

*Proceedings of the Joint Workshop on Routing of Shipments of Spent Nuclear Fuel
Southern States Energy Board's Advisory Committee on Radioactive Materials Transportation
and the
Council of State Governments' Midwestern High-Level Radioactive Waste Committee*

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Welcome and Introductions

Mr. Jim Hardeman (Georgia), chairman of the Southern States Energy Board Advisory Committee on Radioactive Materials Transportation, called the meeting to order at 9:00 a.m. Before explaining the purpose of the meeting, he noted that a few changes had been made to the agenda.

He told the committees the representative from the Federal Railroad Administration would not be present and that Mr. Jack Williams, president of Williams Crane and Rigging, would be added to the agenda as a speaker. He informed the group that the focus of the meeting would be on routing. Mr. Hardeman explained that the audience would be divided into four breakout groups to participate in routing exercises.

Mr. Hardeman thanked Ms. Beth Fulmer and Ms. Lisa Sattler for their efforts in organizing the joint routing workshop. Next, Mr. Hardeman introduced Mr. Harold Borchert (Nebraska), chairman of the Midwestern High-Level Radioactive Waste Committee.

Mr. Borchert began by addressing the topics of the funding reduction for the regional cooperative agreement groups and the ongoing legislation in Congress concerning the disposal of spent nuclear fuel. He told the group that he had been in contact with Senator Bob Kerry's (Nebraska) office and had learned of a resolution being developed to be attached to legislation that would result in the Department of Energy (DOE) funding the cooperative agreement groups at a greater percentage than present.

He indicated that as a companion to the cooperative agreement funding issue, Senator Kerry is developing a resolution to free-up Section 180(c) funding. He believes the money should be provided directly to the states with maximum flexibility and no strings attached. Mr. Borchert informed the group that he provided Senator Kerry's office with documents relating to Section 180(c). The documents were mainly definitions and positions developed by the Midwestern High-Level Radioactive Waste Committee concerning Section 180(c). Mr. Borchert stated that he would try to gather more information regarding the status of the resolutions. To date, there is no paperwork on these resolutions, he noted. He stated he would send information concerning the resolutions or the actual resolutions to Ms. Beth Fulmer and Ms. Lisa Sattler for general distribution to the committee members.

Overview of the Civilian Radioactive Waste Management System and the Pivotal Role of Routing

Mr. Marcus Popa from DOE's Office of Civilian Radioactive Waste Management (OCRWM) began by stating that President Clinton signed the Energy and Water Development Appropriations Bill yesterday morning, November 14. Under this act, OCRWM will receive \$400 million in funding, of which \$85 million is prohibited from use until separate authorizing legislation is enacted for an interim storage facility. OCRWM will have \$315 million, half of the original budgetary request, to carry out its program's activities.

Mr. Popa gave a brief overview of how the reduction in funding will effect OCRWM programs. In regards to the contract with Westinghouse for the construction and use of a multi-purpose canister (MPC), only Phase I will be completed. Phases II and III will not be renewed. DOE is yielding the role of lead agency for the MPC Environmental Impact Statement (EIS) to the Department of the Navy. DOE is also evaluating its options regarding General Atomic's 4/9 cask. Additionally, DOE has announced that it will reduce the number of contractor positions.

Mr. Popa briefed the participants on the status of the site characterization activities underway at Yucca Mountain. He stated that the tunnel boring machine (TBM) was ahead of schedule, and that, as of November 9, 1995, 2,716 meters (8,911 feet) have been excavated. The TBM is expected to reach the potential repository horizon in March 1996 after excavation of 2,800 meters (9,186 feet) of tunnel.

Next, Mr. Popa addressed routing issues. He quoted a Council of State Governments-Midwestern Office document that stated that Department of Transportation (DOT) and Nuclear Regulatory Commission (NRC) routing criteria would not be sufficient for the purposes of addressing NWPA shipments. He then read the statements issued by a representative of DOE's Environmental Management (EM) program at a TEC meeting in July. The statement implied that DOE did not want to undermine DOT regulations in the area of routing. Instead, DOE will work on developing a policy paper regarding interaction with states on routing and other issues related to specific shipping campaigns. Furthermore, he stated that OCRWM had no intention of implementing additional regulatory routing guidance.

After his presentation, Mr. Popa answered questions from the audience. Ms. Sattler asked if EM staff was still developing a procedure for obtaining stakeholder input. Mr. Popa responded that EM is still working on a position statement on how they intend to work with stakeholders. Ms. Sattler then asked who currently selects the OCRWM highway routes. Mr. Popa said that, according to regulatory guidelines, the carrier selects both highway and rail routes. Furthermore, he suggested that DOE has the ability to control carrier selection significantly because of its contracts with the railroad industry. He also explained that states have the ability to designate alternate routes and register them with DOT. She then asked if DOE would implement any extra-regulatory guidance in adjusting the contracts of the carriers. Mr. Popa said that DOE would keep its options open.

Mr. Borchert informed Mr. Popa that, a number of years ago, Nebraska and several other states identified and forwarded documentation to DOT designating primary routes within their states. Mr. Popa said he was aware of 10 states that had successfully filed with DOT for an alternate highway route designation: Alabama, Arkansas, California, Colorado, Iowa, Kentucky, Nebraska, New Mexico, Tennessee, and Virginia. He also mentioned one case in California where legal actions were used to designate an alternate rail route.

U.S. Department of Transportation Regulations Pertaining to HRCQ Shipments of Radioactive Materials

Ms. Pam Deadrick, U.S. Department of Transportation (DOT), Federal Highway Administration (FHWA), provided a brief overview of DOT radioactive materials routing regulations. She explained that radioactive materials routing regulations provide information on how designated routes are selected. Ms. Deadrick stated that the FHWA published an interim final rule in 1992 to incorporate, without substantive change, the preemption determination and waiver of preemption procedures, currently contained in the Research and Special Programs Administration's (RSPA) regulations as 49 CFR 107.201 to 107.227, into the FHWA's regulations at subpart E of 49 CFR Part 397.

The rule also incorporates the routing requirements for radioactive materials, currently found in the RSPA regulations at 49 CFR 177.825 into the FHWA's at subpart D of 49 CFR part 397. Ms. Deadrick provided copies of this rule to the meeting participants. Ms. Deadrick also made copies of the list of preferred routes designated by states under 49 CFR Sec. 397.103 (b) and the Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials. She reported that Mr. Dick Hannon of RSPA said that the mode and route study, which is a joint effort by RSPA and Volpe Transportation Center, will be published by March 1996.

Ms. Deadrick mentioned that a training course offered by the National Highway Institute will occur in the Spring of 1996 and will cover all hazardous materials routing regulations, including radioactive materials. One participant inquired about the time and location of the National Highway Institute training course. Ms. Deadrick informed the group that the information pertaining to the course would be forwarded to all FHWA division offices and made available to the routing agency within that state. She also mentioned that a National Highway Institute course catalog is available.

Ms. Sattler asked Ms. Deadrick to describe the process that states undertake to designate alternative highway routes. The first step, said Ms. Deadrick, involves conducting a routing analysis using the DOT guidelines or something equivalent. At that point, the designated alternative route must be entered into the analysis equation within a specific routing framework. DOT guidelines require that the states work with adjacent states during the developmental phase. If the project was conducted using reliable methodology, then the designated alternative route will be filed, reviewed, and published.

Another participant asked what elements are included in the routing analysis. Ms. Deadrick responded that the elements comprising the analysis are listed in the guidelines and include such factors as exposure, population density, and special areas like routes near schools. Someone asked what would FHWA's role be if two states had a disagreement about a specific interstate route. Ms. Deadrick said that the FHWA would attempt to provide some form of arbitration between the two states that had differences. She mentioned that the division office would sometimes enter into the situation and try to resolve the problem.

Routing Shipments of Radioactive Waste

Mr. Jack Williams, President of Williams Crane and Rigging Incorporated, gave a presentation on the development of a routing plan for the transfer of fuel from the Shoreham reactor in New York to the Limerick reactor in Pennsylvania. He provided some background on the history of the Shoreham Nuclear Power Station. The Shoreham Nuclear Power Station is located east of Long Island, New York. It took approximately 21 years to build the plant at a cost of \$5.5 billion. The reactor is an 809 megawatt boiling water reactor. The plant was never popular with New York's public officials and was eventually shut down after undergoing low-level testing. Governor Cuomo would not approve the evacuation plan for the plant and ultimately purchased the entire plant for \$1.

New York formed the Long Island Power Authority to decommission the plant. Since the plant never operated above 5 percent power, the fuel was essentially brand new although it had been officially irradiated. The federal transportation regulations only classifies two kinds of fuel: fully spent fuel or brand new fuel. The fuel in the Shoreham reactor fell under the category of fully spent fuel and the shipment had to comply with all the appropriate regulations. However, since the fuel was essentially brand new, Philadelphia Electric's Limerick Plant decided to purchase the fuel for use in their reactor. A routing plan was developed to deliver the fuel from Long Island to Philadelphia.

The original plan was to move the fuel by heavy-haul from Shoreham to a rail site about seven miles from the plant, using VECTRA's IF-300 cask. The development of the routing plan and acquisition of the appropriate government approvals took over one year. In addition, the State of New York decided to have public meetings on the issue to inform the local citizenry of the transportation plan. As a result of the information received at the public meetings, Mayor Dinkins and the City Council voted against moving the fuel through New York City. In order to avoid a lawsuit between the state and the city, an alternate route was developed. It was decided that the fuel would be barged from Shoreham to Limerick.

The transportation campaign began in September 1993 and consisted of 33 barge-loaded shipments. The route went from eastern Long Island down to Cape May, New Jersey, and up the Delaware River where it was transferred from barge to rail at a Philadelphia Electric coal-fired plant in Philadelphia and transported by rail the last 40 miles to Limerick. The IF-300 cask had to be loaded 33 times, 17 assemblies per trip, until all 560 assemblies were transported to

Limerick. The reuse of this fuel resulted in a \$70 million savings for Philadelphia's ratepayers. The shipping campaign was completed in June 1994.

Mr. Ronald Kucera (Missouri) asked Mr. Williams what type of National Environmental Policy Act (NEPA) compliance was required for the route selection and use of the barge. Mr. Williams said that the Long Island Power Authority performed the environmental analysis. Mr. Chris Wentz (New Mexico) asked if there was a problem with the infrastructure because of the weight of the package being transported. Mr. Williams informed him that an analysis was conducted over the actual haul route and it was decided that a 58-tire transporter would be used to distribute the weight of the package. In regards to crossing bridges, engineering studies were conducted along with consultation from the highway department to determine the level of safety. Mr. Williams added that the sale of the fuel to the Limerick plant was approximately \$40 million and that the transportation campaign cost approximately \$12 million.

Federal Regulations for Routing of Rail Shipments

Mr. Mike Conroy, DOE Transportation Management Department, began by briefing the participants on a 1988 DOE memo regarding rail routing that was released as a result of the experiences gathered during the Three Mile Island (TMI) shipments. After the TMI campaign, DOT reviewed the routing practices. The Transportation Management Division of DOE issued a memo regarding current recommended practices for rail routing for unclassified shipments of spent nuclear fuel and high-level waste.

The memo mentioned that the selection of routes should be coordinated by DOE, its contractors, and the origin and destination carriers. It also implied that because of the sensitivity of transporting spent fuel through high population centers that DOE, its contractors, and carriers should consider additional specific route selection criteria prior to route finalization.

Ms. Sattler asked how DOE involvement in route selection would differ in regards to highway routing and rail routing. Mr. Popa answered that the carrier would essentially determine the route for highway shipments and that rail routes would be coordinated by DOE, its contractors, and the origin and destination carriers. Mr. Conroy added that he interpreted OCRWM's policies as including states and tribes in the preliminary stages of routing planning and having their concerns serve as a factor in the carrier's final route selection.

Next, Ms. Sattler asked if the routes in the repository EIS would be from reactors to a repository. Mr. Popa noted that the routes in the EIS were computer simulated and are representative routes for EIS purposes only. Ms. Sattler asked if the actual routes from reactors to a repository would be provided for states to review. Mr. Popa indicated that he was not sure if DOE was obligated to conduct some study other than the repository EIS once the actual destination was determined, but he would find out.

Mr. Popa was asked if the transportation plan is deemed insufficient in the NEPA document using representative routes, will additional NEPA work be required for the specific routes. Mr.

Popa answered yes, but he also stated that the preliminary NEPA work has never been found to be insufficient.

Ms. Fulmer asked Mr. Popa to state the percentage of OCRWM shipments by mode. Mr. Popa responded that present plans call for 90 percent of the shipments to be conducted by rail and 10 percent by truck, regardless of the use of a multi-purpose canister. He also added that using barges in the shipping campaign would be considered on a case-by-case basis. Ms. Sattler asked if the heavy-haul option would be used to transport fuel to a rail head. Mr. Popa said that heavy-haul would be used.

Ms. Sattler asked who selects the mode of shipment. Mr. Popa replied that the purchaser could specify their desired mode of transport, but that the ultimate mode selection was negotiable. Ms. Sattler asked Mr. Popa what the repository EIS would be looking for in terms of transportation. Mr. Popa suggested that the EIS could explore how many power plants could be upgraded to use small rail and the possibility of building a rail spur at the repository.

Demonstration of Routing Models

Mr. Paul Johnson from Oak Ridge National Laboratory gave a demonstration of the HIGHWAY and INTERLINE online routing systems. He told the committees he has been involved in routing for fifteen years and was involved with these models since their inception. With the use of a computer and an overhead projector, Mr. Johnson guided the committees through demonstrations of highway and rail routing from reactors to Yucca Mountain. A number of options were demonstrated including changing to the maximum speed of the shipment, the number of drivers used, removal of states from the route, blocking road segments, and alternative routing. He told the committees they can access both models on the TRANSNET computer system by contacting Mr. Rick Orzel (phone 505/845-8094 or e-mail rjorzel@sandia.gov). Copies of user's manual for either model can be obtained from Mr. Johnson (phone 423/574-7450 or e-mail pej@ornl.gov).

Overview of Routing Exercises

Ms. Sattler and Ms. Fulmer presented the committee with an outline and instructions for the routing exercises. Using maps generated by Oak Ridge National Laboratory, the committees would identify highway and rail routes from various reactor sites to Yucca Mountain. The groups would then discuss issues such as who should select the routes, how states should be involved, and if states will be designating routes. Finally, the groups would discuss the need for a work product such as a statement of position or a white paper. The groups would make reports to the plenary.

Reports on Routing Exercises

Mr. Bob Owen (Ohio) reported on the routes selected by Group A. The group felt carriers should not be selecting routes but that states prefer to have DOE select the routes with states

consulted. The carriers should also consult with states before shipping to determine if there have been any physical changes to the route. It is necessary, Mr. Owen said, to select routes before distributing Section 180(c) funding. The group also felt there should be recommendations to DOE regarding this issue.

Mr. Bob Halstead (Nevada) reported that Group B did not choose any routes but instead discussed the geographic and demographic characteristics of each route. The group felt it was imperative that route selection be a joint effort that includes DOE, the NRC, DOT, the states, the carrier, and local governments and felt the regional cooperative agreements should be involved in achieving consensus on routing. The group noted that there may be some state route designations in the west that may have national impacts. For example, Colorado may ban I-70 west of Denver and designate I-25 south of the city instead. If this is the case, I-40 or I-80 may become de facto cross-country routes.

Group B, Mr. Halstead said, felt there was no need for a white paper but rather a statement of position on using the regional groups to achieve consensus on routing and also recommended to DOE that the department coordinate routing activities among its agencies. Other issues the group felt needed to be addressed was the role of the NRC in the process, the education of the public, and the resolution of Section 180(c) funding.

Mr. Harlan Keaton (Florida) said Group C decided they did not have the expertise to select rail routes. The group felt DOE and the carrier should select the routes, but states should be involved in a cooperative effort to refine and approve the routes. The group felt there should be some work product, Mr. Keaton reported, and Section 180(c) issues should be considered. The group added that DOE should consider providing security escorts.

Mr. Thor Strong (Michigan) reported that Group D discussed a route not shown on any of the generated maps that avoided downtown Las Vegas. There was also discussion of assigning responsibility for rail routing to the Department of Defense's Military Traffic Management Command. Mr. Strong said the group felt the regional cooperative agreement groups should have a role in helping DOE select the routes.

Alternative Route Designation: Lessons Learned by the States

Mr. Christopher Wentz, who serves as Coordinator and Senior Policy Analyst for the State of New Mexico's Radioactive Waste Task Force, briefed the committee on New Mexico's experiences with routing for shipments to the Waste Isolation Pilot Plant (WIPP).

Mr. Wentz said every state should consider performing a comparative route analysis, as states will soon experience an unprecedented amount of radioactive material shipments, including WIPP shipments, OCRWM shipments of spent fuel and high-level waste, and special shipments such as the cesium-capsule shipments or those resulting from DOE's clean-up activities.

The containers for radioactive material are robust, he said, but there are health, safety, and economic risks. Non-radiological risks include injuries and fatalities from traffic accidents. Nuclear Waste Policy Act shipments, he noted, present involuntary risks that are more difficult for citizens to accept because such risks are imposed on them. The public must therefore be convinced that states are doing everything possible to make shipments safe.

Routing analyses, Mr. Wentz told the committees, also assist states in preparing for safe routine transport of the shipments. For example, New Mexico learned more about their emergency response capabilities and about working with local governments along the route. New Mexico also learned there was only one hospital in the whole state with a Level One trauma unit. In collecting the data, states also learn about the condition of their infrastructure.

Mr. Wentz described New Mexico's experiences with WIPP. He explained that trucks must get off interstates to get to WIPP in New Mexico. Under existing regulations, transuranic waste from Idaho National Engineering Laboratory, Rocky Flats, and Los Alamos -- 65 percent of the shipments -- would have been routed through Santa Fe, Albuquerque, and Las Cruces, the states' three biggest towns.

The New Mexico Highway Commission hired a university professor with over 20 years of transportation engineering/planning experience to analyze the routes. He worked closely throughout the process with the Task Force, the N.M. Highway and Transportation Department, and other participants. In the course of the analysis, the state collected data related to accidents, traffic counts, vehicle speeds, population, and land use. Sixteen routes were analyzed using DOT guidance, which considered routine radiation exposure, public health risks from release, and economic risks from accidents. If no clear route emerged from this analysis, then the state looked at secondary factors such as emergency response capabilities along the routes, evacuation capabilities, special facilities such as schools and hospitals, and general traffic fatality rates. These criteria, Mr. Wentz said, are important but they are more subjective than the primary factors in the DOT guidelines. New Mexico gathered this information and presented it to the Commission, but did not incorporate it directly in the formal analysis of alternative routes.

Mr. Wentz told the committees the New Mexico State Highway Commission considered in its deliberations not only the comparative route analysis, but also other documentation and testimony received during the comment period and at a series of public hearings. The commission's ultimate decision on designating New Mexico WIPP routes was not challenged administratively or in the courts.

States and DOE benefit from early identification of routes, Mr. Wentz said. In 1980, DOE designated initial routes to the WIPP, eight years before the facility was first scheduled to open. This allowed states to focus their resources and coordinate more effectively with local governments; it also gave DOE a more definitive basis for planning and budgeting. Mr. Wentz acknowledged that the consequence of designating routes is that various parties can find fault with them.

Mr. Wentz urged states to hire an experienced and independent party to do the analysis, as virtually every element in the route selection process will be scrutinized closely. He also recommended eliminating as many routes as possible early in the analysis and noted that the risk factors are not weighted equally. Finally, states should keep the public informed and consult all affected local jurisdictions and other states.

Mr. Wentz was asked about any analysis of the economic impact of accidents. He replied that economic impacts are assessed using available land use data (*i.e.*, information on traversed lands by urban, suburban, rural, and other descriptive use classifications). New Mexico used census data, as it was already available. Mr. Wentz added that it costs New Mexico about \$40,000 - \$60,000 to do its WIPP routing analysis, not including state staff time for highway data collection.

Mr. Wentz was asked what practical results came from the analysis. He replied that, although the DOE had already agreed to assist the state in securing funds for the construction of WIPP bypasses along the designated non-Interstate routes, the New Mexico Highway Department did consider the information in their long-term road construction planning. He stressed that states must analyze current conditions, not what the highway department plans to do.

Mr. Jay Thornton from the Iowa Department of Transportation discussed Iowa's experiences in designating alternate routes. He told the committees Iowa discovered its role in the radioactive waste transportation system in 1980 when an NRC document on shipments through the state prompted a story in the *Des Moines Register*. This came as a surprise to Iowa officials. The state department of transportation, the highway patrol, the department of environmental quality and the department of health quickly met with the federal government, who provided the state with information on the shipments.

Mr. Thornton said the state opposed some of the routes selected by the NRC. Some of the routes, Mr. Thornton said, could not handle the shipments and traversed population centers. Interstates, the state felt, were away from population centers, were better maintained, and were the first to get attention during bad weather conditions. Mr. Thornton reminded the committees that Iowa is crossed by two interstates - I-80 running east to west and I-35 running north to south. Also, much of the area traversed by interstates in Iowa is rural.

Iowa accepted DOT's preferred routes, Mr. Thornton said, and added that Iowa worked with Illinois, Nebraska, and Missouri to designate alternate routes. Illinois was concerned about avoiding populated areas around the Quad Cities, and Iowa agreed to route traffic away from I-80 to I-280. Nebraska had similar concerns around Council Bluffs and Omaha, so Iowa also routed traffic to I-680 in this area. Using the interstate, Mr. Thornton said, makes sense because the shipment gets through the state as quickly as possible.

State Experiences with Shipments of Radioactive Waste

Mr. Ron Kucera from the Missouri Department of Natural Resources related his state's experiences with routing of radioactive materials and the problems states encounter within the state and with federal agencies. Missouri, he said, has learned from its experiences with shipments from Three Mile Island in the mid-1980s and, more recently, with the low-specific activity nitric acid shipments, to be sufficiently organized to reduce the potential for surprises.

Regarding the low-specific activity shipments, Mr. Kucera explained that in 1994, DOE decided to sell the waste to British Nuclear Fuels in order to save money at Hanford. The 183,000 gallons were to be shipped by truck from Hanford to a port in Virginia. Missouri belatedly received a copy of the National Environmental Policy Act-required environmental assessment for this campaign, which Mr. Kucera felt was poorly done. The nitric acid contained less than three grams of plutonium and 150 pounds of fissile uranium-235, but no groups made an issue of the composition of the shipments.

Missouri was not on the original route for the shipments. However, in May 1995, four days before the shipments were scheduled to depart, DOE generated a new route for the shipments. This new route added Missouri to the corridor, but DOE failed to notify the state of the change. Missouri officials strongly objected to the last-minute switch. From a technical standpoint, Mr. Kucera said, this was not a big concern. But as a process issue, Mr. Kucera said this was one of the worst instances of miscommunication he has ever seen.

Missouri called DOE and pointed out that their new route did not conform to the environmental assessment. In response to these concerns, DOE reverted to the original route. Mr. Kucera said the new route was generated because it was two minutes faster. If DOE had sent the shipments through Missouri, Mr. Kucera said, the state would have lost credibility with its citizens and relations between the state and DOE would have soured.

Mr. Kucera explained the special conditions surrounding the shipments of reactor debris from Three Mile Island to Idaho National Engineering Laboratory in the mid-1980s. Because the reactor core had been drilled, flammable particulate matter necessitated special transportation and storage conditions for the debris. Missouri had to discuss the shipments extensively with the public and the media and convince them that they felt the shipments would be safe.

During the course of the shipments, restricted information was made available in the St. Louis area by a local emergency management director. Mr. Kucera cautioned that safeguard violations are a possibility with any shipment and suggested the NRC should consider prosecuting people who violate the regulations. According to Mr. Kucera, Missouri also had to overcome perception problems stemming from a former state emergency management director's comment that doubling the number of casks per shipment made no difference, because "when you're dead, you're dead." Surprises, Mr. Kucera said, can come from outside or inside the state. He encouraged the states to be alert for potential surprises and to be well-coordinated among state agencies. He reiterated that safeguards should be enforced.

Mr. John Kerr from the Minnesota Department of Safety described the routing process for shipments of spent fuel from the Monticello Plant in Minnesota to the Morris Spent Fuel Storage Facility in Illinois. He prefaced his comments by saying that since these shipments occurred in the mid-1980s, some of the immediacy and emotion surrounding them has faded.

In 1984 and 1985, Northern States Power conducted 19 shipments - a total of 1,058 assemblies - from the Monticello Nuclear Power Plant northwest of the Twin Cities to Morris on the Burlington Northern line. Each train carried one to three IF-300 casks.

Mr. Kerr said much of the controversy surrounding these shipments was eliminated by preparation. Northern States Power created the shipment plan, which was approved by the NRC. Work on an emergency response plan was coordinated between the state department of public safety and local governments. There was also extensive first responder training. Because of these shipments, the state put together its own emergency response plan focusing on high-level waste shipments. Minnesota also assesses a \$1,000 fee for each cask. Mr. Kerr said because of these plans, the general public was not concerned, although there was some concern among environmental groups and corridor communities.

In planning the shipments, Mr. Kerr said, the railroad and Northern States Power looked at track and security issues and evaluated and rated the six most likely routes for percentage of A-main line track and for accidents. The route that was chosen brought the train into downtown Minneapolis, but in the middle of the night. The shippers notified the local law enforcement personnel with a secure communications system. There were health physicists and security on the train and state department of health staff shadowing the train.

Minnesota activated the state emergency operations center for each shipment. The track was inspected by the federal and state departments of transportation and a track inspection vehicle preceded each shipment. Around the Minneapolis area, law enforcement personnel were on guard for any unusual activity.

Upcoming Developments in Routing of Spent Fuel Shipments

Mr. Bob Halstead from the Nevada Agency for Nuclear Projects gave an overview of future developments in the routing of spent fuel shipments. He told the committees that the maps generated by his office, which he provided, were from their updated routing report, which will be provided to the committees through the cooperative agreement offices. Nevada also recently released a report by Dr. Edward Bentz on near-term shipments to an interim storage facility. Mr. Halstead said his comments today would be based on the assumption that Congress would speed up shipments by designating an interim storage facility. Nevada, he said, agrees with the Western Interstate Energy Board that DOE should designate cross-country routes with input from states and tribes. The state also urges early implementation of Section 180(c).

Mr. Halstead discussed the route analyses done by his office in conjunction with University of Nevada-Las Vegas and University of Nevada-Reno. The first state studies considered the

Nevada Test Site as the origin for routes to WIPP. After eight years of repository routing work, he says, Nevada has a good idea of what the base-case highway and rail routes to Yucca Mountain will look like.

Nevada feels the draft environmental impact statement for the repository should identify the most probable cross-country routes and should also discuss the factors that would be most likely to change the routes, Mr. Halstead said.

Regarding Nevada's maps, the MPC base case scenario assumes that 90 percent of the shipments are by rail. Shipments will go on Conrail, the former Chicago Northwestern, and Union Pacific through the northeast and north central region of the country and Norfolk Southern and CSX out of the Southeast through St. Louis and Kansas City. The routes merge in Nebraska, funneling about 90 percent of the shipments through that state. Nevada's maps assume rail access in Nevada will come from the Union Pacific in the southern part of the state but the line in the northern part of the state is a possibility, although this would only affect routing in the west. As for highway, Mr. Halstead said, most of the shipments by truck will use I-70 or I-80 to I-15 if Nevada poses no additional routing restrictions.

Mr. Halstead explained his matrix showing various upcoming routing developments, including the MPC and repository environmental impact statements, highway designations in reactor and corridor states, and their near-site, state, and cross-country implications. It is hard to keep up with changes at DOE, he said, as it seems that DOE will now turn the work on the MPC environmental impact statement over to the Navy. The decision to use the MPC (or any other large rail cask) would impact near-site routing, as a number of reactors would need to use heavy-haul trucks to transport the casks to rail heads.

DOE carrier contracts, he said, are the single most important influence on routing, as the department is in a position to dictate the preferred routes. Pending Congressional legislation and rail company mergers and acquisitions can also affect routing. Mr. Halstead told the committee that the states may have to face some difficult near-site routing decisions if spent fuel in an MPC needs to be heavy-hauled or barged to a rail head.

Mr. Halstead discussed possible state alternative route designations that could have national implications. For example, if Nevada decided to designate I-80 as the point of entry or if Colorado prohibits use of I-70, the majority of cross country truck shipments would be shifted to the north on I-80. If California decides to allow shipments through Death Valley, truck shipments from the Southeast and Middle Atlantic states will be shifted to the south on I-40. To illustrate the national impact, Mr. Halstead said that, depending upon how shipments are routed into Nevada, truck shipments through Omaha could be as little as less than one percent of the total or as great as 50 percent of the total. This is why the whole country needs to watch the EIS process and Nevada's routing decisions.

In response to a question about a Yucca Mountain rail spur, Mr. Halstead discussed four of the 13 routes under consideration. Nevada believes DOE's Yucca Mountain Environmental Impact

Statement should evaluate at least three routes, including the route through Carlin, Nevada, which would come from the north and avoid Las Vegas. All routes, he said, will traverse difficult terrain and private property, and he estimated the cost of building a spur at \$750,000,000 to \$1,500,000,000. Construction could take six to 12 years. He added that it will be difficult to move large rail casks by heavy-haul and that DOE should concentrate on smaller 75-ton casks. He concluded by saying that the state remains opposed to the project but they are still determined to play a major role in transportation planning.

Prepared by Carol Ann Kania of the Council of State Governments and Christopher Wells of the Southern States Energy Board.