JIM GIBBONS
Governor

STATE OF NEVADA

BRUCE BRESLOW
Executive Director

OFFICE OF THE GOVERNOR
AGENCY FOR NUCLEAR PROJECTS
1761 E. College Parkway, Suite 118
Carson City, Nevada 89706
Telephone: (775) 687-3744 • Fax: (775) 687-5277
E-mail: nwpo@nuc.state.nv.us

April 21, 2009

Mr. Frank Moussa
U.S. Department of Energy
OCRWM Office of Logistics Management
1000 Independence Avenue, SW
Washington, DC 20585-0001

Dear Mr. Moussa:

In response to the Notice of Availability published in the Federal Register on January 16, 2009, enclosed are the State of Nevada comments on the Office of Civilian Radioactive Waste Management's (OCRWM) National Transportation Plan, Revision 0 (NTP).

Nevada joins the Western Interstate Energy Board's High-Level Radioactive Waste Committee and the other states regional groups in expressing concern over the paucity of meaningful planning reflected in the NTP. The current draft lacks specificity, continues the fragmentation and "stove-piping" of transportation system components, and hinders rather than promotes a systems approach to planning for and managing spent nuclear fuel (SNF) and high-level radioactive waste (HLW) shipments. It is neither 'national' in its orientation and concept nor is it in any sense a useful or meaningful 'plan'.

Nevada is also concerned that DOE is not prepared to review or otherwise act on comments received from states, regional groups, local governments and other stakeholders in response to the Federal Register notice. Speaking to attendees at the March 25, 2009 meeting of the Western Interstate Energy Board's High-Level Radioactive Waste Committee in Denver, OCRWM representatives indicated that no funds or staff remain in the Office of Logistics Management to review, let alone respond to, comments on the NTP. All comments, apparently, will be placed on the shelf to be dealt with at some future time, if ever at all.

Under these circumstances, Nevada strongly recommends that SNF and HLW transportation planning activities be transferred to another DOE office where such activities can be integrated into a truly national planning process for radioactive materials that can be used for SNF and HLW shipments required for alternative waste management strategies in the future.

Alternatively, DOE should announce the immediate suspension of all work on the NTP and withdraw the Notice seeking comments on the draft.

If you have questions regarding these comments, please feel free to contact me at the address indicated above.

Sincerely,

Bruce H. Breslow
Executive Director

BHB/
Enclosure
cc Governor Jim Gibbons
Catherine Cortez Masto, Attorney General
Nevada State Legislature's High-level
Radioactive Waste Committee
Nevada Commission on Nuclear Projects
Marta Adams, Chief Deputy Attorney General
Affected Units of Local Government/Tribes

STATE OF NEVADA COMMENTS
ON THE U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT'S
DRAFT NATIONAL TRANSPORTATION PLAN (DOE/RW-0603)
April 21, 2009

Introduction and Background

For more than 25 years, the U.S. Department of Energy (DOE) and its Office of Civilian Radioactive Waste Management (OCRWM) have been espousing the need for effective and meaningful planning for shipments of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) to a potential repository site for disposal. The current draft National Transportation Plan (NTP) released for comment in January 2009 demonstrates, unfortunately, that little progress has been made in this planning effort despite the expenditure of significant funds (more than $780 million) and extensive input from the State of Nevada and other interested stakeholders over many years.

With the passage of the Nuclear Waste Policy Act (NWPA) in 1982, there was widespread recognition of the need for a safe, secure, and publicly acceptable transportation system if DOE was to achieve the goal of deep geologic disposal of SNF and HLW. Within a year, DOE was grappling with transportation institutional issues raised by affected States, Indian Tribes, local governments, and regional organizations. Stakeholders raised these issues at a time when DOE was evaluating candidate sites in more than 20 states for two geologic repositories and a monitored retrievable storage facility.

By 1984, OCRWM had established a transportation planning component as part of its overall repository activities. A seminal 1984 report by the National Academy of Sciences[1] emphasized the critical importance of addressing the social and institutional issues associated with waste disposal, prominently the potential impacts and issues associated with shipments of SNF and HLW to a repository. Specifically, the NAS study concluded that, "…the socioeconomic and institutional issues associated with facility location and transportation modes, routes, distances, and scheduling require greater attention than they have received to date."[2]

In 1984, the Western Interstate Energy Board (WIEB), representing 11 western states, began working co-operatively with DOE to develop a comprehensive Spent Nuclear Fuel and High-Level Radioactive Waste Transportation Primer that laid out the essential elements of a transportation system and served as the basis for a series of recommendations designed to assist DOE in developing a national plan for SNF and HLW shipments to a repository. It appeared during those early years that DOE was

[1] Social and Economic Aspects of Radioactive Waste Disposal: Considerations for Institutional Management, National Academy of Sciences, National Research Council, Panel on Social and Economic Aspects of Radioactive Waste Management, Washington, DC (1984)
[2] Ibid., p. 80.

prepared to make meaningful progress in the transportation planning arena, even agreeing at one point to move ahead with a process for the early identification of shipping modes and routes.

By 1986, transportation safety and security had emerged as major public concerns in the debate over restructuring of the federal nuclear waste program established four years earlier. That year, DOE published a Transportation Institutional Plan. In the preface, DOE explained the importance of transportation issues as a factor in the credibility of its overall waste management program:

> "The Department of Energy (DOE) recognizes that the success of its program to develop and implement a national system for nuclear waste management and disposal, as directed by the Nuclear Waste Policy Act of 1982 (NWPA), depends not only on safety, but on broad-based public understanding of and confidence in program activities and objectives. While each program element has its particular sensitivity, the transportation of the waste to facilities developed under the NWPA may be the most visible element nationwide. Therefore, DOE's Office of Civilian Radioactive Waste Management (OCRWM) has developed this Transportation Institutional Plan to lay the foundation for interaction among all interested parties for the purpose of productive cooperation and resolution of issues related to establishment and operation of the NWPA transportation system."[3]

The DOE 1986 Transportation Institutional Plan presented 16 issues papers, summarized in Figure 1.

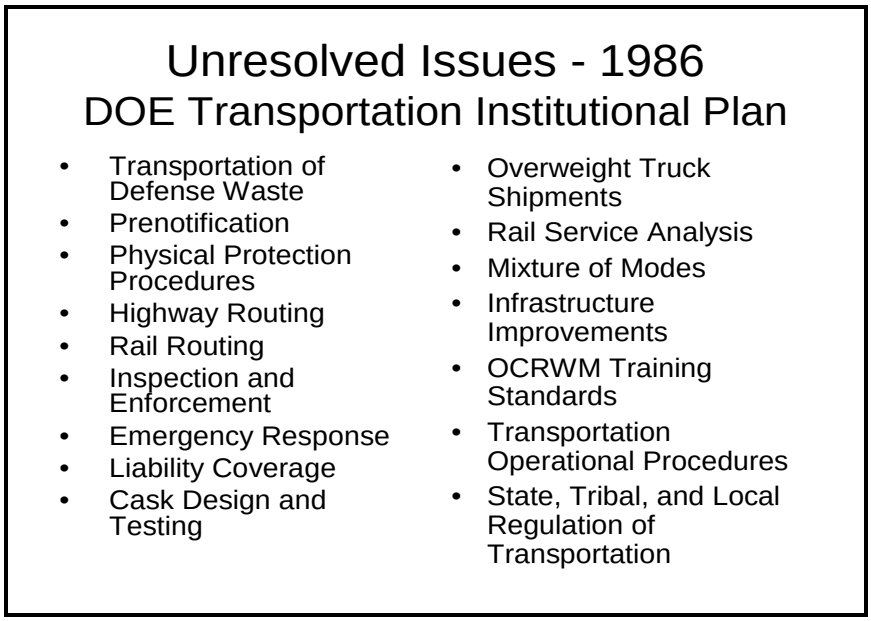

Fig.1. DOE Transportation Institutional Issues, 1986. [Ref. 1]

[3] DOE, *Transportation Institutional Plan*, DOE/RW-0094 (August 1986).

The State of Nevada Agency for Nuclear Projects (NANP) reviewed these institutional issues in a 1988 report, known as the ACR 8 Report, prepared at the direction of the Nevada Legislature.[4] In the ACR 8 Report, Nevada adopted its own positions on each of the 16 institutional issues, and began a process of continuous monitoring of developments in the DOE nuclear waste transportation program. NANP staff and contractors revisit these issues regularly. As of April 2009, only four of the 1986 issues – transportation of defense waste, pre-notification, liability coverage, and rail service analysis – have been substantially resolved. One previously resolved issue, use of overweight trucks, has recently been reopened by DOE.

Following a series of OCRWM reorganizations and restructurings, however, the WIEB recommendations and the early DOE transportation planning efforts were put on the shelf. Transportation became very much the stepchild of the OCRWM repository program and, despite the development of repository and rail environmental impact statements, transportation planning has remained fragmented, incomplete and inadequate. DOE did not publish a transportation plan until 2009, amazingly 25 years after the issues were declared an important component of the Yucca project. Even more amazing, the National Transportation Plan was a meager 28 page outline while the Yucca licensing application was a 8,600 page document supported by a million plus pages of reference documents

Transportation Planning and the NEPA Process

In 2002, following DOE's release of the Final Yucca Mountain EIS (FEIS), the State of Nevada made specific recommendations to DOE for a comprehensive and holistic approach to transportation planning based on the National Environmental Policy Act (NEPA). Nevada pointed out the serious shortcomings for DOE's past efforts:

> "The State contends that DOE should have fully and adequately addressed transportation of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) to Yucca Mountain in the FEIS, and that the transportation analysis contained in the FEIS is legally and substantively deficient and entirely inadequate. …
>
> "… DOE is now proposing to move ahead with decisions about SNF and HLW transportation without having conducted adequate analyses of proposed decisions and their alternatives and without legally required public and stakeholder input. It is Nevada's position that such decisions can only be made - and the activities required to make them can only be undertaken - within the context of a comprehensive and legally sufficient NEPA process."[5]

[4] NANP, *A Report on High-Level Nuclear Waste Transportation: Prepared Pursuant to Assembly Concurrent Resolution No. 8 of the 1987 Nevada Legislature* (1988).

[5] Nevada's Position on How DOE Must Approach SNF and HLW Transportation Planning (August 2002) - http://www.state.nv.us/nucwaste/news2002/nn11757.htm

The same document set forth recommendations constituting a roadmap for arriving at a meaningful and acceptable planning process, including:

- The ONLY acceptable vehicle for engaging in planning for SNF and HLW shipments in Nevada or nationally is the process set forth by the National Environmental Policy Act (NEPA) and its implementing regulations;

- The NEPA process provides a clear and unambiguous framework by which DOE can set forth its proposal(s) for developing and implementing a transportation system in a manner that assures adequate public involvement and that guarantees consistency and transparency;

- The NEPA process assures that there is a level playing field and that DOE will not be able to make one set of representations to one group, region, or area, and another set of representations to other groups, regions, or areas. The NEPA process enhances public involvement while severely limiting opportunities for gamesmanship, manipulation, and playing one set of stakeholders/affected parties off against another;

- This means that DOE must commit to the preparation of an Environmental Impact Statement (EIS) for the transportation program. Such an EIS must encompass an integrated transportation program that covers BOTH the national transportation system and the transportation system within Nevada. The EIS must show how the national and Nevada components function in a consistent and integrated manner, and how decisions with respect to the national system affect the Nevada system, and vice versa;

- DOE should begin the process by first setting forth it's proposed action and alternatives for the national transportation system. Once the national system has been fully scoped and alternatives identified and described, DOE should develop the Nevada component (proposed action and alternatives) in a manner that is fully consistent with the national system;

- All interactions with the public, state and local governments, and other interested parties and stakeholders must be done ONLY through the formal NEPA process. All information made available must be the same for all groups and in all forums. DOE must follow the letter and spirit of NEPA in informing and involving the public and affected parties, both nationally and in Nevada;

- A formal record of all NEPA proceedings, interactions, comments, information requests, etc. must be maintained by DOE, and this record must become a part of the overall record for the EIS and the NEPA process;

- State of Nevada agencies will interact with DOE only via the formal NEPA process;

- All meetings and interactions must be public and formally noticed so that there can be no manipulation of the process - such as the playing off of one party or set of parties against others;

- The EIS should include the DOE's proposal for how to accomplish the transportation project. This is the place to air the alternatives, such as regional transportation service contractors, etc.;

- The EIS should include the policy and procedures for implementation of Section 180(c) of the Nuclear Waste Policy Act, the provision for training and equipping state and local public safety and emergency response personnel.

The document went on to specify eleven concrete steps DOE should take to accomplish the goal of an adequate, integrated transportation plan in the form of a formal Record of Decision setting forth the integrated SNF and HLW repository transportation system (both the selected national and Nevada components and the interface between them). The final EIS and the Record of Decision would then become the basis for any interactions with the State of Nevada, Nevada local governments, regional groups, other states and local governments, the transportation industry, etc. for moving ahead with SNF or HLW transportation activities.

Instead of moving to implement a comprehensive and integrated transportation planning process, DOE continued with the same, inadequate and fragmented approach that has characterized OCRWM's transportation planning efforts since the late 1980s. DOE has continued to insist on segregating so-called Nevada transportation from national transportation. Over the ensuing years, the Nevada component has been further narrowed to mean planning for the construction and operation of a rail spur to provide direct rail access to Yucca Mountain.

Nevada Safety and Security Recommendations

Since enactment of the NWPAA, and adoption of Assembly Concurrent Resolution 8 by the Nevada Legislature in 1987, NANP has made numerous recommendations to DOE regarding nuclear waste transportation safety and security. Since 1997, Nevada has consistently recommended the ten measures summarized in Figure 2. These measures emphasize a comprehensive approach to risk assessment, risk management, and risk communication; development of a preferred transportation system for repository shipments; full-scale, physical testing of shipping casks; and accident prevention and emergency response. Nevada has communicated these same recommendations to the U.S. Nuclear Regulatory Commission (NRC), the NRC Advisory Committee on Nuclear Waste, the U.S. General Accounting Office (GAO), the U.S. Nuclear Waste Technical Review Board, the National Academy of Sciences (NAS) Study Committee on Transportation of Radioactive Waste, the National Association of Regulatory Utility Commissioners, and other agencies and organizations.

- **Oldest Fuel First**
- **Mostly Rail (65-75%)**
- **Dual-Purpose Casks**
- **Dedicated Trains**
- **Full-scale Cask Testing (Regulatory & Extra-regulatory)**
- **NEPA Process for Selection of Rail Spur**
- **WIEB "Straw Man" Routing Process**
- **Sec 180(c) Program Rulemaking**
- **State Regulatory Enhancements (Safety & Perception)**
- **Terrorism and Sabotage Concerns**

Fig. 2. State of Nevada Safety and Security Recommendations

Oldest Fuel First. Nevada has recommended that DOE ship the oldest fuel first, or at least ship older fuel first. NAS and GAO also recommend shipping older fuel first. Shipping fuel 50 years out of reactor, compared to shipping 5-year-cooled fuel, could reduce radiological hazards 65-85 percent.

Modal Mix. Nevada has recommended that DOE select rail as the preferred mode of transportation, acknowledging the serious impediments to developing rail access to Yucca Mountain and to 24 of the 76 shipping sites. Based on shipping site current capabilities, the share of SNF that could realistically be shipped by rail may be 65-75 percent, not the 90 percent projected by DOE. DOE must plan for large numbers of truck shipments under the "mostly rail" shipment scenario.

Dual-Purpose Casks. Nevada has recommended that DOE base its transportation system on use of dual-purpose (transportable storage) casks of a standardized design, with a range of capacities resulting in loaded cask weights of about 125, 100, and 70 tons. In 1995, Nevada endorsed the DOE proposal for a similar approach using a multi-purpose canister (MPC) system for storage and transport.

Dedicated Trains. Nevada has recommended that DOE use dedicated trains for all rail shipments. Until DOE commits to use dedicated trains only, DOE routing studies and risk analyses must evaluate use of both dedicated and general freight rail shipments.

Cask Testing. Nevada has recommended that DOE and/or NRC conduct a meaningful full scale testing program. DOE or NRC should conduct full-scale regulatory tests on each cask design (or in some cases of similar designs, test one cask from each representative grouping). DOE or NRC should also conduct a combination of extra-regulatory, full-scale testing (fire), scale model testing, component testing, and computer simulations to determine cask failure thresholds. In addition, DOE and/or NRC must ensure meaningful stakeholder participation in all aspects of the cask testing program. This is a safety issue, not a public relations demonstration.

Rail Access. Nevada has recommended that DOE use a credible National Environmental Policy Act (NEPA) process to select a preferred Yucca Mountain rail access corridor and rail alignment in Nevada.

Shipment Routes. Nevada has recommended that DOE select routes for the national transportation system following a three-step process proposed by the Western Interstate Energy Board (WIEB): DOE would designate "straw man" routes, preferably in the Yucca Mountain FEIS or another NEPA document; WIEB member states would individually and collectively evaluate the DOE routes, and then designate preferred routes on a regional basis; DOE would then formally adopt the routes identified by WIEB, and designate these routes (allowing exceptions for use of designated alternative routes in emergency situations) in DOE contracts with rail and highway carriers.

Section 180(c). Nevada has recommended that DOE implement the transportation planning and emergency response training program, required under Section 180 (c) of the NWPAA, through formal rulemaking. Absent rulemaking, the State of Nevada believes that congressional action might be needed to implement the program, as was the case with the Waste Isolation Pilot Plant (WIPP) DOE-State cooperative transportation planning program.

State, Local, & Tribal Regulation. Nevada has recommended that DOE support state regulatory enhancements to manage transportation risks and address public perception of transportation risks. These would include, but not be limited to, port-of-entry inspections and state escorts for DOE shipments at DOE expense. States, in conjunction with local governments, may also impose seasonal, day-of-week, and time-of-day restrictions on DOE to address unique local conditions. Tribal governments may also regulate DOE shipments.

Terrorism and Sabotage. Nevada has recommended that DOE address acts of sabotage and terrorism against repository shipments. DOE has acknowledged, in the FEIS and in the SEIS, the potential vulnerability of shipments to such attacks. Analyses by Nevada contractors have concluded that the releases and consequences could be many times greater, resulting in catastrophic cleanup and recovery costs.[6] DOE needs to fully address terrorism issues in development of repository transportation operational protocols. NRC has still not responded to the specific terrorism risks and impacts documented in Nevada's 1999 petition for rulemaking (Docket PRM 73-10).

Nevada believes that DOE has moved toward addressing the sabotage and terrorism concerns raised by Nevada and other stakeholders. DOE appears to have made a significant commitment regarding use of dedicated trains for most, but not all, rail shipments. In six other areas, Nevada sees little progress. Regarding rail access, Nevada believes DOE is misusing the NEPA process to advance its questionable selection of the Caliente rail option. Regarding shipment of older fuel first, DOE is actually moving in the opposite direction.

[6] Resnikoff and Travers, Potential Consequences of a Successful Sabotage Attack on a Spent Fuel Shipping Container: Updated Analysis (November 2008). http://www.state.nv.us/nucwaste/news2008/pdf/rwma0810sabotage.pdf

NAS 2006 Study Recommendations

In 2006, the National Academy of Science Transportation Research Board undertook a comprehensive study of existing DOE SNF and HLW transportation planning efforts and concluded that "[s]uccessful execution of DOE's program to transport spent nuclear fuel and high-level waste … will be difficult given the organizational structure in which it is embedded... . [T]he current program may have difficulty supporting what appears to be an expanding future mission to transport commercial spent nuclear fuel for interim storage or reprocessing."[7] NAS went on to recommend examining three alternative organizational structures including a quasi-independent DOE office reporting directly to upper-level DOE management. The goal would be to give the transportation program greater planning authority, budget flexibility to make multiyear commitments needed to plan for transportation, and greater flexibility to support expanding future missions to transport SNF and HLW. While giving lip service to the NAS recommendations, DOE has failed to implement any of the report's recommendations.

In terms of the national transportation planning, about all that can be said is that there apparently is none. Apart from the inadequate, overly generalized analyses contained in the FEIS and the subsequent Supplemental Repository EIS, there has been no comprehensive attempt to assess the nationwide transportation implications of the unprecedented nuclear waste shipping campaign proposed for the Yucca Mountain repository project or to lay out, in adequate detail and in an integrated fashion, the full set of specific plans and activities that will be needed to actualize such a complex, unique, and highly specialized transportation system.

The current draft of what DOE terms its National Transportation Plan is hardly worthy of the name. It lacks specificity, continues the fragmentation and "stove-piping" of transportation system components, and hinders rather than promotes a systems approach to planning for and managing SNF and HLW shipments. It is neither 'national' in its orientation and concept nor is it in any sense a useful or meaningful 'plan'.

General Comments on the Draft NTP Document

(1) Critical Information Missing in the NTP - SNF is Dangerous

The NTP provides no information about the radiological hazards of spent nuclear fuel (SNF), which would comprise about 90 percent of the highly radioactive wastes that DOE would ship to the repository. The NTP describes commercial SNF as "fuel that has been withdrawn from a reactor following irradiation. The sources of commercial SNF are the commercial nuclear power plants throughout the United States." [p.3] The NTP fails to mention that SNF is lethal. The NTP fails to explain that cleanup after a severe

[7] "Going the Distance: The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States," National Academy of Sciences, Transportation Research Board (June 2006).

transportation accident or terrorist event could cost billions of dollars. The NTP conceals the facts about routine radiation from SNF shipping casks, radiation that is dangerous to workers even when the transportation system is working perfectly.

Fission products, especially strontium-90 (half-life 29 years), and cesium-137 (half-life 30 years), account for most of the radioactivity in SNF for the first hundred years after removal from reactors. Fission products, which emit both beta and gamma radiation, are the primary sources of exposure during routine transportation operations. Cesium-137 is the major potential source of irradiation and contamination if a shipping cask is breached during a severe transportation accident or successful terrorist attack.

Each shipping cask would contain an enormous amount of fission products. Every dedicated train hauling three or four rail casks would contain more Cesium-137 than the total amount released during the Chernobyl accident (2.4-2.9 million curies). Each truck cask of commercial SNF would contain more than 350,000 curies of radioactive cesium and strontium, about 20-30 times the amount of those fission products released by the Hiroshima bomb.

Three decades ago, when planning began for disposal in repositories, DOE was willing to discuss the radiological characteristics of SNF. The following table, based on data developed by DOE, illustrates the general relationship between SNF age (cooling time after removal from a reactor) and the two radiological characteristics most important for assessing SNF transportation risks, total activity and surface dose rate. Table I is based on average SNF characteristics typical of utility discharges 30 years ago. The SNF shipped to Yucca Mountain would be even more radioactive.

Table I. Radiological Characteristics of Commercial Spent Nuclear Fuel

SNF Age (Years Cooled)	Total Activity (Curies)	Surface Dose Rate (Rem/Hour)
1	2,500,000	234,000
5	600,000	46,800
10	400,000	23,400
50	100,000	8,640

Source: U.S. DOE, DOE/NE-0007, 1980.

After one-year in a water-filled storage pool, unshielded SNF is so radioactive that it delivers a lethal, acute dose of radiation (600 rem) in about 10 seconds. Even after extended cooling, SNF can still deliver a lethal radiation exposure in minutes. <u>The lethal exposure time for unshielded SNF is less than one minute after 5 years cooling, less than 2 minutes after 10 years, and less than 5 minutes after 50 years.</u>

The good news about SNF is that the radiological hazards of transportation decline significantly simply by delaying shipments. After 50 years cooling, compared to 5 years cooling, the total radioactivity declines up to 75 percent, and the dose rate declines up to 85 percent. The bad news is that DOE is proposing to transport SNF that is

more radioactive to begin with, because it has a higher burn up, and DOE is designing the TAD canister system to transport SNF cooled as little as 5 years.

The NTP rejects recommendations by the National Academy of Sciences, the General Accounting Office, the State of Nevada, and other parties, that DOE ship the oldest, or older, spent fuel first. Shipping older fuel first would reduce radiological exposures from routine operations, severe accidents, and terrorism. By choosing to ship hotter fuel first, when older fuel is available for shipment, DOE's NTP may also violate the NRC radiation exposure policy of ALARA (as low as reasonably achievable). Indeed, ALARA is not mentioned in the NTP.

The NTP fails to mention that the DOE shipping casks will not be tested to determine accident failure thresholds. The Nuclear Regulatory Commission (NRC) does not currently require full-scale physical testing of shipping casks. None of the SNF shipping casks currently used in the United States have ever been tested full-scale. NRC has developed a plan for demonstration testing of the new rail casks for DOE TAD canisters, but the tests are designed to promote public confidence, and will not actually determine crash failure thresholds, will not include a fire test, and will not include truck casks. DOE and the nuclear industry oppose mandatory full-scale impact and fire tests for new cask designs.

The NTP fails to mention the consequences of a severe transportation accident or a successful terrorist attack on a shipping cask. The DOE Supplemental EIS for Yucca Mountain acknowledges that cleanup costs following a transportation accident resulting in release of radioactive materials could range from $300,000 to $10 billion. The DOE SEIS also acknowledges that both truck and rail casks are vulnerable to terrorist attacks or sabotage involving certain types of military and commercial explosive devices. Nevada-sponsored studies have concluded that a credible attack scenario in an urban area could release enough radioactive material to cause thousands of latent cancer fatalities and to require cleanup and recovery costs exceeding $10 billion.

The NTP fails to mention routine radiation from shipping casks that are operating as designed. NRC regulations allow a certain amount of neutron and gamma radiation to be emitted from shipping casks during routine operations and transport (1,000 mrem/hr at the cask surface, and 10 mrem/hr at 2 meters from the cask surface). The dose rate allowed under NRC regulations could result in near-cask exposures of about 2.5 mrem per hour at 5 meters (16 feet), in measurable exposures (less than 0.2 mrem per hour) at 30 meters (98 feet), and calculated exposures (less than 0.0002 mrem per hour) at 800 meters (one-half mile) from the cask surface. Cumulative exposures at these rates can result in adverse health affects for some workers, and under certain circumstances, to some members of the public. Moreover, the very fact that these exposures would occur has been shown to cause adverse socioeconomic impacts, such as loss of property values, even though the dose levels are well below the established thresholds for cancer and other health effects.

In the Final EIS for Yucca Mountain, DOE acknowledges that routine radiation from shipping casks poses a significant health threat to certain transportation workers. In the most extreme example, motor carrier safety inspectors could receive cumulative doses (200 rem over 24 years) large enough to increase their risk of cancer death by 10 percent or more, and their risk of other serious health effects by 40 percent or more. DOE proposes to control these exposures and risks by severely restricting work hours and doses for certain jobs.

The NTP fails to mention that for purposes of assessing environmental impacts, DOE defines the radiological region of influence (ROI) for incident-free transport as the area 0.8 km (0.5 mile) on either side of the rail alignments centerline, and for accidents and sabotage the area 80 km (50 miles) on either side. The affected environment for radiological impacts includes individuals and businesses within the ROIs.

State of Nevada estimates at least 113,000 residents of Clark County live within one-half mile of a highway route for truck shipments to Yucca Mountain, and at least 95,000 residents of Clark County live within one-half mile of the Union Pacific rail route for shipments to Yucca Mountain via Caliente.

Based on previous studies, State of Nevada estimates at least 40,000 nonresident visitors and workers in Clark County would likely be located within one-half mile of the highway and rail routes for shipments to Yucca Mountain at any hour of the day, and virtually all of Clark County's 1.9 million residents live within the 50-mile radiological region of influence for transportation accidents and sabotage.

(2) Critical Information Missing in the NTP – DOE Transportation Program Details

The lack of specificity in the NTP is not only unacceptable, it is shocking. By its own admission, DOE has been working on repository transportation planning since 1983. By its own figures, DOE spent $780 million (in 2007$) on transportation planning between 1983 and 2006.[8]

The absence of any cost estimates in the NTP can only be interpreted as an intentional act of deception. DOE has recently estimated that the repository transportation program would cost more than $20 billion (in 2007$) if Yucca Mountain goes forward. DOE has prepared detailed cost estimates for every aspect of its transportation program nationally and in Nevada. Transportation accounts for 21 percent of DOE projected costs for Yucca Mountain operations over the next century.[9]

The NTP conceals the massive national transportation program that DOE has recently proposed in the 2008 Yucca Mountain Supplemental Environmental Impact Statement (SEIS).There is no mention of the thousands of cross-country truck and rail shipments

[8] U.S. DOE, Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program, Fiscal Year 2007, DOE/RW-0591 (July 2008), p. vi.
[9] Ibid., Pp. vi, 25-28.

DOE intends to make over five decades. Yet the NTP tells the reader how many casks, cask cars, and trailers DOE plans to buy.

The NTP fails to mention that DOE would make at least 2,800 train shipments, hauling 9,500 rail casks, plus 2,650 truck shipments, to Yucca Mountain over 50 years. If there is no second repository, there could be 7,000 train shipments (24,100 rail casks) & 5,025 truck shipments. For 50 years, there would be 1-3 trains (3-5 casks per train) & 1-2 trucks (1 cask per truck) per week. Every day, for 50 years, one or more loaded casks would be headed for Yucca Mountain by train or truck.

The NTP fails to mention that the "representative routes" DOE has identified to Yucca Mountain would traverse 44 states, 41 Indian Nations, and more than 950 counties totaling a population of more than 160 million Americans.

The NTP fails to mention that the DOE "representative routes" to Yucca Mountain would affect 331 out of 437 U.S. Congressional districts, nor that DOE has made no effort to inform the affected Members of Congress about impacts of the Yucca Mountain transportation system on their districts.

The entire NTP is premised on the assumption that DOE will use Transport, Aging and Disposal (TAD) canister-based systems. The NTP assumes TADs "will comprise the bulk of the transportation cask fleet." [p.9] DOE offers no alternative to the proposed TAD canister system, in the event that TADs are not available on the schedule assumed by DOE, or in the event that some or all utilities choose not to deploy the TAD canister-based system.

Assumed use of TAD canister-based transportation creates major uncertainties for planning, uncertainties that cannot be resolved in the NTP. The feasibility and impacts of the proposed use of TADs cannot be fully evaluated based on the available information. DOE has failed to provide final TAD canister and over-pack designs. At the time of publication of the NTP, only "proof of concept" designs existed, and DOE had only just issued two contracts for design and licensing of the TAD system. Nevada discussions with industry representatives and NRC staff suggest that 5 years or more may be required for final NRC approval under the requirements of 10 CFR Parts 71 and 72. Even after licensing, TAD system costs and financial arrangements are unknown.

The TAD Canister system requires rail transportation for cross-country shipments. **One-third of utility shipping sites lack rail access**. Post 9/11 security concerns about cross-country rail shipments through major cities, including new security regulations recently adopted by the Transportation Security Administration (TSA) and the Pipeline and Hazardous Materials Safety Administration (PHMSA), may limit or prohibit shipment of TAD canisters. Yucca Mountain lacks rail access. DOE has provided no contingency plans for national transportation in the event that rail access to Yucca Mountain is not available.

(3) OCRWM's exclusive focus on licensing and implications for transportation planning

As a result of the waning support for the Yucca Mountain program within the new Administration and Congress, OCRWM appears to be abandoning all transportation planning work and anything else that is not related to supporting DOE's Yucca Mountain license application before the NRC. Speaking remotely by phone to the March 25, 2009 meeting of the Western Interstate Energy Board's High-Level Radioactive Waste Committee in Denver, OCRWM representatives indicated that no funds or staff remain in the Office of Logistics Management to even review, let alone respond to, comments on the draft NTP. All comments, apparently, will be placed on the shelf to be dealt with at some future time, if at all. Under these circumstances, DOE should announce the immediate suspension of all work on the NTP and withdraw the Notice seeking comments on the draft. Alternatively, **SNF and HLW transportation planning activities should be transferred to another DOE office where such activities can be integrated into a truly national planning process for radioactive materials that can be used for SNF and HLW shipments required for alternative waste management strategies in the future.**

DOE should also immediately suspend other transportation activities associated with the now unviable Yucca Mountain program, including withdrawal of the application before the U.S. Surface Transportation Board to construct and operate a rail line from Caliente, Nevada to Yucca Mountain.

(4) Transportation Planning and "Stove-piping"

The draft NTP continues DOE's long and dysfunctional tradition of compartmentalizing and segregating its approach to transportation planning. While the NTP claims to embrace a systems approach to such planning, in reality, various aspects of the plan are dealt with as discrete components with little or no attention to the functioning of the Yucca Mountain transportation system as a whole. By focusing on individual aspects/components of the system, critically important linkages, feedback mechanisms, and impacts essential to sound planning are either missed entirely or dealt with only partially.

The effects of this "stove-piping" can be seen very dramatically in the segmentation of "Nevada rail" transportation and "national" transportation in the NTP, and before that in almost every other DOE document dealing with Yucca Mountain transportation. The NTP (ironically in the section titled "Development of the Transportation System") addresses the "Nevada Rail Infrastructure Project" and the "National Transportation Project" as if they were two entirely different projects. There is no discussion of the impacts of the proposed Caliente rail line on the national rail system. For example, the NTP fails to examine the national rail routes that are dictated by the choice of the Caliente rail alternative. There is no discussion as to how rail shipments to Caliente will affect cities and communities along the nations rail lines; what routes would be used; and how the railroads will be affected by the need to ship thousands of tons of SNF and HLW through high threat urban areas (HTUAs), in compliance with the new

Homeland Security and Federal Rail Administration security regulations. Likewise, there is no discussion of how the use of rail as the preferred mode of shipment will impact short line railroads that serve – or are assumed to serve – reactor sites without direct access to main line railroads. In short, the NTP fails to identify the relationships between the various "stove-pipes"in the overall rail transportation system (both Nevada and national) and, instead, seeks to deal with each element in substantial isolation.

Another egregious example of this compartmentalization in the NTP is the way in which TADs are addressed. The NTP addresses the TAD issue essentially as a hardware matter. It ignores the systemic importance of the decision to use TADs for the entire transportation program. For example, the loaded shipping weight and physical dimensions of TADs in their transportation overpacks. have major implications for infrastructure at and near individual utility sites. TADs have similar implications for short line railroads with lower classes of track; for routing decisions where connecting track segments, tunnels and bridges have weight or dimensional restrictions; even for potential system disruption when TADs cannot be used due to compatibility issues at existing storage facilities. DOE fails to consider any of these factors other than to assert that DOE will not pay for infrastructure upgrades. In short, the planning assumption that SNF will be shipped in TADs is not considered in relation to its effects on other system components or on the transportation system as a whole.

(5) Lack of foundational information required for meaningful planning

The NTP is missing key information that is essential for any meaningful SNF and HLW transportation planning effort. For example, the Plan does not identify the routes (rail and highway) by which SNF and HLW would be shipped to Yucca Mountain. Likewise, as discussed above, the NTP fails to consider the characteristics of SNF and HLW and how the nature of the material being shipped relates to decisions about system components and system functions. Similarly, there is no discussion about transportation infrastructure at/near individual SNF and HLW generator/storage sites and how such infrastructure both affects and is affected by other elements of the transportation system.

A major information omission in the plan – and one that has potentially profound implications across the entire system – is the failure to assess how and in what order waste would be picked up at reactor sites. The fact that DOE has strict contractual arrangements with the utility companies specifying the order in which SNF would be accepted by DOE for shipment to a repository (i.e., the shipping queue) has significant implications for the functioning of the transportation system as a whole. For example, under the existing contracts, there is no requirement for utilities holding specific slots in the shipping queue to ship their oldest fuel first. In fact, there are incentives (economic and functional) for utilities to ship their hottest fuel first. This in turn has implications for risk management system wide, security, and routing (i.e., decisions to use routes that might avoid more populated areas). In addition, the existing pick-up schedule dictated by the standard contracts has no relation to the logistics of compiling multi-shipment dedicated trains as DOE indicates it will do for repository shipments. Putting shipments together from geographically dispersed reactor locations would be cumbersome,

inefficient, and add travel time, shipment miles, and risk to the system. More uncertainty and confusion is injected into the system by the fact that utility companies may be able to sell or trade their "slots" in the shipping queue, making logistics planning even more difficult.

The NTP fails to address any of these issues in a meaningful, systemic fashion, and lacks the foundational information needed to even begin to address a host of complex and interrelated planning issues.

Specific Comments

The following comments address specific issues, statements, or elements contained in the text of the Draft NTP.

ACRONYMS, p. vii.

ALARA is not included in the list of acronyms.

Comment: The absence of ALARA suggests that the DOE transportation program is not committed to this important concept of radiation protection. NRC defines ALARA: "Acronym for 'as low as (is) reasonably achievable.' Means making every reasonable effort to maintain exposures to ionizing radiation as far below the dose limits as practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest (see 10 CFR 20.1003)." [http://www.nrc.gov/reading-rm/basic-ref/glossary/alara.html]

Commitment to future updates, p. 1.

"This Plan will be updated as appropriate to reflect progress in the development and implementation of the transportation system, accommodate changes to the waste management system and incorporate stakeholder and public comments."

Comment: DOE informed Nevada and other states, on March 25, 2009, DOE would not be responding to comments submitted on this plan. DOE intends to "archive" the comments.

History of spent fuel transportation, p.1.

"… more than 70,000 metric tons of SNF have been safely transported worldwide to date."

Comment: The worldwide SNF transportation experience is quite different from the US historical experience and the projected shipments to Yucca Mountain. The only

similarity between the worldwide SNF transportation experience and DOE's projected shipments to Yucca Mountain is the 70,000 MTU amount. The vast majority of long-distance international shipments are made by ocean-going vessels. There is little international experience with long-distance rail or truck shipments. By contrast, according to DOE's SEIS, rail shipments to Yucca Mountain would range from 478 miles to 2,927 miles, with an average of about 2,000 miles in distance. Truck shipments to Yucca Mountain would average about 2,200 miles in distance.

The geography of international shipments and the projected shipments to Yucca Mountain is also different. The United Kingdom and France account for about three-quarters of international SNF shipments. The land area of the United Kingdom is smaller than the land area of the State of Nevada. The land area of France is smaller than the combined area of the States of Arizona and New Mexico. About three-quarters of the worldwide experience with SNF transport has occurred in an area equal to about one-ninth the area of the 44 states that would be traversed by DOE shipments to Yucca Mountain.

DOE can learn from the European experience with intermodal transportation of SNF, radiation protection for transportation workers, and the large-scale protests and civil disobedience that have occurred during some European shipping campaigns. Some other aspects of the European experience with high-level nuclear waste management may be relevant to the United States. European programs have given up on forced repository siting, in favor of voluntary site selection, and European programs accept strict radiation protection standards for repository groundwater protection.

History of spent fuel transportation, p.1-2.

"Since the early 1960s, more than 3,000 shipments of commercial SNF have been conducted safely and securely in the United States, having traveled more than 1.7 million miles."

Comment: The statement might give readers the false impression that spent fuel shipments are more commonplace in the United States than they have been over the past two decades. More than 85 percent of the reported spent fuel shipments occurred before 1991, in a transportation environment considerably different than the present. According to NRC data, there have been only 328 shipments since 1991, or about 22 shipments annually, over the 15 years (1991-2005) for which published data is available. Between 2002 and 2005, there were about 100 shipments, or 25 shipments per year.[10]

Nevada has closely examined the details of historical US SNF shipments. Between 1964 and 2001, there were 2,722 shipments, including 479 rail casks in 326 trains. The amount shipped was about 2,457 MTU. Truck shipments accounted for 88 percent of all shipments. There were an average of 9 train shipments and 63 truck shipments per year. Most truck shipments contained one or two fuel assemblies, averaging about 0.4 MTU per shipment. Rail cask shipments averaged about 3.3 MTU.

[10] US NRC, "Public Information Circular for Shipments of Irradiated Reactor Fuel, NUREG-0725, Rev. 14 (September 2006).

The average distance for train shipments was about 450 miles, and for truck shipments the average distance was about 750 miles.[11]

Since 1971 there have been 4 transportation accidents involving loaded SNF casks, and 3 reported accidents involving empty casks. In 1991, DOE estimated that the actual accident rate for U.S. spent fuel shipments was 0.7 accidents per million miles travelled by truck and 9.7 accidents per million miles travelled by rail.[12] Nevada has updated these estimates to include shipments and shipment-miles since 1991. Nevada estimates that the actual (historical) accident rate for SNF truck shipments is about 0.5 per million miles traveled, and for train shipments the accident rate is about 6.0 per million miles traveled.

History of spent fuel transportation, p.2.

"DOE ships SNF by highway and rail in a manner that meets or exceeds Department of Transportation (DOT) and NRC safety and security requirements and standards applicable to commercial shippers."

Comment: DOE shipments to Yucca Mountain would not be subject to the same NRC regulations as commercial utility shipments. Except for the requirement to use NRC-certified casks and to notify states before shipments, DOE shipments to Yucca Mountain would be exempt from NRC safety and security regulations.

History of spent fuel transportation, p.2.

"There has never been an SNF transportation accident that resulted in any release of radioactive material harmful to the public or the environment."

Comment: The statement is legally correct, but misleading. There have been serious releases of radioactive material during spent fuel shipments, but those events are classified by DOT regulations as hazardous materials incidents, not accidents. The statement fails to acknowledge other serious safety and security events that have occurred during spent fuel shipments.

The U.S. Atomic Energy Commission (USAEC) reported 11 incidents during spent nuclear fuel shipments between 1957 and 1964. Three incidents were reported as "Class IV Radiation Release. Radioactive material is released to the ground or traffic-way with no runoff or aerial dispersal." One of these incidents, by rail in 1960, and two incidents by truck, in 1959 and 1962, resulted in radioactive coolant leakage from spent fuel shipping casks that required cleanup at locations along the shipping routes. In several other instances, the contamination from cask leakage was restricted to the vehicles or loading facilities, and did not affect public highways or railroad tracks. USAEC reported

[11] Halstead and Dilger, "How Many Did You Say? Historical and Projected Spent Nuclear Fuel Shipments in the United States, 1964-2048." (Proceedings, Waste Management 2003, Tucson, AZ).
[12] OCRWM, "Nevada Commercial Spent Nuclear Fuel Transportation Experience," YMP/91-17 (September 1991), p.12.

those incidents as "Class III Radiation Release. Radioactive material is released, but is confined to the package or the vehicle."[13]

Although no radioactive materials were released, one spent fuel truck accident in 1971 was severe enough to kill the driver.[14] "The cask was thrown from the trailer and was embedded in the ground. The radiation surveys taken at the scene indicated that the structural integrity of the cask was intact and there was no release of contents."[15]

One error in shipping cask loading resulted in a serious radiation contamination incident. "An assembly containing damaged fuel rods self-heated in transit sufficiently to re-oxidize fuel pellets into a fine powder that was released when the cask was opened. A private spent fuel pool, a worker and the cask were contaminated, resulting in multi-million dollar lawsuits."[16] Four years later NRC revised its requirements (for inert gas filling of dry casks) to prevent subsequent incidents. In other cases, shipping casks certified by NRC have experienced problems, such as excess surface contamination and errors in cask fabrication, that in isolation are minor safety concerns, but that could cause serious complications in the event of an accident.[17]

In the United States, there has been at least one attempt to sabotage a rail shipment of spent nuclear fuel. A section of rail was removed along a route in Minnesota, resulting in the derailment of a freight train that was traveling just ahead of the dedicated train hauling spent fuel casks.[18]

History of spent fuel transportation, p.2.

"The long history of safely transporting SNF in the United States provides a sound experience base for the development of the OCRWM transportation system."

Comment: Projected DOE shipments to Yucca Mountain would be significantly different than past SNF shipments in the United States. The amount of SNF and other wastes shipped per year would be 20-40 times greater than annual shipments in the past. The number of rail casks shipped per year would be 15-50 times greater than annual shipments in the past. The average rail shipment distance would increase from less than 500 miles to about 2,000 miles. The cross-country rail operating environment would be quite different from past shipments, combining the challenges of rail shipments through highly populated metropolitan areas with long route segments through rugged western

[13] USAEC, "A Summary of Incidents Involving USAEC Shipments of Radioactive Material, 1957-1961," TID-16764 (November 1962), Pp. 63-68; USAEC, "A Summary of Incidents Involving USAEC Shipments of Radioactive Material 1962," (no date), p. 28; USAEC, "A Summary of Incidents Involving USAEC Shipments of Radioactive Material, 1963-64," TID-16764, Suppl. 2 (April 1966), p.vii.
[14] Resnikoff, The NeResnikxt Nuclear Gamble: Transportation and Storage of Nuclear Waste (1983), p. 169.
[15] Cashwell and McClure, "Transportation Accidents/Incidents Involving Radioactive Materials (1971-1991)," SAND 91-2672A. p. 6.
[16] Audin, "A Review of Human Reliability Issues in the Transportation of Spent Nuclear Fuel," (May 1988), p. 11, in Kasperson, et al,"The Effects of Human Reliability in the Transportation of Spent Nuclear Fuel," (June 1988).
[17] Ibid., Pp. 11-13.
[18] Halstead and Ballard, Nuclear Waste Transportation Security and Safety Issues: The Risk of Terrorism and Sabotage Against Repository Shipments (December 1998), Pp.37-39.

terrain. The proposal to use large TAD casks would require unprecedented reliance on heavy haul trucks and barge shipments from reactors that lack rail access.

Amount of materials to be transported, p. 3.

"…amount of materials planned to be transported to the repository include" 63,000 MTHM commercial SNF, 2,333 MTHM DOE and NNPP SNF, and 4,667 MTHM DOE HLW.

Comment: The NTP shipment amounts include only the 70,000 MTHM currently authorized under the NWPA. The NTP ignores the potential for a much larger inventory and increased shipments totaling 122,000 – 153,000 MTHM, if there is no second repository.

Commercial SNF, p. 3.

"SNF is fuel that has been withdrawn from a nuclear reactor following irradiation."

Comment: The NTP fails to mention that SNF is highly radioactive and remains dangerous for a long period of time.

Dedicated trains, p. 4-5.

"…dedicated trains will be the usual mode of rail transportation for SNF and HLW to the Yucca Mountain repository." p.4

"In adopting this policy, however, OCRWM recognized that such materials can be shipped safely regardless of mode or type of service due to the stringent regulatory standards in place and the robust nature of the transportation packages involved." p.5

"…the primary benefit of using dedicated trains is the significant cost savings over the lifetime of the Yucca Mountain program…" p.5

Comment: The NTP repeats DOE's stated commitment to use dedicated trains, without clarifying the circumstances under which DOE would ship SNF and HLW in mixed freight trains. The NTP provides no evidence regarding the safety of non-dedicated train shipments, and ignores the findings of reports by the State of Nevada and the NRC on the potential consequences of mixed freight rail accidents such as the 2001 Baltimore rail tunnel fire. The NTP ignores radiation protection concerns in favor of economics as the "primary benefit" of dedicated trains.

Shared Use option, p.7.

Comment: The State of Nevada has challenged DOE's commitment to the shared use option in filings to the Surface Transportation Board. Absent an operations plan and

other details, DOE's purported commitment to shared use appears primarily intended to preempt Nevada jurisdiction over DOE's proposed construction and operation of the Caliente rail line.

DOE ROD selecting Caliente rail alignment, p. 8

Comment: The State of Nevada has filed a legal challenge to DOE's selection of the Caliente rail alignment, based on the October 2008 Record of Decision, in the 9th Circuit U.S. Court of Appeals

Assessment of Existing Infrastructure, p.16.

"OCRWM will not fund upgrades to transportation infrastructure at shipping sites or the national transportation system."

Comment: The NTP statement on infrastructure funding discredits DOE's assumption that intermodal transportation can be used to implement the mostly rail scenario to transport TADs and other large rail casks to the repository. The NTP fails to provide updated information on current transportation capabilities at and near the shipping sites, and fails to assess the cost of upgrading existing transportation infrastructure to allow use of heavy haul truck (HHT) and/or barge transport for the proposed TAD canister system or other large rail casks.

In the SEIS, DOE identifies 22 shipping sites that cannot directly ship TAD canisters or other large rail casks by rail. [Table G-7, p.G-14] DOE identifies 16 of these sites as possible candidates for barge shipments [Table G-21, p.G-59].

The distances for HHT shipments range from 2.1 miles (3.4 kilometers) for the Indian Point reactor in New York, to 150 miles (241.4 kilometers) for the Humboldt Bay reactor in California. Thirteen sites would require HHT shipments of at least 18.6 miles (30 kilometers). The HHT shipment routes would use a combination of local, state, and federal highways. The HHTs that DOE has proposed using to haul TAD canisters and other large rail casks, would be up to 220 feet (67.1 meters) in length, and have gross vehicle weights of as much as 500,000 pounds (227,000 kilograms). [SEIS, p.6-5] The SEIS does not provide route-specific information on the likely cost of upgrading roads, bridges, traffic controls, and emergency response capabilities necessary to allow HHT shipments from reactor sites to nearby railroads.

Despite the range of distances noted in the SEIS (13 sites require HHT shipments of 18 miles or more), the NTP characterizes the needed HHT movements as "short-distance transport." [p.13] The NTP asserts, without citing the distances involved, that the "viability" of HHT shipments in the US is demonstrated by HHT shipments in France. [p.5]

The NTP admits that DOE's last systematic studies of utility facilities interface capabilities and near-site infrastructure capabilities were conducted in 1992. DOE states

that utilities "are responsible for any necessary infrastructure upgrades within their gates." DOE assumes that any needed off-site infrastructure upgrades will be provided "by States, counties and railroads." DOE anticipates that it will "consult with State transportation departments" regarding "highway and bridge upgrades in the vicinity of the shipping sites." [p.16]

The NTP statement on infrastructure funding also discredits DOE's assumption that short line railroads (Class II and III carriers) can be used to implement the mostly rail scenario to transport TADs and other large rail casks to the repository. The DOE SEIS assumes short line railroads can be used to connect shipping sites to the representative routes that DOE would use for cross-country rail shipments. SEIS references identify routes from 23 shipping sites that would use short lines. An FRA preliminary evaluation concluded that these short lines might not be capable of safely transporting spent nuclear fuel without significant upgrading.

The DOE assumes short line railroads can be used for SNF shipments. "In most cases, rail transportation of spent nuclear fuel and high-level radioactive waste would originate with short line rail carriers that provide service to the commercial and DOE sites. At rail yards near the sites, dedicated rail shipments would switch from short line carriers to national mainline railroads." [SEIS, p.3-95] The SEIS identifies 23 shipping sites which would use Class II or Class III railroads, or railroads operated by the U.S. government, to originate rail shipments to Yucca Mountain via the Caliente rail line. At least 17 short line railroads and 4 government operated railroads would be used for shipments in at least 19 states. DOE proposes to use short line route segments ranging in length from 12 miles to more than 250 miles. Seventeen DOE rail routes to Yucca Mountain would use short lines for at least 25 miles.

DOE has not systematically assessed the financial status, infrastructure conditions, current traffic, or traffic capabilities of these short line railroads. FRA conducted a preliminary evaluation of short line railroads that might be used for Yucca Mountain shipments, and reported the results to DOE in February 2008. FRA tasks were to identify potentially affected short line carriers, establish contact with railroad officials, conduct field reviews of physical and operational infrastructure, qualify each railroad's present operational status against a safe acceptable standard, and facilitate upgrades to meet safe acceptable standards. The FRA contacted 18 of 28 short line railroads potentially involved, and received responses from 6 of the 18 railroads contacted. FRA also conducted a pilot field assessment of the Winchester and Western Railroad route for spent fuel shipments from the Hope Creek and Salem nuclear power plants in southern New Jersey.

The FRA assessment of the Winchester and Western Railroad route found a number of safety- and security-related conditions: 3 miles of excepted track, 8 miles of class 1 track, numerous grade crossings, and questionable feasibility of the heavy haul

truck route from the reactor to the railroad.[19] The FRA preliminary evaluation of short lines generally identified conditions that might require significant upgrading before such routes could be safely used for spent nuclear fuel shipments, including: class of track, rail weight, track restrictions, signals, hazardous materials registration and training, grade crossings, track conditions, sharp curves, tunnels and bridges. The FRA concluded that there was a need for an in-depth evaluation of shortline railroads servicing nuclear power plants. FRA informed DOE that where use of shortlines appeared three questions needed to be answered: "Are There Grants Available From FRA And State?" "Would It Be Economically Viable To Upgrade The Railroad?" "Should The Minimum Acceptable Standard Be Class 2 Track?"[20]

The NTP makes no mention of the FRA evaluation of shortline railroads that might be used for spent nuclear fuel shipments. Yet, the NTP says "OCRWM expects to consult with the Federal Railroad Administration (FRA) to review short-line rail track capability near reactors." [p.16]

Inspections, p.17.

"Prior to any shipment from the origin site, it is expected that transportation equipment will be inspected, and any defect will be corrected prior to its deployment."

Comment: The statement that inspections are "expected" is **unacceptable.** Inspections by regulatory personnel, not DOE personnel or contractors, must be required at all steps in the transportation process.

NRC personnel should be responsible for inspecting empty TAD canisters when they are received at the shipping sites, responsible for overseeing TAD canister loading and closure, insertion of TAD canisters into transportation over-packs, and placement of loaded TAD casks (canisters in over-packs) onto railcars, or onto HHTs or barges for intermodal transport to off-site rail facilities. To date NRC, has made no definite statements and no commitments about its role in regulation of TAD canister receipt, loading, closure, and preparation for off-site shipments. Similar NRC inspections should be required for loading of truck casks at shipping sites. The NRC resident inspector at each commercial shipping site could be assigned these responsibilities. DOE should invite NRC or other independent inspections at DOE shipping sites, which are exempt from NRC regulation.

The remainder of the NTP discussion must be revised to commit DOE to mandatory inspections according to federal and state regulations. The statement on page 18 that shipments in-transit "may be inspected by State, Federal and industry inspectors

[19] USDOT, FRA, "Shortline Railroad Study: Exploratory Accessment Winchester & Western Railroad Co. Spent Fuel Routing for the Hope Creek and Salem NPP," Presentation by M. Massaro, DOE Rail TEC Winter Meeting, February 6, 2008, San Antonio, TX.]

[20] U.S. DOT, FRA, "Evaluation of Shortline Railroads Tasked for the Transportation of Spent Nuclear Fuel," Presentation by M. Massaro, DOE Rail TEC Winter Meeting, February 6, 2008, San Antonio, TX.

as appropriate" should be revised to state that shipments in-transit will be inspected wherever required.

DOE must make a clear commitment to both radiological and mechanical safety inspections, and security (anti-tampering) inspections, by stating that DOE will not attempt to preempt or circumvent federal or state regulations requiring inspections in transit and other safety requirements. Such a commitment is needed because DOE has previously promoted changes in Federal statutes that would have exempted DOE repository shipments from both federal and state regulation (for example, OCRWM promoted transportation preemption provisions in S.2589 in 2006).

Emergency Management – Likelihood of Accidents, p. 22.

"In the unlikely event of an accident involving a DOE radioactive material shipment, incident command would be established based on the procedures and policies of the State, Tribal, or local jurisdiction in which the accident occurred."

Comment: If DOE rail and truck shipments to Yucca Mountain are as safe as past SNF shipments in the Unites States, and experience similar accident rates, about 30 to 80 rail accidents, and 3 to 6 truck accidents, would be expected over 50 years of repository operations. In the SEIS, DOE states that the probability of truck accidents would be one per 500 shipments, and the probability of rail accidents would be one per 300 to 400 shipments. [p. G-53] If the SEIS estimates prove to be correct, there would be about 5 to 10 truck accidents, and 7 to 25 rail accidents, involving loaded casks over 50 years.

Rail Routes – Implications of TSA & PHMSA Security Rules, p.24.

"Federal rules do not prescribe specific routes for SNF and HLW shipments by rail, although certain factors, as described below, must be considered in route selection."

Comment: The NTP acknowledges that route selection for rail shipments to Yucca Mountain must comply with the Final Rules issued by the Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) in coordination with the Federal Railroad Administration (FRA) and the Department of Homeland Security's Transportation Security Administration (TSA), effective December 26, 2008.

Yet all of the representative rail routes shown in the FEIS, SEIS, and the NTP were selected *prior to* publication of the Final Rules. The NTP provides no specific information on how the *new* route evaluation criteria and planning requirements for rail shipments through designated high threat urban areas (HTUAs) could have been or will be applied to routes previously selected. Although routing criteria of the Final Rule has long been anticipated, DOE has not indicated when proposed *new* routes will be identified. The NTP fails to consider how the national rail system might be impacted by its compliance with the new security requirements in the Final Rules. The combined objectives of the TSA and PHMSA rules appear to conflict with the DOE approach to rail

routing through highly populated areas, and raise serious questions about the viability of DOE's mostly rail scenario for repository shipments.

The TSA Final Rule includes a list of 46 designated high threat urban areas (HTUAs) in 28 states and the District of Columbia. [49 CFR Part 1580, Appendix A] Rail shipments of spent nuclear fuel and high-level radioactive waste through these HTUAs would be subject to the new chain of custody and control and other procedures, such as designation of rail security coordinators and monitoring plans, established by the TSA Final Rule. [49 CFR Part 1580, Appendix B] The SEIS identifies 68 commercial reactor and storage sites which ship to Yucca Mountain by rail, and 4 DOE sites which ship by rail. [Table G-10, p.G-16] Another 7 commercial sites ship by truck only, and 2 DOE sites ship by truck in addition to rail. [Table G-8, p.G-14] In selecting representative rail routes for the SEIS for Yucca Mountain, DOE did not consider the HTUAs identified in the TSA Final Rule

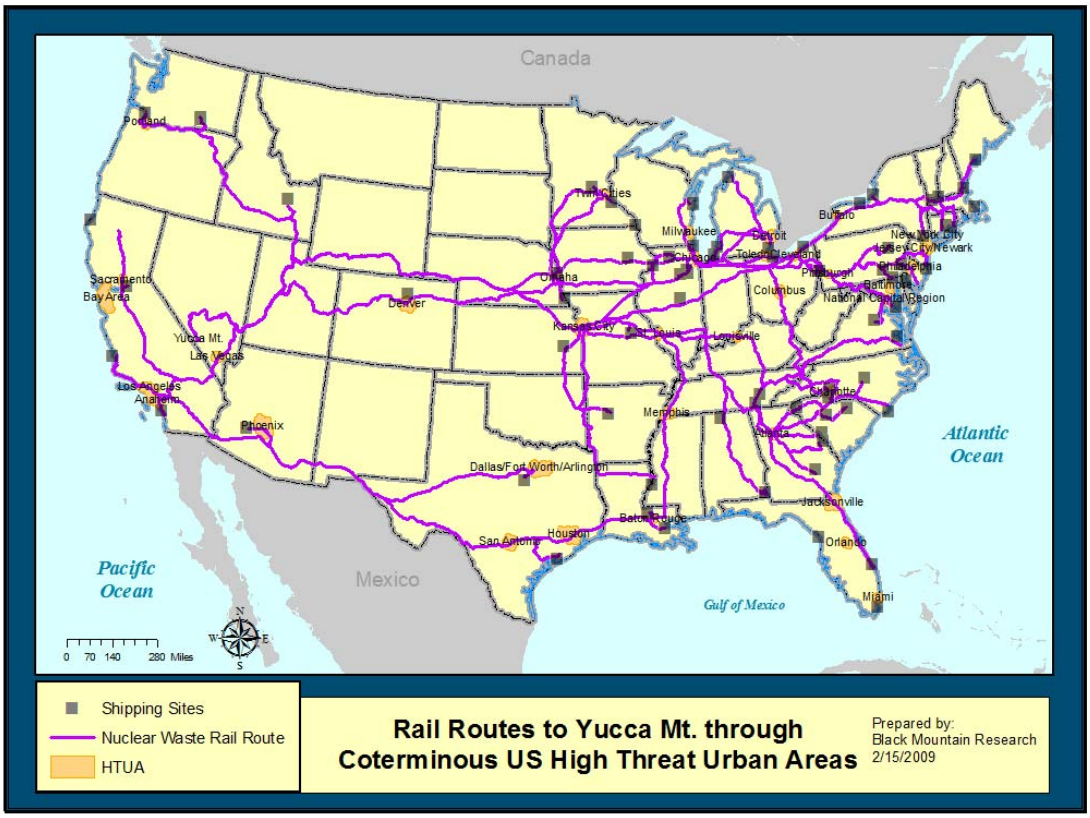

Figure 3. HTUAs Traversed by DOE Rail Routes to Caliente

Figure 3 shows the HTUAs traversed by DOE representative rail routes to Caliente. Of the 46 HTUAs designated in 49 CFR Part 1580 Appendix A, 30 HTUAs in 25 states and the District of Columbia would be traversed by at least one DOE rail route to Caliente, and 5 HTUAs could be traversed by DOE barge deliveries to railroads. Several HTUAs, including Atlanta, Chicago, Kansas City, and St. Louis are traversed by

two or more rail routes. Major carrier interchanges occur in HTUAs, including Chicago, Kansas City, and St. Louis. Barge-to-rail intermodal transfers could occur in the Baltimore, Bay Area, Los Angeles, Miami, Milwaukee, and New York HTUAs

Figure 3 also shows that the vast majority of the 72 DOE rail routes to Yucca Mountain via Caliente traverse one or more HTUAs. Of DOE's 72 rail routes, 63 traverse at least one HTUA, 49 traverse two or more HTUAs, and 28 traverse 3 or more HTUAs. [Appendix A provides a list of DOE Rail Routes and Affected HTUAs]

In Nevada, the Las Vegas HTUA would be heavily impacted by rail shipments to Yucca Mountain shipments over the projected life of repository operations. Under the Proposed Action, DOE would make 755 rail cask-shipments through Las Vegas, about 8 percent of the total. [SEIS, p.G-67] If there is no second repository, and the same percentage shipments enter Nevada from California, there could be about 1,929 rail cask-shipments through Las Vegas. The lowest estimate of train shipments, assuming DOE uses dedicated trains with 3 casks per train, would result in 5-13 trains per year through Las Vegas, for 50 years. Since there is no regulatory requirement for using dedicated trains, DOE could ship casks one at a time in general freight service, resulting in 15-39 train shipments per year through Las Vegas.[21]

DOE significantly underestimates the potential number of rail shipments through Las Vegas. Nevada has identified rail routes under which 40-80 percent of rail shipments could travel through Las Vegas. When the consolidated southern cross-country rail routes identified by Nevada are used, development of the Caliente rail line results in about 7,494 rail cask-shipments (79 percent of the total) in about 2,416 dedicated trains (85 percent of the total) through Las Vegas over 50 years. If there is no second repository, and the same percentage shipments enter Nevada from California, there could be about 19,048 rail cask-shipments through Las Vegas, in about 6,144 trains. Thus, if DOE develops the Caliente rail line and uses dedicated trains, the maximum impact on Las Vegas could be 46-118 trains per year, every year, over 50 years.[22]

Shipments through the Las Vegas HTUA would be a matter of concern due to population density and the presence of iconic targets. The estimated 2006 census population of the Las Vegas HTUA is about 1.8 million. The State of Nevada estimates at least 95,000 of these residents live within one-half mile of the Union Pacific route for shipments to Yucca Mountain via Caliente. The world-famous Las Vegas "Strip" is located within the HTUA. Nevada consultants estimate that 34 Las Vegas hotels and about 49,000 hotel rooms are located within 800 meters (one-half mile) of the Union Pacific mainline route to Caliente, as shown in Figure 4.

[21] Halstead, Dilger, Ballard, and Collins, "State of Nevada Perspective on the U.S. Department of Energy Yucca Mountain Transportation Program," Revised version of paper presented at WM2008 Conference, February 25, 2008, Pp. 15-16, http://www.state.nv.us/nucwaste/news2008/pdf/wm2008perspective.pdf.
[22] Ibid.

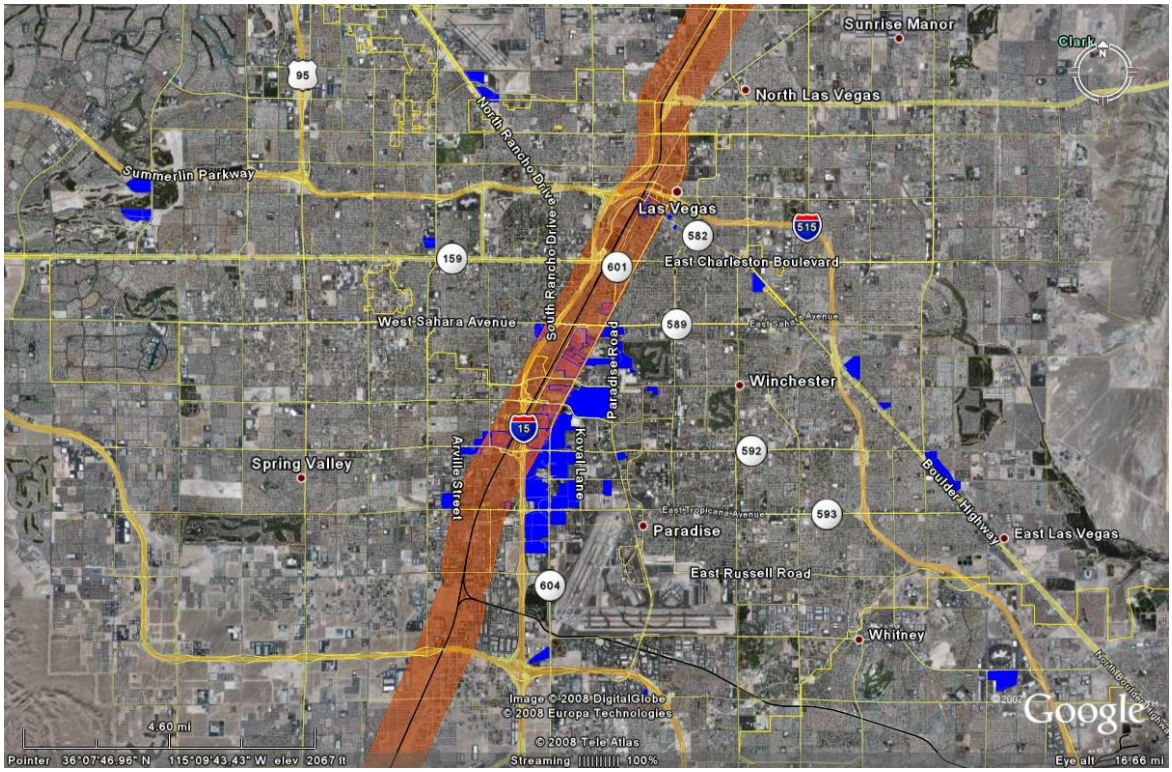

Fig. 4. Las Vegas Hotels within ½ Mile of Union Pacific Route to Caliente

Outside of Nevada, certain HTUAs, such as the Chicago HTUA, would also be heavily impacted by rail shipments to Yucca Mountain by way of Caliente.
About 25 percent of the rail shipments to Yucca Mountain, about 700 trains hauling 2,100 casks, would travel through the Chicago area over a period of 50 years, under the proposed action. Figure 5 shows the DOE representative rail routes through the Chicago HTUA. According to the 2000 census, about 4.4 million people live in the affected area in and around Chicago. About 585,000 people in the Chicago high threat urban area live within 800 meters (one-half mile) of the rail lines that would be used for Yucca Mountain shipments.

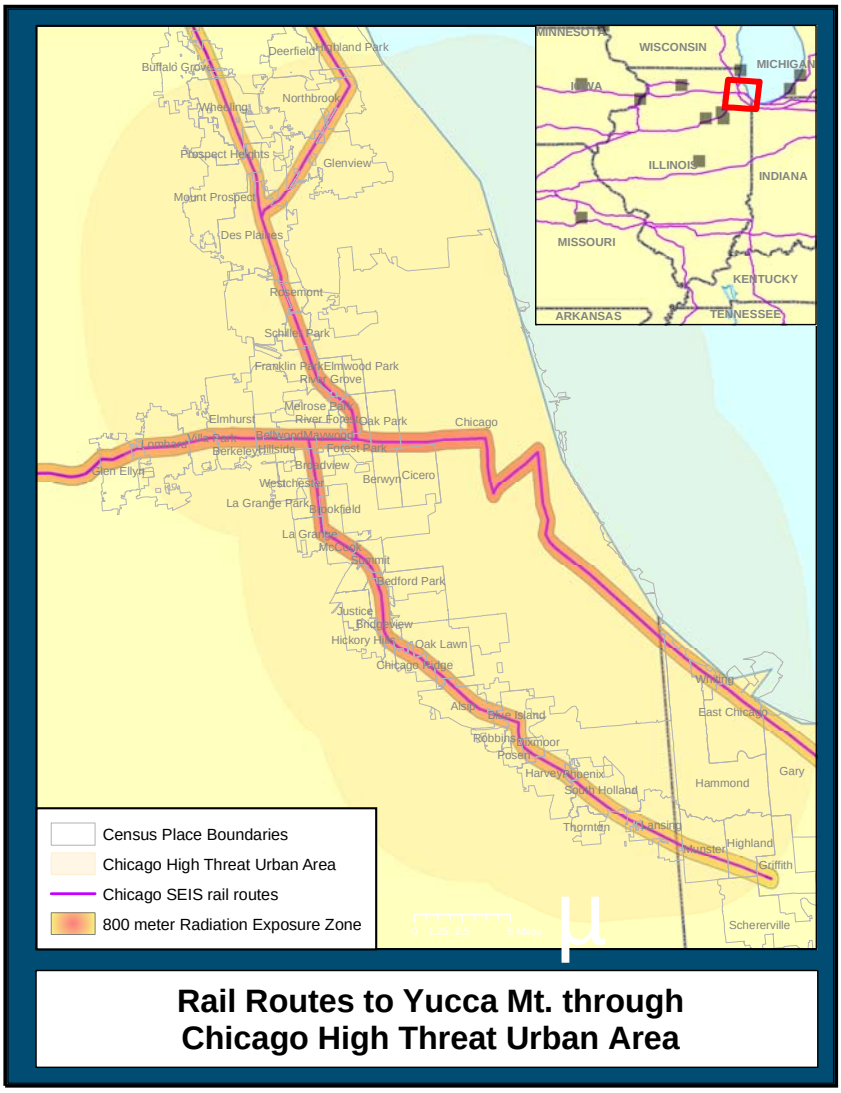

Figure 5. DOE Representative Rail Routes Through Chicago

The PHMSA Final Rule would require rail transportation route analyses for spent nuclear fuel shipments through major urban areas, including those which are not designated high threat urban areas (HTUAs).The PHMSA Final Rule is intended to prevent "catastrophic release or explosion in proximity to densely populated areas, including urban areas and events or venues with any large numbers of people in attendance." [73 FR 20752] The PHMSA Final Rule includes a list of 27 risk analysis factors to be considered in rail route evaluations, including proximity to "iconic targets," population density along the route, and venues – "stations, events, places of congregation." [49 CFR Part 172, Appendix D]

The DOE representative routes, identified in the SEIS for Yucca Mountain prior to publication of the Final Rule, and shown in the NTP in Figure F [p.26] were not evaluated in accordance with the rail risk analysis factors adopted at 49 CFR Part 172,

Appendix D. If these route analyses factors had been applied, the representative routes to Caliente identified by DOE in the SEIS and the NTP might not be permissible. For example, DOE proposes to use the Union Pacific main line through Salt Lake City, Utah, for about 8,355 rail cask shipments of SNF and HLW to Caliente. [SEIS, Figure G-41, p.G-138, Table G-31, p.G-79, and Table G-66, p.G-149] Those cask shipments would constitute about 87 percent of all rail shipments to Yucca Mountain.

Figure 6 shows the DOE SEIS rail route through downtown Salt Lake City. According to the 2000 census, about 660,000 people live in the affected area in and around Salt Lake City. About 136,000 people in the Salt Lake City area live within 800 meters (one-half mile) of the rail lines that would be used for Yucca Mountain shipments. Put another way, one out of every 20 residents of Utah lives within 800 meters of a rail route to Yucca Mountain. In addition to high residential population density, the area has a large population of day-time business and government employees, visitors and tourists. Nearby iconic buildings and landmarks include Temple Square, the State Capitol, the State Fairgrounds, and the Delta Center/Energy Solutions Arena. The City Creek Center, a billion-dollar redevelopment project, is being constructed in this area on the site previously occupied by the ZCMI Center Mall, one of the largest downtown shopping malls in the country. The Temple Square area reportedly draws up to 5 million tourists and visitors per year. The 20,000-seat Energy Solutions Arena is located within 800 meters of the Union Pacific rail line

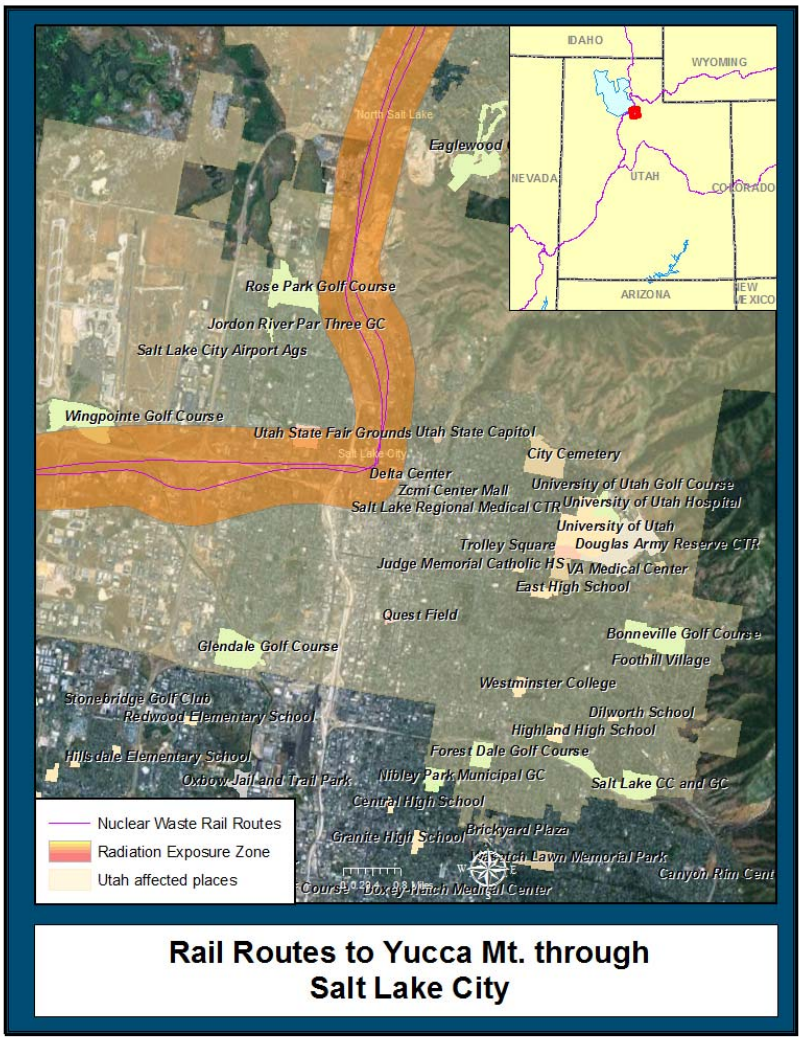

Figure 6. DOE Representative Rail Route Through Salt Lake City

Rail carriers transporting DOE shipments of spent nuclear fuel and high-level radioactive waste through major urban areas, including those which are designated high threat urban areas (HTUAs) and those which are not designated HTUAs, would be required to prepare rail transportation route analyses under the PHMSA Final Rule. As many as 18 railroads would be required to prepare rail transportation route analyses for DOE shipments to Yucca Mountain. The Union Pacific Railroad would likely be required to prepare route analyses involving at least 13 designated HTUAs and at least 23 other major urban areas. The Norfolk Southern Railroad and CSX Transportation would each likely be required to prepare rail transportation route analyses involving at least 10 designated HTUAs and at least 11 other major urban areas. The NS and CSXT route analyses would have to be integrated with those prepared by the UP for routes involving carrier interchanges, especially the large number of route interchanges in Chicago, St. Louis, and Kansas City. Dozens of other interchanges with originating and connecting

carriers would also have to be integrated with the analyses prepared by CSXT, NS, and UP. [Appendix B provides a List of Affected Railroads and Areas of Security Concern]

In addition to the HTUAs designated by TSA, the DOE representative rail routes traverse 39 urban areas with 2000 census population greater than 100,000, and 12 state capitol cities. Application of the full list of route analysis factors adopted by PHMSA in 49 CFR Part 172 Appendix D could significantly increase the number (and complexity) of the route analyses required for DOE shipments to Yucca Mountain. The NTP has not considered the implications of Yucca Mountain shipments for the national rail system and the rail carriers that make up the national system. Under the new TSA and PHMSA rail security rules, DOE's proposed mostly rail scenario for repository shipments may no longer be viable.

APPENDIX A.
DOE RAIL ROUTES TO YUCCA MOUNTAIN
AND AFFECTED HIGH THREAT URBAN AREAS (HTUAs)

Origin	State	HTUAs Traversed by Rail Route to Yucca Mountain via Caliente	Carriers
Browns Ferry	AL	St. Louis, Kansas City	CSXT, TRRA, UP
Farley	AL	St. Louis, Kansas City	CSXT, TRRA, UP
Arkansas	AR	Kansas City	UP
Palo Verde	AZ	Phoenix, Las Vegas	UP
Diablo Canyon	CA	Los Angeles, Las Vegas	UP
Humboldt Bay	CA	Sacramento, Las Vegas	UP
Rancho Seco	CA	Las Vegas	UP
San Onofre	CA	Los Angeles, Las Vegas	BNSF, UP
Haddam Neck	CT	Buffalo, Cleveland, Chicago	PW, NECR, CSXT, IHB, UP
Millstone	CT	Buffalo, Cleveland, Chicago	PW, NECR, CSXT, IHB, UP
St. Lucie	FL	Jacksonville, Atlanta, St. Louis, Kansas City	FEC, CSXT, TRRA, UP
Hatch	GA	Atlanta, Louisville, St. Louis, Kansas City	NS, UP
Vogtle	GA	Atlanta, Louisville, St. Louis, Kansas City	NS, UP
Arnold	IA	None	IN,UP
INL	ID	None	UP
Braidwood	Il	St. Louis, Kansas City	UP
Byron	IL	None	ICE, UP
Dresden	IL	None	EJE, UP
LaSalle	IL	Denver	BNSF, UP
Morris	IL	None	EJE, UP
Quad Cities	IL	Denver	BNSF, UP
Zion	IL	Chicago	UP
Wolf Creek	KS	Kansas City	UP
River Bend	LA	Baton Rouge, Memphis, St. Louis, Kansas City	CN, UP
Waterford	LA	Houston, San Antonio, Las Vegas	UP
Yankee Rowe	MA	Buffalo, Cleveland, Chicago	ST, CSXT, IHB, UP
Calvert Cliffs	MD	District of Columbia, Pittsburgh, Chicago	CXST, UP
Maine Yankee	ME	Buffalo, Cleveland, Chicago	ME, ST, CSXT, IHB, UP
Big Rock Point	MI	Chicago	LSRC, CSXT, IHB, UP
Fermi	MI	Detroit, Chicago	CN, IHB, UP

Palisades	MI	Chicago	CSXT, UP
Monticello	MN	Twin Cities, Denver	BNSF, UP
Prairie Island	MN	Twin Cities	CPRS, UP
Callaway	MO	Kansas City	OV, KCS, UP
Grand Gulf	MS	Kansas City	KCS, UP
Brunswick	NC	Atlanta, St. Louis, Kansas City	USG, CSXT, TRRA, UP
Harris	NC	Atlanta, St. Louis, Kansas City	CSXT, TRRA, UP
McGuire	NC	Charlotte, Columbus, Chicago	CSXT, UP
Cooper	NE	Omaha	UP
Fort Calhoun	NE	None	UP
Seabrook	NH	Buffalo, Cleveland, Chicago	ST, CSXT, IHB, UP
Hope Creek	NJ	Philadelphia, Pittsburgh, Chicago	WW, CR, NS, UP
Oyster Creek	NJ	Jersey City, Pittsburgh, Chicago	CR, NS, UP
Salem	NJ	Philadelphia, Pittsburgh, Chicago	WW, CR, NS, UP
FitzPatrick	NY	Buffalo, Cleveland, Chicago	CSXT, UP
Indian Point	NY	Buffalo, Cleveland, Chicago	CSXT, UP
Nine Mile Point	NY	Buffalo, Cleveland, Chicago	CSXT, UP
West Valley	NY	Buffalo, Cleveland, Chicago	BPRR, CSXT, IHB, UP
Davis-Besse	OH	Toledo, Chicago	NS, UP
Perry	OH	Cleveland, Kansas City	NS, UP
Trojan	OR	Portland	WPRR, UP
Beaver Valley	PA	Cleveland, Kansas City	NS, UP
Limerick	PA	Pittsburgh, Kansas City	NS, UP
Peach Bottom	PA	Pittsburgh, Kansas City	NS, UP
Susquehanna	PA	Pittsburgh, Toledo, Chicago	NSHR, NS, UP
Three Mile Island	PA	Pittsburgh, Kansas City	NS, UP
Catawba	SC	Charlotte, Louisville, St. Louis, Kansas City	NS, UP
Oconee	SC	Atlanta, Louisville, St. Louis, Kansas City	NS, UP
Robinson	SC	Atlanta, St. Louis, Kansas City	CSXT, TRRA, UP
Savannah River	SC	Atlanta, St. Louis, Kansas City	USG, CSXT, TRRA, UP
Summer	SC	Atlanta, Louisville, St. Louis, Kansas City	NS, UP
Sequoyah	TN	Louisville, St. Louis, Kansas City	NS, UP
Watts Bar	TN	Louisville, St. Louis, Kansas City	NS, UP
Comanche Peak	TX	Dallas-Fort Worth, Las Vegas	FWWR, UP
South Texas	TX	San Antonio, Las Vegas	UP

North Anna	VA	District of Columbia, Pittsburgh, Chicago	CSXT, UP
Surry	VA	Louisville, St. Louis, Kansas City	NS, UP
Vermont Yankee	VT	Buffalo, Cleveland, Chicago	NECR, CSXT, INB, UP
Columbia	WA	None	USG, UP
Hanford	WA	None	USG, UP
Kewaunee	WI	Chicago	CN, IHB, UP
Point Beach	WI	Chicago	CN, IHB, UP

APPENDIX B.
RAIL CARRIERS AND
ROUTE ANALYSIS CONSIDERATIONS FOR
DOE RAIL ROUTES TO YUCCA MOUNTAIN

Railroad	Designated High Threat Urban Areas (HTUAs)	Major Urban Areas & Other Areas of Concern
Burlington Northern Santa Fe (BNSF)	Anaheim/Santa Ana, Denver*, Twin Cities*	San Bernardino, Lincoln*, Provo, Quad Cities, Riverside, Sioux City
Buffalo & Pittsburgh (BPRR)	Buffalo	
Canadian National (CN)	Baton Rouge*, Chicago, Detroit, Memphis, St. Louis	Appleton, Jackson MS*, South Bend, Milwaukee-Waukesha
Canadian Pacific (CPRS)	Twin Cities*	
Conrail (CR)	Newark	Camden NJ
CSX Transportation (CSXT	Atlanta*, Buffalo, Chicago, Cleveland, Columbus*, District of Columbia, Jacksonville, Kansas City, Pittsburgh, St Louis	Akron, Athens, Birmingham, Chattanooga, Erie, Montgomery*, Lansing*, Nashville*, Springfield MA, Syracuse, Youngstown
Florida East Coast (FEC)	Jacksonville, Orlando	Cape Canaveral
Fort Worth & Western (FWWR)	Dallas-Fort Worth	
Indiana Harbor Belt (IHB)	Chicago	
Iowa Northern		Cedar Rapids
Kansas City Southern (KCS)	Kansas City	Joplin, Shreveport, Topeka*
New England Central (NECR)		New Haven, Hartford*, Springfield MA
Norfolk Southern (NS)	Atlanta*, Charlotte, Chicago, Cleveland, Kansas City, Louisville, Philadelphia, Pittsburgh, St Louis, Toledo	Allentown, Asheville, Camden NJ, Dalton, Elkhart, Fort Wayne, Harrisburg*, Lafayette IN, Macon, South Bend, Springfield IL*
Providence and Worchester (PW)		New Haven, New London Submarine Base, Worcester
Springfield		Lowell, Worcester, Portland ME

Terminal (ST)		
Terminal Railroad Assn of St. Louis (TRRA)	St. Louis	
Union Pacific (UP)	Chicago, Dallas-Fort Worth, Houston, Kansas City, Las Vegas, Los Angeles, Omaha, Phoenix*, Portland, Sacramento*, San Antonio, St Louis, Twin Cities*	Ames, Bakersfield, Beaumont TX, Bloomington, Cedar Rapids, Cheyenne*, El Paso, Fresno, Jefferson City*, Modesto, Ogden, Pocatello, Provo, Salt Lake City*, San Bernardino, San Luis Obispo, Santa Barbara, Sioux City, Springfield IL*, Stockton, Topeka*, Tucson
Willamette & Pacific (WPRR)	Portland	

*State capitols designated by asterisk.