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TRANSPORTING NUCLEAR MATERIALS: DESIGN, LOGISTICS, AND SHIPMENT

THURSDAY, OCTOBER 1, 2015

House of Representatives,

Subcommittee on Environment and the Economy,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to call, at 10:54 a.m., in Room 2123, Rayburn House Office Building, Hon. John Shimkus, [chairman of the subcommittee] presiding.

Present: Representatives Shimkus, Harper, Latta, Johnson, Bucshon, Flores, Tonko, McNerney, and Pallone (ex officio).

Staff Present: Will Batson, Legislative Clerk; Rebecca Card, Staff Assistant; David McCarthy, Chief Counsel, Environment and Economy; Chris Sarley, Policy Coordinator, Environment and Economy; Greg Watson, Legislative Clerk; Andy Zach, Counsel, Environment and

Economy; Jacqueline Cohen, Minority Senior Counsel; Tiffany Guarascio, Minority Deputy Staff Director and Chief Health Advisor; Rick Kessler, Minority Senior Advisor and Staff Director, Energy and Environment; Aledander Ratner, Minority Policy Advisor, and Timia Crisp, Minority AAAS Fellow.

Mr. Shimkus. If I can get the door closed in the back there, and call this hearing to order and welcome our guests, I will start recognizing myself for 5 minutes for an opening statement.

Good morning, and welcome to today's hearing to examine issues associated with the transportation of nuclear materials. Annually, over three million packages containing radioactive material are transported throughout the United States. Privately shipped items are safely regulated and Federally overseen by both the U.S. Department of Transportation and the Nuclear Regulatory Commission, the NRC. The NRC must approve any package used for shipping nuclear material before shipment. To secure the necessary approval, the package must be shown to withstand a series of accident conditions which are sequentially performed to determine cumulative effects on the package. The rigorous testing and monitoring of these items highlights the lack of technical issues to transport nuclear material.

State authorities also play a key role in the transportation system by identifying highway routes and assuring emergency responders are adequately prepared. Regional organizations such as the Council of State Governments' midwestern office extensively communicates with the public to prepare communities. They also provide lessons learned from historical nuclear transportation activities to continually improve the radioactive material transportation planning process and public outreach. The successful track record is a testament to the established guidelines and system.

The Federal Government also has a significant experience shipping nuclear material. For example, the Department of Energy ships spent nuclear fuel from Naval ships to Idaho for storage and transports radioactive material across the country for nuclear research and development activities. The DOE has managed thousands of safe shipments of low level radioactive waste for disposal in New Mexico, and even disposes of nuclear material at the Nevada National Security site located directly adjacent to Yucca Mountain.

However, much of the material that is currently shipped is less hazardous and in smaller quantities than high-level radioactive waste, spent nuclear fuel, and defense nuclear waste which must be permanently disposed of. Congress directed DOE to appropriately plan for a transportation campaign to move spent nuclear fuel and high-level radioactive waste for permanent disposal when the Nuclear Waste Policy Act was signed into law in 1982. Yet 33 years later, many nuclear experts recognize transportation may still be the long pole in the tent.

In 2006, the National Academies of Science published a comprehensive report including findings and recommendations to develop and execute a national transportation campaign for spent nuclear fuel disposal.

In 2012, the Obama administration's Blue Ribbon Commission evaluated DOE's implementation of these recommendations and noted much work remains to be accomplished. While DOE has made limited progress, much of the planning has been undone over the last 6 years, and DOE

now is treading water by conducting only generic non-site specific planning.

The scale and necessary coordination for shipment will require persistent effort from Federal, State, local, and tribal governments, and the private entities. DOE has planned to transport 3,000 tons of commercial spent nuclear fuel a year, while the fleet of nuclear power plants continues to annually generate about 2,000 tons of spent nuclear fuel. A 2008 life cycle system analysis for the Yucca Mountain project included a $20 billion, 70-year national transportation campaign.

While Congress potentially considers amending the Nuclear Waste Policy Act, we must evaluate whether marginal safety gains from temporary consolidating used fuel justifies the financial cost to transport used fuel twice.

As this committee continues to engage in the conversations with national stakeholders to identify a path forward for permanent disposal of spent nuclear fuel, I hope DOE revisits previous recommendations and lays a foundation for a national campaign.

One constructive step is the recognition to procure a fleet of rail cars to ship spent fuel. In August, DOE signed a contract for the design of a rail car that could meet the Association of American Railroads' requirements for transporting spent fuel and high-level waste. However, after the prototype rail car is acquired, it still must undergo rigorous testing to demonstrate performance.

DOE estimates that overall timeframe for the development of the

entire train system is 7 to 9 years. That lead time is a reminder Congress and the DOE must remain attentive to comprehensive issues associated with used fuel management policy.

Today we will hear from expert stakeholders about the experience we have in moving nuclear fuel, such as engaging with State and local stakeholders to share information, identify routes, and train emergency responders. We will hear DOE's previous activities and discuss the next steps for the Department to implement.

I thank all of our witnesses for being here today, and now I recognize the ranking member, Mr. Tonko, for his open statement.

[The prepared statement of Mr. Shimkus follows:]

******** COMMITTEE INSERT ********

Mr. Tonko. Thank you, Mr. Chair, and good morning. And good morning to our witnesses. Thank you for participating in the hearing this morning. It is valuable input.

Transportation of nuclear waste certainly is a vital component of any long-term storage program. There has been a great deal of discussion about the challenges and the delays of construction of a long-term storage site at Yucca Mountain. But significant challenges remain in the planning for transportation of this waste, both technical and social.

As I understand it, additional work is needed to develop casks that are sufficiently robust to ensure this waste will be transported safely from individual generation facility sites to the permanent storage area.

We have transported nuclear waste. That is true. But I think we will hear today that some of this waste requires special handling over and above what is needed for the waste that moves today. And then there is public acceptance. This is probably an even bigger challenge than the technical matters at hand. I think the current public concern and opposition to the drastic increase in transportation of oil by rail offers a small window into this problem. And we have been transporting oil by rail and by pipeline for a much longer time than we have for spent fuel from nuclear plants.

Many of my constituents, as well as the State and local governments, do not believe that we are taking adequate safety

precautions with the transportation of oil. And they are asking for better, safer rail cars for this cargo that is passing through numerous populated areas and vital land and water resources. Their demands for safe transit pathways and secure transport containers will be even more insistent. And I believe they are right in these demands.

Much of the remaining work to devise an acceptable, safe process for moving this waste will fall to the U.S. Department of Transportation. And obviously there is also an ongoing role for our Department of Energy as well. State and local governments will need to be very involved in these discussions as plans move forward also. And all of these tasks need to be done regardless of whether we decide to establish some interim sites or not.

So, the message is we have a lot of work to do. Again, I thank the witnesses for being here this morning. I look forward to your testimony, and hopefully we can move forward.

With that, Mr. Chair, I yield back.

Mr. Shimkus. The gentleman yields back his time.

[The prepared statement of Mr. Tonko follows:]

******** COMMITTEE INSERT ********

Mr. Shimkus. I have a statement for the record that we would submit from the chairman of the committee, Mr. Upton. Without objection, so ordered.

[The prepared statement of The Chairman follows:]

******** COMMITTEE INSERT ********

Mr. Shimkus. Does anyone else on the majority side seek time?

Seeing none, the chair now recognizes the ranking member of the full committee, Mr. Pallone, for 5 minutes.

Mr. Pallone. Thank you, Mr. Chairman.

The Nuclear Waste Policy Act of 1982 made the transportation and long-term storage of nuclear waste the responsibility of the Secretary of Energy. The subcommittee has held several hearings on long-term storage, but has been less focused on transportation issues. No matter what site or combination of sites are eventually chosen for storage, transportation issues will have to be addressed. So I welcome the opportunity to focus on those issues today.

Over the last decades as political fights have brewed over Yucca Mountain and its alternatives, spent nuclear fuel has generally been left onsite at the nuclear power reactors where it has been generated. It is stored in cooling pools and then eventually in dry casks. For many communities around nuclear power plants, this onsite storage raises serious concerns, and as the inventory of spent fuel stored on site grows, so do those concerns.

In New Jersey, we have several operating nuclear reactors that provide carbon-free electricity. This includes Oyster Creek, the Nation's oldest operating plant which will soon stop providing power but will continue to provide a home to spent nuclear fuel until a long-term plan for managing nuclear waste is finalized. Like the challenge of siting permanent and interim repositories, the challenge

of transporting nuclear waste involves both technical and societal concerns. Transportation must be done safely with robust protections, even in the case of intentional malevolent acts and exceptional accidents.

Technical issues include the suitability of storage casks for transportation, safety of transporting high burnt-up fuel, and the safety of repackaging spent fuel currently in storage onsite. The Department of Energy and stakeholders must work together to address these technical issues. But addressing the technical concerns is not enough. Transportation must also be done with public acceptance, which can only be built with transparency and outreach. And I think all levels of government, State, local, and tribal, must be involved for these efforts to be successful. And I expect the witnesses on today's panel to agree.

So again, I thank the chairman and our ranking member, Mr. Tonko, for convening this panel, and I look forward to the witnesses.

I yield back.

Mr. Shimkus. The gentleman yields back his time.

[The prepared statement of Mr. Pallone follows:]

******** COMMITTEE INSERT ********

Mr. Shimkus. Now the chair likes to again formally or informally welcome you all to the hearing. We have got a big panel. Your full statement is in the record. You have 5 minutes. We are not going to be, obviously, militant about the time. But when the red light pops up, if you can know to start summing up. And I will just introduce you as your time to speak is.

So, first starting from my left, your right, we have Mr. Christopher Kouts, managing partner of Kouts Consulting. Sir, you are recognized for 5 minutes. Welcome.

STATEMENTS OF CHRISTOPHER KOUTS, MANAGING PARTNER, KOUTS COUNSELING; EDWARD R. HAMBERGER, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ASSOCIATION OF AMERICAN RAILROADS; KELLY HORN, CO-CHAIRMAN, MIDWESTERN RADIOACTIVE MATERIALS TRANSPORTATION COMMITTEE; ROBERT QUINN, VICE PRESIDENT, CASK AND CONTAINER TECHNOLOGY, ENERGYSOLUTIONS; CHAIRMAN, SPENT FUEL TRANSPORTATION TASK FORCE, U.S. NUCLEAR INFRASTRUCTURE COUNCIL; FRANKLIN RUSCO, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, U.S. GOVERNMENT ACCOUNTABILITY OFFICE; AND, KEVIN KAMPS, RADIOACTIVE WASTE WATCHDOG, BEYOND NUCLEAR

STATEMENT OF CHRISTOPHER KOUTS

Mr. Kouts. Thank you, Chairman Shimkus, Ranking Member Tonko, and members of the subcommittee. I am Christopher Kouts, former principal deputy director and acting director of the Department of Energy's Office of Civilian Radioactive Waste Management, OCRWM. I appreciate the invitation to appear before the subcommittee to provide my perspective on high-level radioactive waste materials transportation planning.

As background, for 25 years I served in various technical and management positions in virtually every program area within OCRWM. In those positions I was responsible for nuclear waste transportation, interim storage, disposal, systems analysis, as well as activities

related to the management of the standard contract with nuclear utilities. I became the principal deputy director of the program in 2007, and was the acting director from 2009 until I retired in early 2010 after 35 years of Federal service. The program was terminated later in 2010 by the current administration after nearly 30 years of existence; a program established by the Nuclear Waste Policy Act of 1982, as amended, the NWPA.

The transportation of spent nuclear fuel and high-level radioactive waste materials has been safely undertaken both nationally and internationally for over 40 years. The containers within which the materials are carried are the most robust in the commercial transport world. The designs for transportation casks must be certified by the Nuclear Regulatory Commission, the NRC, to meet rigorous standards that encompass, with safety margins, the envelope of potential accidents that a railway or trail carrier could experience. Over the long history of high-level waste shipments, there have been accidents, but none of those accidents released radioactive materials.

The routing of truck and rail shipments is well understood and well practiced. Truck shipment routing is regulated by the U.S. Department of Transportation, DOT, which requires that the shipments must be routed primarily on the Interstate highway system unless State-designated alternatives are submitted to DOT. Since railway lines are privately owned, railroad carriers coordinate across various

rail lines to determine routing between the point of origin and the destination.

Planning for spent fuel transportation campaigns to an interim storage facility or geologic repository will require continued effort for more than a decade before a facility is planned to begin operation. Procuring the necessary transportation casks, rail cars, truck trailers and other equipment will require sustained and adequate funding to assure that the necessary equipment will be available and tested to meet the shipping rates required for the receiving facility.

The greatest challenge regarding transportation planning in the current highly uncertain policy environment is to discern what level of activities are appropriate given the status of the development of the receiving facility. Two of the obvious critical needs of meaningful transportation planning are knowledge of the point of origin and knowledge of the destination point for the shipments.

In this case, the points of origin are well known. Focusing on commercial spent nuclear fuel, approximately 74,000 tons are currently being stored at 73 sites in 33 States. However, no amount of transportation planning can overcome the lack of a definitive destination for these shipments. Until this administration came into office, this Nation had a potential destination for commercial spent fuel and defense high-level radioactive waste that had been under study for over 35 years, Yucca Mountain.

The Yucca Mountain site was developed in accordance with the

requirements of the carefully crafted NWPA. The site underwent nearly 20 years of intense scientific site characterization, was recommended to the President in 2002 for further development, and was approved by Congress that same year, overriding the statutorily submitted notice of disapproval by the Governor of Nevada, and was well into the NWPA-mandated 3-year license review process by the NRC when the project was halted.

The administration tells us that a pilot spent fuel interim storage facility will be available for shut-down reactors in 2021, a larger interim storage facility in 2025, and a new geologic repository in 2048. Yet the required legislation for implementing those facilities is not even on the horizon for enactment, making those dates notional at best and fantasy at worst. Over 30 years of experience tells me that the most certain path for the Nation to find an eventual destination for these materials is already in place and has been since 1982. The only ingredients we lack are the leadership and the resolve to make it happen.

Thank you for this opportunity to discuss these issues, and I would be pleased to answer questions the subcommittee might have at this time.

Mr. Shimkus. Thank you very much.

[The prepared statement of Mr. Kouts follows:]

******** INSERT 1-1 ********

Mr. Shimkus. Now I would like to turn to Mr. Edward Hamberger?

Mr. Hamberger. Yes, sir.

Mr. Shimkus. I messed up Kouts' name. So I want to make sure I get that right.

President and chief executive officer of the Association of American Railroads. Again, you are welcome and recognized for 5 minutes.

STATEMENT OF EDWARD R. HAMBERGER

Mr. Hamberger. Thank you, Mr. Chairman, Ranking Member Tonko. On behalf of the members of the Association of American Railroads, thank you for the opportunity to be here this morning to discuss the transportation of spent nuclear fuel.

Before I get into my prepared remarks, I would like to thank you, Mr. Chairman, and you, Congressman Flores, for your early co-sponsorship of H.R. 3651, the Positive Train Control Enforcement and Implementation Act of 2015, which I hope will see the House floor perhaps as early as next week. Thank you.

If policymakers determine that it is in the public interest for meaningful amounts of spent nuclear fuel to be transported to one or more repositories, railroads will most likely be called upon to handle most of those movements. The Department of Energy has long indicated its preference for using rail to transport spent nuclear fuel, and the

Yucca Mountain project had formally established a mostly rail policy before the program was cancelled.

In 2006, the National Academy of Sciences Committee reaffirmed the preference for using rail, saying that it, quote, "strongly endorses DOE's decisions to ship spent fuel and high-level waste to the Federal repository by mostly rail using dedicated trains." And in January 2012, the Transportation and Storage Subcommittee of the Blue Ribbon Commission on America's nuclear future repeated the National Academy's point to, quote, "mostly rail has clear advantages," end quote.

The preference for rail is based predominantly on safety. Nothing is more important to railroads than our safety, and the industry's commitment to safety is reflected in safety statistics from the Federal Railroad Administration. The train accident rate in 2014 was the lowest ever, down 80 percent from 1980, and down 44 percent from 2000. Rail safety extends to hazardous materials as well. In fact, railroads are the safest mode for transporting hazardous materials.

In 2014, 99.999 percent of rail hazmat shipments reached their destination without a release caused by a train accident. Rail hazmat accident rates in 2014 were down 95 percent since 1980, and 66 percent since 2000. Although no firm in any industry can guarantee that it will never suffer an accident, the railroads' overall safety record should give this committee, and hopefully the public, confidence in

the rail transport of spent nuclear fuel if policymakers decide that the public interest requires its transportation.

Railroads recognize that public concern over radioactive materials requires that all parties involved in the transport take special measures to ensure safe movement. In particular, the Departments of Energy and Defense, as shippers of the spent nuclear fuel, the NRC and Department of Transportation, as the regulators of the safety aspects of hazmat transport, and of course the railroads themselves must work together to design the safest possible transportation system for spent nuclear fuel.

That system must include the use of dedicated trains. That is, trains with no other freight than spent nuclear fuel carefully monitored and traveling directly from origin to destination. Dedicated trains offer numerous safety advantages that would reduce the already very small possibility of an accident involving spent nuclear fuel. Advantages of dedicated trains include, eliminating the need to switch the shipments in rail yards, the ability to use cars with special safety features designed to handle the extreme weight of spent nuclear fuel shipments, and reduce time in transit. Dedicated trains can be transported with greater security. Escorts which are required by the Nuclear Regulatory Commission for all spent nuclear fuel movements are able to monitor the spent fuel much more easily on dedicated trains than in general freight service.

Equipment standards for spent nuclear fuel trains are exceedingly

stringent. As we have just heard from Mr. Kouts and will later hear from Mr. Quinn, spent fuel requires transport in massive steel casks that are several feet in diameter and are able to withstand a range of extreme forces. In addition, the AAR has developed a rail car standard with special designed features exclusively for spent nuclear fuel.

Many of the issues surrounding the transportation of spent nuclear fuel and other high-level wastes are controversial. And many issues remain to be resolved. What isn't controversial is that the transportation of spent nuclear fuel requires extreme care. If policymakers determine that a single or several regional repositories for spent nuclear fuel are in the public interest, the railroads stand ready to work with the relevant entities on all issues regarding its transportation.

Railroads are confident they can provide the necessary level of care. But doing so will require close cooperation and extensive planning involving DOE, DOT, State and local governments, and others if safety and security is to be maximized. One example of that is this past summer we were pleased to host the Nuclear Waste Technical Review Board at our transportation technology center in Pueblo, Colorado, where we were able to demonstrate some of the new technologies we are working on to improve safety at our emergency response training center, which would be available for training for spent nuclear fuel as well.

Thank you for the opportunity to be here.

Mr. Shimkus. Thank you very much.

[The statement of Mr. Hamberger follows:]

******** INSERT 1-2 ********

Mr. Shimkus. The State of Illinois has a new administration. So I think I am welcoming the first member from the new administration in Illinois to testify before a committee in the House of Representatives.

So being from Illinois, I am particularly pleased to welcome Mr. Kelly Horn from the Illinois Emergency Management Agency, co-chairman of the Midwestern Radioactive Materials Transportation Committee, Council of State Governments. We are glad to have you here, and you are recognized for 5 minutes.

STATEMENT OF KELLY HORN

Mr. Horn. Thank you. Chairman Shimkus, Ranking Member Tonko, members of the subcommittee, on behalf of the great State of Illinois and the Council of State Governments, Midwestern Radioactive Materials Transportation Committee, thank you for inviting me to talk about the transportation of spent fuel and the important roles that States have in this matter. My testimony today is strictly for informational purposes.

As a region, the Midwest has a very large stake in the future Federal program to transport spent fuel from commercial nuclear power plants. As noted in my written testimony, we have a large nuclear fleet and a sizeable inventory of spent fuel in storage. In addition, our geographical location makes it likely we will be affected by shipments

traveling from other regions to any site for waste management.

Transporting the spent fuel is not a new concept. As a Nation, we have been doing it safely for the past 40 years. The U.S. Department of Transportation and the U.S. Nuclear Regulatory Commission have primary oversight for spent fuel shipments. Under the Nuclear Waste Policy Act, the U.S. Department of Energy is responsible for moving commercial spent fuel to authorized facilities. States are involved because we are co-regulators of transportation. We bear the primary responsibility for protecting the public health, safety, and environment, as well as enforcing State-specific laws with regards to shipments. We are responsible for training emergency personnel and serve as the intermediary between Federal and local governments.

Several States including Illinois have experience with spent fuel shipments on a small scale. However, since 1999, many States have gained firsthand experience with the very large national program to move a different type of radioactive waste, transuranic, or TRU waste, from defense-related facilities. The Department of Energy disposes of TRU waste at its Waste Isolation Pilot Plant, WIPP, outside of Carlsbad, New Mexico. As noted by the National Academies and others, the WIPP transportation program is a good model for a national spent fuel transportation program because it is large, complex, highly successful, and has the support and buy-in of affected States and tribes.

While WIPP is a good model, there are many differences between

the TRU waste shipments and spent fuel shipments that go beyond just the type of material being shipped. One critical difference is the Federal assistance available to States and Tribes. Section 180(c) of the Nuclear Waste Policy Act, and 16(d) of the Land Withdrawal Act, both require Federal financial and technical assistance for States and tribes that will be affected by shipments. Section 180(c) refers to this assistance being intended for training, and DOE has interpreted this provision very narrowly.

Grants that may be available someday under Section 180(c) are not likely to allow States to recoup operational costs. In contrast, Section 16(d) of the Land Withdrawal Act refers to transportation programs, thereby allowing States to do more than just train. We have the flexibility to effectively manage and mitigate all impacts we experience from WIPP shipments.

A second difference between TRU waste shipments and spent fuel shipments is that DOE will transport spent fuel mostly by train, whereas WIPP shipments travel solely by highway. For WIPP shipments, the States conduct rigorous safety inspections following the Commercial Vehicle Safety Alliance Level VI enhanced inspection procedure. The DOT-required Level VI inspection identifies the items to be checked, standardizes the process for logging findings and sharing results, and assures accountability from a duly certified State inspector who performs the inspection.

For rail shipments of spent fuel, we do not yet have an enhanced

reciprocal inspection program analogous to what we have for trucks. Another impact of mode-related difference is that States have the authority to designate routes for highway shipments of radioactive material, but we do not have the authority over routes for rail.

The States recognize that the public will hold large-scale shipments of spent fuel to a higher standard than that of other DOE shipments. And so we feel strongly DOE must adopt reasonable measures to minimize public risk and maximize public confidence in the transportation program. These measures include, but are not limited to, State involvement in route identification, the development of a reciprocal rail inspection program, and a financial support system for a transportation safety program that is consistent with the WIPP model.

All these elements have DOE's TRU waste transportation program become the model it is today. The States believe DOE will need to implement, at a minimum, the same elements in order to achieve the goal of transporting spent fuel in a manner that is safe, secure, efficient, and merits public confidence.

Mr. Chairman, on behalf of the great State of Illinois and the Council of State Governments, Midwestern Radioactive Materials Transportation Committee, I thank you for hearing my testimony.

Mr. Shimkus. Thank you very much.

[The prepared statement of Mr. Horn follows:]

******** INSERT 1-3 ********

Mr. Shimkus. Next we will turn to Mr. Robert Quinn, who is vice president, Cask and Container Technology Energy Solutions, chairman of the Spent Fuel Transportation Task Force, U.S. Nuclear Infrastructure Council. You are recognized for 5 minutes. Welcome.

STATEMENT OF ROBERT QUINN

Mr. Quinn. Okay. Thank you, and good morning. My name is Bob Quinn. I am the vice president, as you said, of Cask Container Technology at EnergySolutions, which is U.S.-based internationally operating nuclear services company, specializing in safe recycling, processing, and disposal of nuclear material. And EnergySolutions is a member company of the U.S. Nuclear Infrastructure Council, which is a leading business association advocate for new nuclear energy and global engagement of the U.S. supply chain.

I am currently serving as the chair of the council's spent nuclear fuel transportation task force, and I must note that my statements today reflect the consensus views of the council and the Spent Fuel Transport Task Force, but do not necessarily reflect the specific views of any individual member, company, or organization.

Transportation of nuclear materials, including spent nuclear fuel, is not new or novel, and has, in fact, been done for the last 70 years with an outstanding safety record. And for 40 years of that we have been shipping spent fuel. Nuclear materials are transported

on an ongoing basis all over the world by public highway, rail, barge, ocean vessels, and air. About three million packages of radioactive materials are shipped each year in the United States.

Spent fuel shipments from commercial nuclear power plants, research reactors, and the Navy have been made safely for decades. The U.S. Navy has completed about 850 shipments totalling 1.6 million miles of transport. And since the mid-1970s, there have been over 1,300 safe shipments of commercial spent fuel in the United States. Between 1990 and 2012, 60 shipments, including more than 250 transportation casks of foreign research reactor fuel have been shipped to and within the United States by sea, land, and air. Shipments continue today.

Just recently two shipments arrived at Savannah River. There is a long history of safe, successful transportation of spent fuel globally as well. Over 70,000 metric tons of spent fuel have been transported by road, rail, and sea within and among the United Kingdom, France, Germany, Sweden, Japan, and other nations. In all these shipments, there has been no failure of a package and no release of radioactive materials.

Spent fuel is transported in packages which are also often referred to as shipping casks that are designed and fabricated to provide shielding of the radiation that is emitted by the fuel, and also to prevent the release of radioactive material even in severe accidents. The standards for the transportation packages are regulated by Federal law, which is enforced by the U.S. Nuclear

Regulatory Commission for domestic shipments.

For international shipments, there are similar regulations that are promulgated by the International Atomic Energy Agency. An independent review of these current international and U.S. standards and regulations performed by the National Academies, as documented in their 2006 Going the Distance report, concluded that these regulations are adequate and proven to ensure package containment effectiveness during both routine transport and in severe accidents. And the Blue Ribbon Commission on America's nuclear energy future also noted that the standards and regulations for spent fuel transportation are proven and functioning well.

The regulations require that the demonstration of the package meet demanding criteria for normal operating and accident conditions, including impact, fire, submersion, and puncture resistance before the NRC will certify them for use. These prescribed hypothetical accident conditions are challenging and have been demonstrated to be bounding of realistic real world accident scenarios.

Demonstrations that the regulatory requirements are satisfied by a package design is done by detailed computer simulation analyses using state of the art analytical and modeling tools, and by confirmatory testing of specific features or details, scale models, or in some cases, even full scale casks. The NRC review of certification applications for spent fuel transport casks is extremely thorough, and typically takes 1 1/2 to 2 years to complete. And these certificates must be

renewed every 5 years.

Resulting spent fuel transportation packages that receive NRC certification are extremely robust, state-of-the-art containers. They are typically comprised of multiple layers of steel and radiation shielding. Current generation spent full casks weigh well in excess of 100 tons. And there have been extreme demonstrations of the robustness of these packages that have been performed in the United States and the United Kingdom showing casks being hit by trains and plowing into solid concrete bunkers at high rates of speed.

In each of these demonstrations, the casks maintained their integrity and suffered only superficial damage. The U.S. Nuclear Infrastructure Council believes that the history of nuclear materials and spent fuel transportation demonstrates a commendable safety record. Transportation of nuclear materials, including spent fuel, is not new or novel. The facts speak for themselves. For more than 70 years of nuclear material transport, and 40 years of spent fuel transport in the U.S. and worldwide, no member of the public has ever been harmed from a radioactive release.

This is a testament to the effectiveness of the regulatory requirements and processes which are adequate and well proven, and the industry's implementation of the regulatory requirements in partnership with regional and local governments. The rigorous engineering methods, manufacturing processes, ongoing operational and periodic maintenance requirements, and implementing procedures have

provided and will continue to provide assurance of safety of spent fuel transportation.

Thank you for your time.

Mr. Shimkus. Thank you very much.

[The prepared statement of Mr. Quinn follows:]

******** INSERT 1-4 ********

Mr. Shimkus. Next we will turn to Mr. Franklin Rusco, director, Natural Resources and Environment with U.S. Government Accountability Office. You are recognized for 5 minutes. Welcome.

STATEMENT OF FRANKLIN RUSCO

Mr. Rusco. Thank you. Chairman Shimkus, Ranking Member Tonko, and members of the subcommittee, I am pleased to be here today to discuss GAO's work on spent nuclear fuel management, and particularly challenges associated with transporting spent fuel.

In our past work we have identified three key challenges to transporting spent nuclear fuel. First, DOE does not have clear legislative authority for either consolidated interim storage or for permanent disposal at a site other than Yucca Mountain. Specifically, provisions in the Nuclear Waste Policy Act of 1982, that authorized DOE to arrange for consolidated interim storage have either expired or are unusable.

For permanent disposal, the amendments to the Nuclear Waste Policy Act of 1982 directed DOE to terminate work on sites other than Yucca Mountain. Without clear authority, DOE cannot site an interim storage or permanent disposal facility and make related site-specific transportation decisions for commercial spent nuclear fuel.

Second, there are multiple technical challenges to safely transporting spent nuclear fuel. These challenges can be resolved,

but it will take time and could be costly. Specifically, there are uncertainties about the safety of transporting what is considered to be high burn up spent nuclear fuel, newer fuel that burns longer and at a higher rate than older fuel because of potential degradation while in storage. Also, NRC guidelines for dry storage of spent nuclear fuel allow higher temperatures and external radiation levels than do guidelines for transportation of such fuel. As a result, spent nuclear fuel already in dry storage is not readily transportable without being re-casked.

In addition, the current transportation infrastructure, particularly for a mostly rail option of transportation, which is DOE's preferred mode, may not be adequate without procuring new equipment and costly and time-consuming upgrades on the rail infrastructure.

Third, and perhaps the most daunting challenge, is achieving societal acceptance of any plan to move or store spent nuclear fuel. Specifically, in order for stakeholders and the general public to support any spent nuclear fuel program, particularly one for which a site has not yet been identified, there must be a broad understanding of the issues and risks associated with management of spent nuclear fuel, as well as what can be done to mitigate these risks. Also, some organizations that oppose DOE have effectively used social media and other means to promote their agendas to the public. But DOE has no coordinated outreach strategy to reflect their own views on this.

Given these challenges, it may take many decades to implement a

storage strategy and transport the fuel that will almost all be in dry storage by then. So the question is what can DOE and other agencies do to prepare to take possession of spent nuclear fuel as required by law? With regard to building societal consensus around transport and storage of spent nuclear fuel, we believe DOE has authority and should be doing more public outreach to try to build such consensus.

What else can be done? Can DOE, NRE, and DOT identify spent nuclear fuel dry storage and transportation options that are not dependent on a specific interim or permanent storage strategy, but that will save time and money once the issue of siting an interim or permanent storage site have been resolved? Can they ask Congress for authority to pursue such storage site neutral efforts to resolve technical challenges? Hopefully, this hearing can begin to answer these questions.

Thank you. This ends my statement. I would be happy to answer questions.

Mr. Shimkus. Thank you very much.

[The prepared statement of Mr. Rusco follows:]

******** INSERT 1-5 ********

Mr. Shimkus. Last but not least, we have got Mr. Kevin Kamps, Radioactive Waste Watchdog with Beyond Nuclear. You are recognized for 5 minutes. Welcome.

STATEMENT OF KEVIN J. KAMPS

Mr. Kamps. Thank you, Chairman Shimkus, Ranking Member Tonko, and members of the subcommittee. My name is Kevin Kamps. I serve as Radioactive Waste Watchdog at Beyond Nuclear based in Takoma Park, Maryland.

Our country needs to avoid radioactive waste wrecks, both figurative of policy, as well as literal on our roads, rails, and waterways. We need to just say no to unwise irradiated nuclear fuel transport, storage, and disposal schemes that have more to do with offloading nuclear utilities' liabilities onto the public than on protecting health, safety, and the environment.

Transporting high-level radioactive waste by truck, train, and barge through 45 States and the District of Columbia to the unsuitable Yucca Mountain, Nevada, site would take unnecessary risks and violate consent-based and environmental justice principles.

Yucca is the worst site ever studied for high-level radioactive waste disposal. It has been kept alive by double standard standards. When Yucca can't meet the standards, they are either weakened or gotten rid of. Yucca is an earthquake and volcanic zone. If radioactive

waste is ever buried there, it will leak massively into the groundwater, creating a large nuclear sacrifice zone downstream.

Nevada has not consented to being railroaded into becoming this country's radioactive waste dump. The Western Shoshone Indian Nation who live downstream have accused Federal officials of environmental racism.

Consolidated interim storage also makes no sense. Take private fuel storage targeted at the Skull Valley Goshutes Indian reservation in Utah. If that de facto permanent parking lot dump had ever opened and imported 4,000 casks of radioactive waste, they would have been returned to sender when Yucca was cancelled. Fifty casks from Maine would have traveled 5,000 miles roundtrip for nothing.

High-level radioactive waste shipments are potential mobile Chernobyls. Risks include long-lasting high temperature fires, as NAS acknowledged in 2006, which could breach shipping containers and release disastrous amounts of hazardous radioactivity in heavily populated areas.

Barge shipments on the Great Lakes, California's Pacific coast, the waters of New Jersey, and numerous other rivers and seacoasts, including in New York, are potential floating Fukushimas, risking radioactive contamination of vital drinking water supplies and the food chain, and even deadly nuclear criticality accidents if submerged.

A quality assurance meltdown in industry and at NRC revealed by whistleblowers and accidents adds to the risks of shipments. Calling

into question, as but one example, Holtec casks' structural integrity sitting still, let alone traveling 60 miles per hour or faster on the rails.

NAS also emphasized that risks of terrorist attack need to be addressed. A 1998 test of a TOW anti-tank missile on a shipping container conducted at the U.S. Army's Aberdeen Proving Ground showed that casks are potential dirty bombs on wheels. Combined with an incendiary, such breaches could cause a large-scale radioactivity release.

Incredibly, DOE is throwing caution to the wind, proposing unprecedented liquid high-level radioactive waste truck shipments from Chaulk River, Ontario, to Savannah River, South Carolina, with little to no environmental assessment. Even after the Blue Ribbon Commission heard many calls for environmental justice, it nonetheless kept Native American communities on the target list for centralized interim storage. But as Keith Lewis of the Serpent River First Nation put it, there is nothing moral about tempting a starving man with money.

As President Obama honored Grace Thorpe for helping 60 Native communities, six-zero, Native communities, fend off DOE's parking lot dumps, such radioactive racism must stop.

Through sheer luck, the Los Alamos barrel that burst in the WIPP underground do not do so while being shipped, or astronomically costly and hazardous radioactive releases to the environment and worker or public alpha inhalation doses could have been much worse. Waste

control specialists in Texas, a lead contender for a parking lot dump, hastily hosted similar potentially explosive barrels in the open air, which could put not only the Ogallala Aquifer at risk, but also the radioactive waste storage targeted at that site.

Savannah River site and Dresden Nuclear Power Plant in Illinois are also inappropriate targets for parking lot dumps, as they are already heavily burdened by radioactive contamination and large-scale radioactive waste storage.

So if Yucca and parking lot dumps are bad ideas, what are some solutions? We should phase out nuclear power, stop the generation of high-level radioactive waste, and replace the electricity and jobs with renewables and efficiency. For the high-level radioactive waste that already exists, 200 groups representing all 50 States have been advocating hardened onsite storage for well over a decade. Vulnerable pools need to be emptied into quality dry casks that are built to last, safeguarded against accidents and natural disasters, and fortified against attacks.

Thank you.

Mr. Shimkus. Thank you very much.

[The prepared statement of Mr. Kamps follows:]

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Mr. Shimkus. Now I will open the round of questions. I will start by recognizing myself for 5 minutes.

And I would like to start with Mr. Horn, of course, from the great State of Illinois. Your testimony notes that the Nuclear Waste Policy Act authorized the Department of Energy to provide technical assistance and funds to States for training of public safety officials. Is DOE providing the funding as the law directs?

Mr. Horn. Mr. Chairman, the way the 180(c) of the Nuclear Waste Policy Act states is that once a site is determined and States have the opportunity to analyze routing through their States and determine how affected their State will be, then they can submit to the DOE a funding mechanism asking for money under 180(c). So to date, since we do not have a facility to ship to, States and regional groups are not getting money under 180(c).

Mr. Shimkus. What additional recommendations do you have for DOE with respect to implementing the provision?

Mr. Horn. Once the 180(c) money and we as States and affected communities have the ability to petition the Federal Government for funding, it is the regional office's belief that the Nuclear Waste Policy Act should mirror that of the Land Withdrawal Act.

And in my written and oral testimony, I alluded to that. If we looked at the Land Withdrawal Act, we see that States have a comprehensive ability to look at their programs and determine more than just training issues. We have the ability to provide first responders

with equipment. We have the ability to reach out and do public outreaches to communities along the affected shipment routes. Where under the Nuclear Waste Policy Act, 180(c), all we can do is train those first responders. And although we find that to be very helpful, it does not get us to where we need to be.

Mr. Shimkus. Would further congressional direction assist organizations such as yours to be fully prepared for the transporting of spent fuel?

Mr. Horn. As I stated in my oral testimony, my comments here today are strictly for informational purposes. However, with that stated, I would direct you to the Blue Ribbon Commission study and Section 9.4, which has some very well-thought-out recommendations, and they took a lot of those recommendations from State testimony.

Mr. Shimkus. Thank you very much.

Mr. Kouts, advocates for interim storage often neglect to acknowledge the complicated efforts associated with a national transportation campaign. Given your professional experience at the Department of Energy, if Congress were to pass a bill authorizing interim storage of used fuel, what is the earliest that DOE could adequately develop a routing, procure the rail cars, and ship commercial spent fuel to an interim storage site?

Mr. Kouts. Well, that is a fascinating question, Mr. Chairman. And thank you for it. I actually used to do those kinds of estimates when I was at the Department, and I will -- we used to develop

success-oriented schedules. And I will walk you through the steps in that schedule very quickly. I am going to make some assumptions about the legislation you pass because that will be critical in determining the timeframe.

Let's assume for the first piece about the siting of the facility that Congress would need to approve the site and also approve any benefits agreement associated with that site because that would require appropriated funds to be given to the localities around the site or the State. My sense is that that would be probably, if we are going at warp speed here, probably at a 4-year process.

To find the site, and the rage these days is consent-based siting, to negotiate with them, to get an agreement, to get it to Congress, and get the Congress approve it. So we are probably 4 years away from identification from a site.

The next step would be, this is a major Federal action, it would require an EIS. And since this would be a very controversial facility, as you can tell from some of the comments from the panel here, my sense is that warp speed to do a major EIS would probably be about 4 years. So you are up to eight right there.

During that same timeframe you could be doing the design of the facility, you could be doing the preparation of a license application. And I am going to assume that the legislation also requires the NRC to review the license.

So at the end of the 8-year period you submit the license

application. I am also going to assume that the legislation will limit the amount of time that NRC has to review the license, just as it did with Yucca Mountain. So let's say there is a 3-year process that the NRC is given, or a 3-year timeframe. You are up to 11 years.

At that point, assuming that the licensing goes well, you begin to build the facility. At that point it is probably a 2- to 3-year construction period. Probably 2 years to construct it if everything is ready to go on day one, and about a year to shake it down to make sure everything is good. So basically you are at 13 to 14 years, 14 years into the future.

Now let me just say this about these kinds of facilities. Nothing goes as planned. Back when the people were drafting the Nuclear Waste Policy Act in 1982, they assumed that we would have an operating repository by January 31, 1998. They thought 16 years was plenty of time to do a repository. Okay. So that turned out to be wrong. And had Yucca Mountain continued, the earliest we could have started would have been 2021. So basically there is going to be schedule drift. And since interim storage facilities are simpler, if you will, than repositories, I would say you are at least, let's say, a 50 percent schedule drift. So you are anywhere between 14 and 21 years assuming you had legislation today, before that facility would begin to operate.

Mr. Shimkus. My time is expired.

Now I will turn to the ranking member of the subcommittee, Mr. Tonko, for 5 minutes.

Mr. Tonko. Thank you, Mr. Chair.

Nuclear waste transport is an essential component of any long-term waste management strategy. Although some on this panel have suggested that this practice is well established and understood, large-scale transportation required under a long-term strategy will pose serious challenges. We must ensure that this transportation can be done and done safely.

Mr. Rusco, GAO identified several technical challenges for transporting spent nuclear fuel in its recent study. Would you please briefly explain some of the remaining technical challenges involved in repackaging spent fuel from storage casks to transportation casks?

Mr. Rusco. So much of the spent nuclear fuel now is stored in dry casks that themselves are designed to be temporary, and to sit on these pads until a permanent site is -- or an interim site is found, developed, and then they will have to be re-casked, for shipment. And while there are casks that have shipped spent nuclear fuel before, there are different kinds of spent nuclear fuel. As we get more high burned up fuel that has different characteristics, it will have to be casked differently than the other fuel.

One of the main issues is that to re-cask something you have to have a facility to re-cask it in. And you could use a wet pool that is on a nuclear power plant facility. But as time passes and these nuclear facilities close, then they will start decommissioning. Those pools will be shut down, and at some point you are going to have to

then build a re-casking facility in order to move these things. These are all things that can be dealt with, but the clock is ticking, and so the longer it takes to find -- to start that process, the more fuel will be out there without a ready place to re-cask it.

Mr. Tonko. Thank you.

In recent years, some reactor operators have used fuel that is burned longer in the reactor which results in that high burn up fuel. This spent fuel is both hotter and more radioactive than other forms of nuclear waste. Are there outstanding technical questions about how to safely transport that fuel element, the high burn up fuel?

Mr. Rusco. In our most recent report, we talked to a number of experts, and they said that there were remaining technical issues that needed to be resolved. Everyone thinks that they can be resolved. But no one is going to invest the amount of money to do so until there is an actual reason to do it.

Mr. Tonko. And do you have additional concerns about the sufficiency of current infrastructure to support transportation?

Mr. Rusco. Certainly there will need to be enhancements to the rail infrastructure if we are to transport fuel from many of the sites where it currently resides because there is not sufficient rail infrastructure there at the time. Again, these are challenges that can be addressed, but they will take time and money.

Mr. Tonko. Thank you.

In 2006, the National Academies released a report on safe

transport of nuclear waste and raised concerns about severe accidents which may involve long-duration fires. Mr. Kamps, is that a theoretical concern or are long-duration train fires a real possibility?

Mr. Kamps. It is a very real world possibility. So one example was July of 2001 there was a train without radioactive waste onboard traveling through the Howard Street Tunnel downtown Baltimore that caught fire and burned for days. And the beginning of that fire was very hot. There were toxic materials that fueled that fire. And a study that was commissioned by the State of Nevada Agency for Nuclear Projects afterwards looked at the potential what if, hypothetical question, what if a Holtec transport container with high-level radioactive waste had been in the middle of that fire? And the results were shocking and concerning.

Radioactivity would have breached out of that container over a course of hours, and would have entered that smoke that was pouring out both ends of the tunnels. Would have inevitably exposed people at the baseball stadium, living in downtown Baltimore. And let's see if I can remember the figures. The latent cancer fatalities that would have been inevitable would have been counted in the many hundreds. If people continued to live in contaminated areas in downtown Baltimore for a year, the number of latent cancer fatalities would have then grown to something like 1,500.

And this is very expensive to clean up. Billions of dollars. In

fact, $13 billion was the figure for the cleanup that would have been required. And then if people continued to live in that contamination for 50 years, five-zero, the casualties were over 30,000 latent cancer fatalities. And that is an accidental severe fire.

The fire standards that are applied to these casks go back many decades. They have never been updated in all those decades. It is a 30-minute fire at around 1,500 degrees Fahrenheit. Less than that. This fire burned hotter than that for a longer period of time. So it is a very serious issue that the NAS itself documented.

Mr. Tonko. And I would assume that DOE needs to ensure that transportation casks can withstand such fires?

Mr. Kamps. Well, one would hope. Right now the Nuclear Regulatory Commission requirements do not require that casks survive more than 30 minutes in a relatively low-temperature fire. So real world accident conditions are much more severe than what these criteria call for.

Mr. Tonko. Thank you. I have gone beyond my time. I appreciate the chair being tolerant, and with that I yield back.

Mr. Shimkus. The gentlemen yields back his time.

The chair now recognizes the gentleman from Ohio, Mr. Latta, for 5 minutes.

Mr. Latta. Thank you, Mr. Chairman. And thanks for holding today's hearing. And to our panelists, thanks very much for being here.

Mr. Hamberger, if I could start with you, assuming a permanent repository such as Yucca was given the green light today, how long do you think it would take to transport the nuclear waste in the United States to that site in which it was supposed to store?

Mr. Hamberger. In conversation before the hearing began, I believe the plan from DOE was to move 3,000 tons a year. So I don't know how many years it would take to move.

Mr. Kouts. If I could help you with that --

Mr. Latta. Yeah, Mr. Kouts.

Mr. Kouts. -- Congressman. Basically, it would take approximately 24 years to ship all the waste, up to the statutory limit, which is the 70,000 metric ton limit that exists in the act today. So the plan was the shipping campaigns would take 24 years. It would be about two to three train shipments per week.

Mr. Latta. Okay. Thank you.

Mr. Hamberger, if I could also follow up with that, does the rail industry today have the cars available to transport that much right now?

Mr. Hamberger. I believe that the standard that we adopted almost 10 years ago, S-2043, is still in development. So I believe it would be several more years before the car meeting that standard would be available.

RPTR MCCONNELL

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[11:49 a.m.]

Mr. Latta. Okay, Mr. Quinn, the Department of Energy recently stated it will need at least 7 to 9 years to design and procure a fleet of rail cars for the spent nuclear fuel shipment. Again, how long do you estimate it would take for the DOE to procure those necessary components, do you think, for the testing and everything else to get that done? Mr. Quinn?

Mr. Quinn. Oh, sorry. As far as the transportation casks themselves, which is what I do for a living, once we have the specification from the Department of Energy of what casks they want, it would be about a 1.5- to 2-year effort to get them designed and to get the safety analysis report and license application ready to submit to NRC.

It is about another 1.5 to 2 years to get that approval. So we are up to 3 to 4 years and then we can begin to construct the casks. Typical casks take about a year to fabricate. So depending on the size of the fleet that is required, it could take 2 to 3, or 4 years.

Mr. Latta. Do we have the manufacturing capacity out there right now to be able to do that?

Mr. Quinn. Yes, there are fabricators in the U.S. and overseas who have the capability to fabricate these casks.

Mr. Latta. Okay, thank you. Mr. Rusco, I found kind of interesting in your statement that you were talking about the DOE has no coordinated outreach strategy including social media. And there is a question it sounds like they are losing the information war out there in your research, and when you were looking at this, why is that? Did you ask the question, "why is that?" when you were talking to the folks?

Mr. Rusco. I think DOE feels that it doesn't have the authority to really take on this issue. They feel like they don't want to get too far down the path of discussing any specifics about a strategy until they have a consensus with Congress about where to go with it.

Mr. Shimkus. Will the gentleman yield?

Mr. Latta. Yes, absolutely, to the chairman.

Mr. Shimkus. So is it true to say to say that DOE doesn't feel that they have the backing to comply with the law as it is written today?

Mr. Rusco. I am not sure that is how they would put it, but --

Mr. Shimkus. That is how I would put it, so I yield back.

Mr. Latta. Thank you very much. Reclaiming my time.

Mr. Kouts, if I could go back to you. DOE has five major computer-based tools to assist in integration and analysis of spent nuclear fuel storage and transportation programs. Are you aware if any of these tools has been integrated from the DHS' highly-developed risk-informed routing model?

Mr. Kouts. I have been briefed on some of the DOE models that

exist, and I don't know the answer to your question. The model I was briefed on was a tool for stakeholders to route shipments from point A to point B. And I think it had some work that still needed to be done, but in terms of the other models, I really can't comment on.

Mr. Latta. Okay, thank you. And Mr. Hamberger, in the last bit of time that I have, can you discuss the logistics of transporting nuclear waste by way of rail across the country from the East Coast or the Midwest to Yucca?

Mr. Kouts. I don't have the specifics of what that route would be. I would prefer to answer that for the record if I might.

[The information follows:]

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Mr. Latta. Okay. Well, thank you very much, and Mr. Chairman. My time is expired and I yield back.

Mr. Shimkus. [Presiding] The gentleman yields back his time. The chair recognizes the gentleman from California, Mr. McNerney for 5 minutes.

Mr. McNerney. I thank the chairman. I just want to follow up on the chairman's comment about the DOE not having the backing. But the DOE needs the Federal resources allocated and appropriated by Congress to do that.

Mr. Hamberger, you mentioned about a pretty sophisticated network to ship nuclear waste including casks and monitoring the trains and all that. How long would it take if you had the mandate -- would the rail take to do that, how much would it cost, and would it have to share a cost with the Federal Government?

Mr. Hamberger. I do not have the cost of the S-2043 car. I was told in preparation of this hearing it would be several hundred thousand dollars for each car, but I can, again, try to get that more specific.

Mr. McNerney. Well, how long would it take to develop that technology? You know, you had a whole network of --

Mr. Hamberger. Two to three years.

Mr. McNerney. Two to three years. Well, that is pretty fast. That is a lot faster than we could be ready in terms of a disposal site.

Mr. Rusco, I want to ask a couple of rhetorical questions, but you mentioned how important it is for the public acceptance of the

implementation of a relocation plan and the selection of relocation sites, and routes, and so on. You just affirmed that those require public acceptance?

Mr. Rusco. Yes, I think a lot of the delays that we have seen that have gone past the expected completion in past strategies, particularly with the Yucca Mountain, much of that was the result of the lack of public acceptance, and I think transporting nuclear fuel through communities will, you know, engender some --

Mr. McNerney. It is going to take transparency, I think as the chairman mentioned. Also, what steps do you think the DOE should take to build that acceptance? What would it take if we started today with the DOE? What steps should it take?

Mr. Rusco. Obviously, as many of the witnesses have said today, we have been shipping nuclear radioactive waste for a number of decades. And to start with, one would want to examine that record and to make public what, you know, what that record is, and how do we deal with the risks. To identify what the risks are, to be transparent about them, and to effectively transmit a strategy for mitigating those risks and stating, you know, how they will be mitigated.

Mr. McNerney. And it is going to take a certain amount of resources to do that. Are we talking about just putting stuff on Web sites, or advertising on billboards, or how would you go about making the public aware?

Mr. Rusco. I don't have a specific strategy for them. You know,

we really recommended that they develop a strategy for that, and we are not particularly specific on exactly how.

Mr. McNerney. Well, transportation of nuclear waste is going to take acceptance at the Federal and at the State level. Mr. Horn, what do you think the States' role should be in implementing an outreach strategy?

Mr. Horn. As I stated, the States when material is ready for transport and we know what routes are going to be affected, and those communities that are going to be affected, the States are going to be the intermediary between the Federal Government and the stakeholders, those local communities.

So we ask that DOE and the Federal Government work in a cooperative, consultative manner with the States, and the States can be that intermediary between the two and we can go out and work with the local communities and do the training, the public outreach. We could be that tool that allows that message to be conveyed.

Mr. McNerney. That is a pretty good role. States have better acceptance than the Feds in many communities. That is for sure.

Let's see. Mr. Kamps, I had a question. You mentioned -- you referred to a cruise missile test against a shipping container. Is that publicly available information, or is it classified information?

Mr. Kamps. It was not a cruise missile. It was a TOW antitank missile and the test was in June of 1998 at Aberdeen Proving Ground in Maryland. It was kept quiet for a long time, but it came out right

about the time of the Yucca Mountain votes in 2002.

There was video that ABC News played and the specific results were that a hole about as big around as a grapefruit was shot through the side of a German CASTOR cask which is 15 inches of die cast iron, which is much thicker than our U.S. shipping casks. That would have been the release pathway for a disastrous amount of radioactivity combined with an incendiary fire that would have driven the radioactivity out of the fuel.

Mr. McNerney. So that might be our biggest threat in terms of shipping is a terrorist attack?

Mr. Kamps. And the NAS, in 2006, said they did not have access to the classified and restricted information about the terrorism aspects of nuclear waste shipping. But yes, very much so, there are, I believe, thousands of TOW antitank missiles on the black market worldwide, and these train shipments would go through places like downtown Chicago within a quarter mile of the Art Institute. And I know that there is talk of dedicated trains bypassing major metropolitan cities, but they are still going to pass through the major population centers of our country.

Mr. McNerney. Okay, thank you, Mr. Chairman.

Mr. Shimkus. Thank you. Let me, without objection, just -- a TOW missile is a tube-launched optically-tracked wire-guided missile that was really developed about 20 years ago and I fired one. They are very difficult and they are guided by a wire.

So if you have a moving target that is moving like on a train track, it would be very, very difficult. So I know there is new weapons in development today, but --

Mr. Kouts. If I could also just supplement something.

Mr. Shimkus. Let me just -- I am taking my colleague's time and if one of my colleagues would like to follow up, I would do that. But the chair now recognizes the gentleman from Texas Mr. Flores for 5 minutes.

Mr. Flores. Thank you, Mr. Chairman. Mr. Hamberger, I have a quick question for you. You have testified that the use of dedicated rail trains is essential to the safe operation -- excuse me, the safe transportation of radioactive materials. In fact, this conclusion was affirmed in a recent Department of Transportation report in 2005, also in a 3-year study by the National Academy of Sciences in 2006, and also in the Nuclear Regulatory Commission response to the National Academy of Science's report in 2008.

However, while the Department of Energy stated in 2005 that it planned to use dedicated trains for shipment to Yucca Mountain, the agency has neither proposed nor adopted a regulation requiring dedicated trains for high-level waste and spent nuclear fuel. This appears to leave open the possibility that the DOE could ship these materials in regular mixed freight trains in the future.

And so my question is this: Do you believe that the DOE should adopt a formal requirement and regulation calling for the use of

dedicated trains?

Mr. Hamberger. Absolutely, Mr. Flores. I am pleased that they did announce that that was their policy for Yucca, but I think it would be important to make it a formal policy for all shipments.

Mr. Flores. Okay, thank you. Mr. Horn, a question for you. The Nuclear Waste Technical Review Board recently recommended that DOE expedite its effort to finalize and publish documentation supporting its integration and planning tools associated with the transportation of spent nuclear fuel, and release a modeling tool to the public to quote, "increase their understand of the constraints of routing options for the transportation of spent nuclear fuel." Unquote.

Will you please describe how DOE is engaging with regional organizations as they develop the required routing models?

Mr. Horn. Yes, sir. For about the past 10 to 15 years, DOE, through the cooperative agreements with the State organizations, Council of State Governments being one of them, has been working on rail routing issues and highway routing issues together. And just recently, DOE has been formulating a new routing model called START. It stands for Stakeholder Tool for Assessing Radioactive Transportation; not a whole lot known to the general community about this tool right now.

However, I will say that I have a meeting with DOE next week where I am going to be for the first time, introduced to this tool and will sit down and look at it. And I will be able to take that information

back and share it with my State -- our organizational groups as a whole.

Mr. Flores. Okay, I appreciate that. If you have any observations after you have looked at that tool if you would like to share those with us, that might be helpful.

Mr. Horn. I would love to, sir, thank you.

Mr. Flores. Thank you, Mr. Chairman, I yield back.

Mr. Harper. [Presiding.] The gentleman yields back. I will now recognize myself for questions for 5 minutes. Thanks to each of you for being here. This is such a critically important topic.

First, and this question will be directed to Mr. Quinn and Mr. Kouts, the Nuclear Waste Policy Act states that the Secretary of Energy shall utilize by contract private industry to the fullest extent possible in each aspect of spent nuclear fuel transportation. And the Secretary shall use direct Federal services for such transportation only upon a determination of the Secretary of Transportation in consultation with the Secretary of Energy that private industry is unable or unwilling to provide such transportation services at reasonable cost. And so this would be to Mr. Kouts, or Mr. Quinn. Are you aware if that determination has been made, Mr. Kouts?

Mr. Kouts. I have no idea what sections of the Nuclear Waste Policy Act DOE still believes are applicable to its activities. They seem to pick and choose what they want to utilize and/or accept, if you will, but I really don't have the answer to that question, and again, that guidance is for NWPA shipments.

And I think the Department would want other authority other than under the NWPA, but if there is new authority given to DOE, I think that would be an excellent section to put in there because all of the expertise, if you will, of moving these materials resides with private industry.

Mr. Harper. Mr. Quinn.

Mr. Quinn. I am not aware that any determination to that effect has been made. And as a member of an industry that actively transports nuclear materials today, we stand ready, willing, and able to do so when DOE comes and asks.

Mr. Harper. So we would really like to have DOE come and ask. Would that be a fair statement and assessment, Mr. Kouts?

Mr. Kouts. Yes, it is.

Mr. Harper. Okay. Mr. Quinn?

Mr. Quinn. Yes, sir.

Mr. Harper. Okay. Given your experience, are there actions that private industry is unable or unwilling to undertake, Mr. Kouts.

Mr. Kouts. In terms of the movement of these materials, no. I think there will be an issue in terms of if there is public concern, whether or not you want to point to the contractor, you know, talk to the contractor. I think ultimately DOE will be the responsible entity or whatever entity there is for implementing this.

But ultimately, I think there needs to be some Federal presence. So if someone has a problem, they would go to the Fed as opposed to

going to a contractor. But in terms of all of the movements --

Mr. Harper. So you believe private industry is ready, willing, and able to move forward given the proper instructions?

Mr. Kouts. I have high confidence they are.

Mr. Harper. Mr. Quinn?

Mr. Quinn. I will categorically state that industry is ready, willing, and able.

Mr. Harper. And Mr. Kouts, if I could ask you a followup here. Where in the transportation planning process should DOE provide funding to States for training of its first responders and other personnel for spent fuel shipments?

Mr. Kouts. When I was running the program, we looked at a time period of about 3 to 5 years before shipments when we would identify routes and provide funding, which would be supplemental to the already existing funding for existing training for State and local officials and Indian tribes.

Mr. Harper. Okay. Mr. Rusco, if I could ask you. As a part of a national transportation campaign, when is it appropriate for DOE to make funding available for training?

Mr. Rusco. I am sorry, I just don't have an answer for that.

Mr. Harper. Okay. All right. Anybody want to reply to that, sir?

Mr. Horn. Could you repeat that question real quick?

Mr. Harper. Yeah. The question was, as part of a national

transportation campaign, when is it appropriate for DOE to make funding available for training?

Mr. Horn. Again, if we go back and look at the Nuclear Waste Policy Act, it stipulates that 180(c) funding will be let 4 years prior to the first shipment. So as a State and regional group, we are going to need more lead time than that, want to analyze those routes that we are going to have to train to, and then to have more outreach with affected communities along those routes.

So we are looking probably a total 7 to 10 years, somewhere in that timeframe before the first shipment moves because we are going to have to analyze the routes, go out and determine which communities need to be trained, and then that will drive our funding mechanism to apply for funding. And then once we receive that funding, then we can effectively start that.

Mr. Shimkus. Would the gentleman yield?

Mr. Harper. I yield to Chairman Shimkus.

Mr. Shimkus. Mr. Horn, would the State approve a route next to the Art Institute of Chicago?

Mr. Horn. We would not, sir. We would highly oppose it.

Mr. Shimkus. Thank you very much.

Mr. Harper. And reclaiming my time. I now recognize the gentleman from Ohio Mr. Johnson for 5 minutes of questioning.

Mr. Johnson. Thank you, Mr. Chairman, I appreciate it. And Gentlemen, thank you for joining us today.

Mr. Hamberger and Mr. Kouts, your testimony discusses the development and use of the Rail Corridor Risk Management System, which is a sophisticated statistical routing model designed to help railroads analyze and identify the overall safest and most secure routes for transporting highly hazardous materials. Has the Department of Energy communicated with the Department of Homeland Security to discuss whether this model would be adequate for the shipment of spent nuclear fuel?

Mr. Hamberger. I will defer to the former member of DOE.

Mr. Kouts. I really am not a member of the Department and I can't say at this point what the Department is doing in that area. I think that would be an excellent suggestion. But again, I have no information as to whether or not the Department is doing that or not doing that.

Mr. Hamberger. When we developed that, Mr. Johnson, it was under contract with the -- we had an advisory committee of 15 different agencies. I believe the Department of Energy was one of those. It is a 27-factor model. And so they are aware of it. It is unclear to us whether in developing what Mr. Horn was just referring to, the START program, whether that had any cross-pollenization or not.

Mr. Johnson. Okay, so, well then I think I heard Mr. Kouts say it would be a good idea. Would you recommend that DOE use the DHS model?

Mr. Hamberger. I certainly would recommend that they use it if they want to add on to it, or if there are additional things that they

want to use. But yes, it took a great deal of effort to come up with that. We used it for all of our hazardous material shipments.

Mr. Johnson. Okay, Mr. Kouts, the Department of Energy has five major computer-based tools to assist in the integration and analysis of spent nuclear fuel storage in transportation programs. So are you aware if any of these tools have been integrated with DHS' highly-developed risk-informed routing model?

Mr. Kouts. I have only been briefed on one of those tools and I don't believe that was, but that was a stakeholder tool. The others I really can't comment on.

Mr. Johnson. Okay. All right. Mr. Kouts, a final question for you. The Department of Energy planned for a 70-year, $20 billion transportation campaign for Yucca Mountain. If Congress authorizes DOE to pursue interim storage, do you have any idea what the cost implications for having to ship spent fuel more than once would be?

Mr. Kouts. Well, it will be $20 billion plus; whatever it takes to move that fuel to your interim facility, if you will, and then moving that fuel to an ultimate destination which would be -- it could be Yucca Mountain, it could be another repository. But it would be an added cost, and --

Mr. Johnson. Would you say that cost would be significant?

Mr. Kouts. Significant depends on the amount of fuel that is sent to the interim storage facility. If you are sending 10- to 15,000 tons, yes, it would be very significant.

Mr. Johnson. Okay. All right, Mr. Chairman, I yield back.

Mr. Shimkus. The gentleman yields back his time. I want to thank you for coming and appreciate your response to our questions. The question period will be open for 10 legislative days. Members will be able to submit questions for the record in writing. We would ask that you respond to those within 10 business days of receiving any additional questions.

[The information follows:]

******** COMMITTEE INSERT ********

Mr. Shimkus. Having said that, again, I want to thank the witnesses for being here. With that, I am going to adjourn the hearing.

[Whereupon, at 12:12 p.m., the subcommittee was adjourned.]