Studies

Overview of Discussions

- SFPO transportation roles and activities
- Revisions to 10 CFR Part 71
- Transportation risk studies
  - Reexamination of spent fuel risk estimates
  - Package performance study
- DOT role in transportation of radioactive material (Mr. Richard Boyle, U.S. DOT)

SFPO Transportation Roles and Activities

- Agency lead for transportation matters
  - Interface with DOT and IAEA
  - Assist other NRC offices (e.g., EIS reviews)
  - Point of contact for Regional offices/inspectors
- Certify transportation packaging designs
- Quality assurance program approvals/inspections
- Transport physical protection
- Generic issues resolution
  (high burnup, burnup credit)

10 CFR Part 71 Rulemaking

- Rulemaking to incorporate latest, periodic revision of IAEA transportation standards (ST-1)
  - Identified 13 topics that may result in Part 71 changes
  - Changes involve details, but not changes to the overall approach of the regulation
- Also includes other considerations:
  - Changes for certain spent fuel packages (similar to process in §72.48 and §50.59)
  - Resolve petition on double containment for plutonium
  - Expand scope to include certificate holders, owners
  - Resolve comments on 1997 fissile exemptions rule

10 CFR Part 71 Rulemaking

Process

- Staff plans to use enhanced public participatory approach
  - Similar to the approach used for Part 63, Part 70
  - Public meetings and outreach on issues
- Coordinating Part 71 changes with DOT's changes to 49 CFR Parts 171-178
- Schedule: develop proposed rule by 3/01

Transportation Safety Studies

Ongoing Effort to Ensure Shipment Safety

1977	-	FES on Transportation by Air and Other Modes (NUREG-0170)
1987	-	Shipping Container Response to Severe Accidents (NUREG/CR-4829)
2000	-	Reexamination of Spent Fuel Shipment Risk Estimates (NUREG/CR-6672)
~2003	-	Package Performance Study (Severe Accidents)

NUREG-0170 (1977)

Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes

- Assessed public and transport worker impacts
- All licensed shipments, all modes, incident-free transport and accidents
- Used as basis for NRC and DOT regulations
- Spent Fuel (1 of 25 types of materials studied)
  - Reprocessing economy (90 day cooled fuel)
  - Simple accident release (using engineering judgement)
  - Estimated a 1985 total of ~2000 shipments/year
  - Total population doses (p-rem): 565 (truck); 298 (rail)

Modal Study (1987)

NUREG/CR-4829 (LLNL): Shipping Container Response To Severe Highway and Railway Accident Conditions

- Spent fuel package accident response by analysis
- Impact and thermal forces
- Finite element analysis of cask wall stresses
- Goal: relate Part 71 tests to forces in accidents
- Also considered 'real life' transport accidents
- Risks estimated to be ~1/3 those in NUREG-0170

Reexamination of Spent Nuclear Fuel Risk Estimates (March 2000)

NUREG/CR-6672, Sandia National Laboratories

- Assess risks for shipment campaign to storage facilities and repository
- Model current cask designs (including closure system), modern fuel properties
- RADTRAN V incident-free & accident dose risk
- Result: risk < Modal Study < NUREG-0170
- Plain-English compliment to technical report is in development

Package Performance Study

- Spent fuel only, truck and rail packages
- Build upon 1987 modal study and 2000 reexamination study
- Assess severe accident cask performance and fuel responses
- Consider the need for and benefits of physical testing (partial-scale or full-scale)
- Using an enhanced public participatory approach

Package Performance Study

Where We Are Today

- Contract with Sandia National Laboratories
- Scoping study
  - Collect public views
  - Literature search/review
- Issues & Resolution Options Report
  - Available summer 2000

Public Involvement

- Website (http://ttd.sandia.gov/nrc/modal.htm)
- Workshops
  - Nov. 17, 1999: Roundtable in Bethesda, Maryland
  - Dec. 8, 1999: Henderson, Nevada roundtable and evening seminar
  - Dec. 9, 1999: Pahrump, Nevada seminar
- Mailing list
- Additional workshops this summer, to discuss both reexamination report and issues report

Summary

- Reactor licensees will have more dry cask options
  - SFPO anticipates 4 dual-purpose cask systems should be completed by December 2000
- SFPO has established rules of engagement and schedules for reviews
  - Schedules have been met
  - Stability and predictability in review process established

Summary (Continued)

- Principal areas for further improvement (amendment process, technical issue resolution)
- SFPO actively engaged with industry and public licensing and technical issues related to spent fuel storage, decommissioning, and transportation
- Transportation studies
  - Positioning NRC to be better prepared to address questions on a large shipment campaign of spent fuel to repository or storage
  - Enhanced public communication process being used

Overview of DOT's Program for the Safe Transport of Radioactive Material

Richard W. Boyle

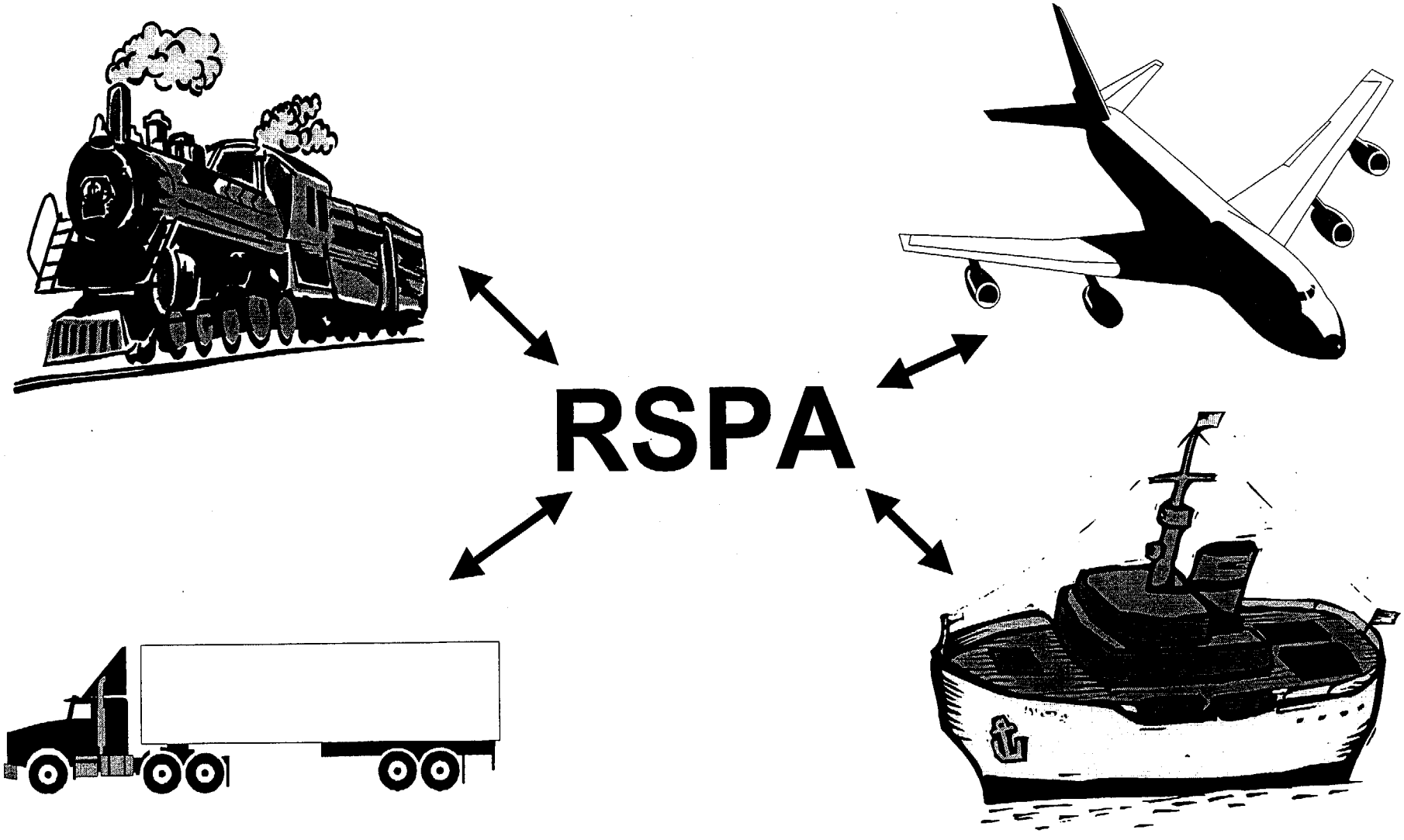
DOT/RSPA/Hazardous Materials Safety

March 27, 2000

DOT Operating Administrations

- U.S. Coast Guard
- Federal Aviation Administration
- Federal Highway Administration
- Federal Railroad Administration
- National Highway Traffic Safety Administration
- Federal Transit Administration
- St. Lawrence Seaway
- Maritime Administration
- RSPA
- Bureau of Transportation Statistics

DOT "HazMat" Administrations



RAM Transport in the Federal Government

- Regulatory Role
  - Department of Transportation
  - Nuclear Regulatory Commission
- Department of Energy

MOU Between DOT and NRC

- DOT Responsibilities
  - Competent Authority
  - Classification
  - Type A Materials (LSA, SCO, Non-fissile UF6)
  - Hazard Communication
  - Operations/Handling
  - Radiological Controls
  - Employee Training
- NRC Responsibilities
  - Technical Support to the Competent Authority
  - Type B Materials
  - Fissile Materials
  - Safeguard Standards
  - Quality Assurance
  - Inspection/Enforcement

DOT Modal Responsibilities

- Routing
- Inspection/Enforcement
- Infrastructure/Conveyance Safety
- Operator Training

Current Activities

- U.S. Adoption of IAEA Regulations, ST-1 (1996 edition)
- Revision of IAEA Regulations
- "Current Events"
- Program Coordination and Outreach
- Package Review Casework