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December 11, 2006

Mr. M. Lee Bishop, EIS Document Manager  
Office of Logistics Management  
Office of Civilian Radioactive Waste Management  
U.S. Department of Energy  
1551 Hillshire Drive, M/S 011  
Las Vegas, NV 89134

RE: *State of Nevada Comments on DOE's Amended Notice of Intent To Expand the Scope of the Environmental Impact Statement for the Alignment, Construction, and Operation of a Rail Line to a Geologic Repository at Yucca Mountain, Nye County, NV*

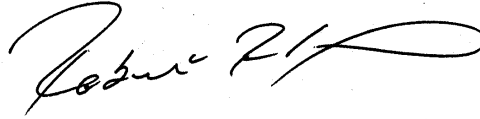
Dear Mr. Bishop:

Attached please find the State of Nevada's comments on the above-referenced Notice of Intent that was published in the Federal Register on October 13, 2006. These comments are in addition to - and do not replace - those submitted by the State of Nevada on May 25, 2004 in response to DOE's April 8, 2004 Federal Register Notice of Intent to Prepare an Environmental Impact Statement for Alignment, Construction, and Operation of a Rail Line to a Geologic Repository at Yucca Mountain, Nye County, Nevada.

Please note that while we are providing comments regarding the scope of the proposed draft Environmental Impact Statement (EIS), Nevada has no preferred rail corridor alternative. It remains Nevada's strongly held position that there are no acceptable rail or highway access routes to Yucca Mountain, that Yucca Mountain is an unacceptable and unsafe repository site, and that the project must be halted. These comments are not intended to be comprehensive as to scoping issues and Nevada reserves its rights to contest any aspect or scoping parameter of the draft EIS or final EIS.

If you have questions regarding these comments, please contact me or Joseph Strolin, Planning Division Administrator for the Agency for Nuclear Projects, at 775-687-3744.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert R. Loux". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Robert R. Loux  
Executive Director

RRL/cs  
Attachment

Cc: Governor Guinn  
Attorney General George Chanos  
Nevada Commission on Nuclear Projects  
Nevada Congressional Delegation  
Affected Local Governments and Tribes

**STATE OF NEVADA COMMENTS  
ON THE U.S. DEPARTMENT OF ENERGY'S AMENDED NOTICE OF INTENT  
TO EXPAND THE SCOPE OF THE ENVIRONMENTAL IMPACT  
STATEMENT FOR THE ALIGNMENT, CONSTRUCTION, AND  
OPERATION OF A RAIL LINE TO A GEOLOGIC REPOSITORY  
AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA  
[Federal Register / Vol. 71, No. 198 / Friday, October 13, 2006, 60484 – 60490]**

**Prepared by  
The Nevada Agency for Nuclear Projects  
Office of the Governor  
December 11, 2006**

**Introduction**

The State of Nevada (Nevada) submits these comments in response to the U.S. Department of Energy's (DOE) Amended Notice of Intent (NOI) to expand the scope of the Environmental Impact Statement for the Alignment, Construction, and Operation of a Rail Line to a Geologic Repository at Yucca Mountain, Nye County, Nevada. Separately, the State is also submitting comments on a second DOE NOI issued on October 13, 2006 that announced DOE's intent to prepare a "Supplement to the Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain." While the comments provided herein address the amended Yucca Mountain rail alignment NOI, it is important to note that the actions contemplated by the two Notices are inextricably interrelated, and there are common issues relevant to both.

The two October 13<sup>th</sup> NOIs, taken together, comprise nothing less than a major restructuring of the entire Yucca Mountain high-level radioactive waste program. The changes contemplated in the notices affect the universe of repository program elements, including the actual design of repository surface facilities, the characteristics of the waste disposal packages and engineered barrier systems, the thermal characteristics of the repository subsurface, the long-term performance of the waste isolation system and how that is modeled, and the entire national and Nevada waste transportation system. Yet, instead of treating these major program changes with the weight and importance they deserve, DOE is, once again, attempting to shirk its responsibilities and limiting public and stakeholder involvement by establishing truncated and unrealistic comment deadlines, withholding key information critical for understanding the actions being proposed, and restricting opportunities for comment on the critical issues that are at stake. For example, DOE failed to provide maps of the proposed Shurz-Mina rail line to the public even though they were available to DOE. In sum, for scoping purposes, the public notices, comment period, and meeting locations were woefully inadequate.

On October 16, 2006, the Nevada Agency for Nuclear Projects formally requested that DOE extend the comment period for both NOIs to at least 90 days. The Agency also asked that, at a minimum, six additional public meetings be scheduled in Nevada communities located along the rail route that encompasses the newly proposed Mina rail access corridor. DOE agreed to extend the comment period by just two weeks - to December 12<sup>th</sup> - and added only a single additional meeting in Reno.

The State of Nevada finds DOE's response to be entirely inadequate and unacceptable. The proposed Schurz-Mina rail line to Yucca Mountain would impact more Nevada communities than any other route DOE has identified. Communities across the State along the I-80 corridor, from West Wendover to Lovelock, would be directly affected by thousands of shipments of spent nuclear fuel and high-level radioactive waste from the eastern portion of the country.

The heavily populated Reno-Sparks area, northern Lyon County, and the city of Fernley (one of the fastest growing communities in northern Nevada) would be impacted by hundreds - and perhaps thousands - of shipments from Arizona, California, Oregon, and Washington that would transit California and end up coming through the Reno-Sparks metro area. It is likely that even reactors in Texas and a number of southern states would ship through California and northern Nevada to a Mina rail line.

None of these impacts are discernable from the NOIs released on October 13<sup>th</sup>. DOE failed to provide any maps showing the new rail access routes or the connecting main line railroads that are proposed for nuclear waste shipments. Key information about the actual communities affected, nationally and in Nevada, and potential impacts are intentionally obscured by the NOI in an apparent effort to suppress public involvement and meaningful participation. On October 26<sup>th</sup> and 27<sup>th</sup>, DOE added some additional information about the two proposals to its OCRWM web page, but issued no notice of its availability. Furthermore, these additions are no remedy for the deficient notices and the short time public comment period. Moreover, the Schurz-Mina and Caliente corridor maps published on the DOE website did not provide sufficient information to allow identification of the actual parcels of land, land owners, and land users affected by the proposed action.

The states of California and Utah – two states that stand to be significantly impacted by development of a rail access route to Yucca Mountain using the proposed Schurz-Mina corridor – were left totally in the dark by DOE. Despite the fact that national changes in rail routing as a result of using a Mina rail line would mean exponentially more shipments in California and would require the use of an entirely different main line railroad segment in Utah, DOE refused to schedule public meetings in those states or even formally seek their input.

In the NOI announcing DOE's intent to prepare a supplement to the Final Yucca Mountain EIS, DOE is proposing fundamental changes in waste packaging, waste handling, and repository performance assessment. Nevertheless, DOE failed to include even a revised conceptual design for the Yucca Mountain facility in the notice. Instead,

the NOI relies on vague references to the newly concocted canistered approach, the Transportation, Aging and Disposal (TAD) system and a shift in focus to a “clean” repository operating system. No reference is made to the newly proposed transportation-emplacement vehicle system for the canistered packages.

In reality, the shift to the TAD concept as the governing construct for repository waste acceptance, storage, transportation and disposal marks a major change in DOE’s entire repository design. It impacts every aspect of the proposed waste management system, from the way in which waste is handled and managed at nuclear reactors, to how it is transported, received and handled at a repository, and to how it is ultimately disposed of underground (and how the waste disposal system performs over the tens of thousands of years necessary for safe waste isolation).

Failure to address the transportation system implications of the proposed TAD system is particularly significant regarding the potential number and mode of shipments to the proposed repository. Since publication of the Yucca Mountain FEIS in 2002, DOE has repeatedly stated that about 175 shipments per year would be expected over 24 years. This number was wrong to begin with because it unrealistically assumed that 95 percent of civilian spent nuclear fuel would be shipped by rail in large-capacity casks and in multiple cask shipments per train. Deployment of the TAD system would likely increase the number of rail cask-shipments because of a decrease in the average capacity of rail casks. Between 20 and 40 reactor sites may not be able to use the TAD system, either because of transportation infrastructure issues or incompatibility with the existing dry storage systems, and a yet uncertain number of utilities may refuse to utilize the TAD system at all. Therefore, the deployment of the TAD system could significantly increase the number of legal-weight truck shipments and/or the number of rail cask shipments. The draft EIS for the TAD system must completely re-examine life-cycle shipment numbers and modes for both the 24-year and 38-year (or longer) emplacement scenarios. These same shipment numbers and modal assumptions should be used in the draft EIS for the rail line. Both draft EISs must also evaluate a 100 percent legal-weight truck shipment scenario.

There is nothing in the NOI that even hints at the wide-ranging, all-encompassing effects of the changes DOE is proposing. One can only conclude that, as with the rail alignment NOI, DOE is intentionally seeking to mask the true import of its actions and withhold crucial information from the public.

The format for the limited number of meetings DOE held in Nevada is likewise deficient and designed to limit public participation. The meetings provided no opportunity for a public exchange of information. People coming to the meetings intending to make comments were shuttled from one DOE public relations display to another, with no provision for documenting comments made to DOE staff. In order to “formally” comment, individuals were required to huddle with a paid DOE transcriber, in the presence of a DOE official, in a corner of the meeting room in an environment that is both intimidating and does not encourage comments.

While DOE is asserting in the media that comments on both NOIs will be accepted at all of the scheduled meetings, the NOIs themselves say something else. For example, the notices state that DOE will accept comments on the proposed supplement to the Yucca Mountain EIS at the meetings in Amargosa Valley and Las Vegas, while comments on the scope of the revised rail alignment draft EIS would be accepted at meetings in Amargosa Valley, Goldfield, Caliente, Hawthorne, and Fallon. According to how the notices are structured, DOE is under no obligation to accept “out-of-scope” comments on the supplemental Yucca Mountain EIS at any meetings other than Las Vegas and Amargosa Valley. Likewise, DOE has no obligation to accept comments on rail alignment scoping at the Las Vegas meeting.

Two fundamental principles underlying the National Environmental Policy Act (NEPA) process are that federal agencies must transparently set forth and analyze proposed actions that have the potential to adversely affect the quality of the human environment and must also follow procedures that encourage and facilitate meaningful public participation in the decision-making process. Both NOIs DOE published in the Federal Register on October 13, 2006 fail the tests of transparency and inclusive participation, and actually serve to obscure the real extent of the changes being proposed and the nature and extent of likely impacts.

DOE should withdraw the NOIs and reissue them with provisions for meaningful public participation, sufficient time for review and comment on the proposed actions, and attention to both the letter and spirit of the National Environmental Policy Act.

### **Inadequate Comment Period for Nevada Stakeholders and Failure to Conduct a Broader Scoping Process**

The choice of a rail line alternative will have wide-reaching implications for shipments of spent nuclear fuel (SNF) and high-level waste (HLW) within Nevada and around the country. The decision as to the location of a rail line will unavoidably affect the entire nuclear waste transportation system, resulting in greater numbers of shipments along certain rail routes and through certain states and cities and lesser numbers of shipments through other areas. These system-wide differential impacts have never been adequately assessed, and the scoping process for the proposed rail line must encompass the full range of impacts and impacted areas.

The only way for DOE to adequately identify and assess the full range of impacts that are likely to occur is to provide for an adequate scoping period. Nevada believes that ninety days is the minimum amount of time required to allow the public and affected parties to understand and evaluate the proposed action and to prepare comments. The comment period provided in the NOI, even with the additional two weeks that were added subsequent to the publication of the original Notice, amounted to only 60 days and does not constitute a sufficient amount of time for adequate public review and comment.

Since states and cities around the country also stand to be substantially affected by DOE’s choice of a Nevada rail line, Nevada contends that DOE should have scheduled scoping

meetings in strategic locations nationwide, not just in Nevada. This is especially important with respect to western states such as California, Utah, Arizona, and New Mexico that would be impacted very differently, depending on the use of a Caliente rail line vs. a Schurz-Mina line. There should have been a sufficient number of scoping meetings to adequately cover key impacted states/cities throughout the Yucca Mountain transportation system.

### **Impacts to the Reno-Sparks Metropolitan Area, Washoe County and Communities Along the I-80 Corridor<sup>1</sup> Must Be Addressed**

Selection of the Schurz-Mina rail line alternative – or any Yucca Mountain rail access route that departs the Union Pacific main line in northern Nevada – presents an entirely new rail corridor routing that would significantly impact Washoe County, the Reno-Sparks metro area, and all of the other communities located along the I-80 corridor from the border with California to the Utah border. Estimates of the number of shipments through Washoe County, the Reno-Sparks metro area and the Lyon County community of Fernley range from 10% to over 80% of the total, depending upon general routing strategies (such as the “suite of routes” strategy the DOE Transportation External Coordination Working Group is currently considering), rail routing criteria developed by DOE and state regional groups, and factors used by the railroad companies in routing rail shipments on a seasonal and daily basis.

The railroads will likely find it attractive (due to economics, weather conditions, and railroad traffic logistics) to route a significant number of cross-country shipments along southern mainlines, passing through San Bernardino and/or Los Angeles, California, up through the Central Valley to the Sacramento area and across the Sierra Nevada Mountains to Reno via the Union Pacific (UP) mainline. Likewise, spent fuel and defense high-level wastes from Washington, Oregon and northern California generators would be shipped south through northern California and through the Reno-Sparks metro area. Communities such as West Wendover, Elko, Carlin, Winnemucca, and Lovelock would be impacted by SNF and HLW shipments from the east. The draft EIS must examine the full range of impacts of waste shipments on these communities, considering both minimum and maximum shipment scenarios.

The newly completed railroad trench in Reno poses potentially new and troublesome circumstances for any incident, accident, or terrorist action that might result in derailment, release, or other obstruction of shipments. The draft EIS must thoroughly evaluate the impact of the Reno trench in terms of increasing the risks posed by SNF and HLW shipments, impacts on emergency preparedness and response, impacts to public health and safety, radiation exposures due to routine operations and accident conditions, and other factors associated with the use of the rail line through Reno for shipments of highly radioactive materials.

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<sup>1</sup> The Union Pacific mainline railroad in northern Nevada runs parallel to Interstate 80 for much of the distance between the California and Utah borders.

The proposed Schurz-Mina rail corridor requires analysis and evaluation of a wide range of new and substantial impacts not heretofore undertaken. Impacts in the Reno-Sparks metropolitan area and surrounding counties have elements that are similar to yet vastly different from those in Nevada's other metropolitan area of Las Vegas and Clark County. Because the proposed Schurz-Mina corridor will utilize the UP east-west mainline that parallels the I-80 corridor, dramatic, new impacts to the region and stakeholder interests in northern Nevada and California will result and require serious study. As noted in these comments, the impacts are real.

### **DOE is Usurping the Authority and Responsibilities Of the Surface Transportation Board**

In assigning itself "lead agency" status for this massive transportation project, DOE continues to preempt the exercise of exclusive regulatory authority by the Surface Transportation Board (STB) over this new rail line and the activities proposed by DOE in the NOI. The NOI notes that "currently" the STB is to be a "cooperating agency" in preparation of the supplemental YMP rail corridor and rail alignment EIS, as that role is defined in 40 CFR 1501.6 and 1508.5. The STB should be the lead agency on transportation issues within its exclusive jurisdiction. The STB has exclusive jurisdiction over (a) existing active rail lines and related facilities [49 USC 10501(b)(1) and (2), and 10102((6)(C)(railroad defined) and (B)(transportation defined)], (b) construction and operation of rail lines that provide common carrier rail service [49 USC 10901(a)(2)(3) and (4)], and (c) abandonment of an active rail line segment [49 USC 10501(b)(2) and 10903].

The Schurz-Mina corridor proposal utilizes a portion of an existing active rail line, including a line segment from Schurz to Hawthorne, NV that is currently limited to transport of Department of Defense munitions shipments. (See 71 F.R. 60486) Union Pacific's current map of "public use tracks" includes rail service lines from its east-west main line southerly to Fallon, Wabuska, Schurz, and Thorne (Hawthorne). Central to the use of the Schurz-Mina corridor and Walker River Paiute Tribal concerns is the realignment and construction of a new bypass line segment at Schurz, NV, presumably combined with abandonment of the old rail line segment. (See 71 F.R. 60488) The STB has exclusive jurisdiction over existing active rail lines and proposals to realign, bypass and abandon any segment thereof. Although the NOI is silent on the matter, if DOE intends to utilize intermodal service pending completion of rail line construction to Yucca Mountain as proposed in its 2004 Record of Decision, such a facility constructed on an existing rail line will necessarily fall within STB jurisdiction. Thus, regardless of whether DOE has yet to commit to provide common carrier rail service, the STB's exclusive jurisdiction and expertise is implicated and must be invoked. Accordingly, the STB should be the lead agency concerning any NOI rail corridor selection/alignment-realignment issues. (See 40 CFR 1508.26. Cf. Decision, pp. 11-13 (DC Cir. Aug. 18, 2006))

Particularly disturbing is the fact that while the NOI's "Proposed Action" section specifically includes the evaluation of "the shipment of commercial commodities by

private entities (shared use)”, during public meetings, DOE disingenuously suggested to rural community stakeholders interested in economic development that shared use for commercial purposes may be allowed. But when asked directly, DOE refused to commit to shared use of any rail lines constructed or operated for service to a Yucca Mountain repository. DOE’s approach is cleverly calculated to curry the favor of rural stakeholders, frustrate STB jurisdiction, and attempt to federally preempt state action.

### **Other Agency Involvement - Necessary Federal And State Agencies Are Omitted**

In the NOI, DOE continues to ignore other obvious responsible agencies in transportation. Although the STB is now included, DOE fails to include the Federal Railroad Administration - responsible for railroad operations and safety, the U.S. Department of Transportation’s Pipeline and Hazardous Materials Safety Administration - responsible for rules for transportation of hazardous materials, and the Department of Homeland Security - responsible for the security of transportation modes, systems, and infrastructure.

In addition, there are numerous State of Nevada agencies with statutory, regulatory, or oversight roles and responsibilities for rail and highway activities contemplated by the NOI. These include, but are not necessarily limited to, the Nevada Public Utility Commission (rail regulations), the Nevada Department of Transportation, the Nevada Department of Public Safety (especially the Nevada Highway Patrol and the Nevada Division of Emergency Management), the Nevada Division of Health, the Nevada Department of Conservation and Natural Resources (especially the divisions of Environmental Protection, State Lands, State Parks, Wildlife, Water Resources, etc.), the Nevada Department of Museums, Library and Arts (Historic Preservation Office), and others. The draft EIS must assess roles of and impacts to each of the affected State of Nevada agencies.

### **Consultation and Communication**

The draft EIS should clearly define the communication mechanisms to be employed between DOE and all of the identified stakeholders, especially the Bureau of Land Management, the Walker River Paiute Tribe, the State of Nevada, and the affected local jurisdictions.

The comment process used by DOE at the scoping meetings, i.e., the individual delivery of oral comments to a court reporter, had the affect (intended or unintended) of concealing the information provided by each commenter from the other meeting attendees. All comments received by DOE during the public scoping meetings should be transcribed verbatim and made public immediately (preferably via a DOE web site). DOE should publish the verbatim comment transcripts as an appendix to the Scoping Report. The Caliente Rail draft EIS must contain a comment-response section that clearly articulates each comment received, together with the DOE response.

## **Not Business as Usual**

The proposed Yucca Mountain rail line is not, and must not be treated as, simply another rail line. The purpose for which DOE is proposing to construct and operate the rail line is unique and has the potential to negatively and substantially impact people and the environment in an unprecedented way. If DOE ultimately constructs a rail access route to Yucca Mountain, a rail line 200 to over 300 miles long would be built to carry SNF and HLW from nuclear power reactors and other facilities around the country. At least 70,000 metric tons and potentially more than 120,000 metric tons of this dangerous material would be transported along this corridor, requiring thousands of shipments over a period spanning 40 years or more. An accident involving release of this material could result in massive and long-lasting environmental damage. Even without an accident, repeated exposures over long periods of time to routine radiation emitted by shipping containers can result in negative health consequences. The mere fact that the line will be used as a nuclear waste transportation corridor also has the potential to stigmatize both the line itself and surrounding areas, resulting in potential impacts to property values and other economic consequences for users of adjacent or nearby lands.

The proposed Yucca Mountain project has created major and sustained conflict between the State of Nevada and the federal government over the years and is likely to continue to be a major source of controversy in the future. The proposed Schurz-Mina rail line alternative has the very real potential to generate additional conflict and controversy among a dramatically expanded number of new stakeholder interests, including the Walker River Paiute Tribe, affected local governments, and other Native American interests.

It is critically important for DOE to recognize that any action involving the construction and operation of a rail access route to Yucca Mountain cannot be handled in a “business-as-usual” fashion. The draft EIS must assess impacts resulting from the special nuclear nature of the proposed action and alternatives.

## **Proposed Action/Project Description**

The draft EIS must contain detailed information on the proposed rail alignments, the proposed rail construction plans, and the proposed rail operations plans. The information must be sufficiently detailed to allow potentially affected individuals to determine the impacts of each of the potential rail lines on all privately owned and leased lands traversed by the alignment. The information should also be sufficient to assess any significant direct or indirect impacts upon private lands or private economic activities on leased lands located within 5 miles of the alignment, whether traversed by the alignment or not.

It is critically important that DOE present detailed rail alignment design maps and plan views, including vertical profiles for the Caliente and Schurz-Mina alternatives and any other rail corridors/alignments that are evaluated in the draft EIS. The alignment maps and plan views must clearly show the relationship to the existing transportation network

(including all highway and road crossings) and the rights-of-way according to ownership and land-use. Detailed information must be provided on grades and curves; earthworks, borrow pits and spoils pits; and bridges, grade crossings, underpasses, and over-passes. The draft EIS must identify any fences and water wells that might be associated with rail construction and operation.

There must also be detailed maps showing how the Yucca Mountain rail line alternatives will affect SNF and HLW shipments nationally. Such maps should clearly depict all applicable rail routing scenarios from individual origin points to the point(s) of departure from railroad main lines.

DOE should provide this information as a hardcopy appendix to the draft EIS. DOE should also make this information available in PDF format on CD-ROM and on the DOE Internet website. DOE should consider presenting this information in additional formats compatible with public domain GIS software, such as ArcExplorer.

The proposed connections to the existing rail lines should be described in detail. This should include a description of the connections required to accommodate rail traffic from both directions, overpass structures required, etc. The draft EIS should also contain detailed information regarding any upgrades, changes, modifications, etc. that would be required for existing/connecting rail lines as a result of any of the proposed rail lines.

In addition to the turnouts, other facilities may be required, such as secure yards constructed to facilitate temporary storage of cask cars. Additional terminal facilities that may be constructed include operations centers, locomotive shops, maintenance headquarters, automotive vehicle maintenance facilities, emergency stations, dormitories, fueling stations, and railroad car repair shops. These should also be described in detail.

The right-of-way required for the new lines should be described in detail, including the minimum width and increased right-of-way widths necessary in areas of cut and fill slopes.

Location and description of all proposed grade crossings must be provided, including at-grade crossings and grade separation crossings (specifying type of crossing, such as road overpass, road underpass, cattle underpass, etc.). For at-grade crossings, the description should include the type of traffic control/warning devices to be installed (sign only, lights only, lights and arms, etc.).

Access roads that parallel the tracks for service and maintenance should be described, including points of access for the roads, methods of preventing unauthorized use of the access roads, and the frequency of use for the roads.

Detailed information on the finished track structure is critical for assessing impacts on humans, livestock, and wildlife. The top-of-rail elevation above the adjacent land surface and the height and slope of the ballast are details of particular importance. The top-of-rail elevation may vary from less than one foot to ten feet or more.

Detailed information on train speeds is also necessary for assessing impacts. Previous DOE contractor studies have stated that maximum train speeds on heavy grades and sharp curves could be less than 20 miles per hour upgrade and 25 miles per hour downgrade, while maximum speeds on other route segments could be 60 miles per hour.

The description of the proposed action must clarify if and how DOE will share use of the rail line with other governmental and non-governmental entities. Previous DOE studies have stated that the rail line will be shared use with the Nevada Test Site. The discussion of shared uses should include the safety implications of shipping other hazardous materials, such as military munitions, civilian explosives, chemical and petroleum products, etc.

The description of the proposed action must clarify how DOE intends to operate the rail line. Such description must be specific to each rail corridor/rail line alignment being evaluated. Previous DOE studies have stated that a Yucca Mountain rail line would be operated under contract by a short-line operating company and that the operating company would be required to meet Federal Railroad Administration (FRA) requirements for maintenance, operations, and safety. The discussion of operations should address the implications of the FRA 12-hour time limit for crew service.

The description of the proposed action should also include a discussion of system components not required under FRA regulations, but which would enhance operational safety and security, such as (but not limited to) the costs and benefits of a mid-route way station for crew changes, maintenance, security and emergency response, and installation of a centralized traffic control system to direct the movement of trains on the line.

The draft EIS must also comprehensively evaluate and assess impacts along the entire length of the proposed Schurz-Mina rail corridor, from its point of departure from the Union Pacific mainline railroad at Hazen, Nevada to Yucca Mountain, including the segment of the proposed route from Wabuska, NV to Hazen, NV.

In addition, for the Schurz-Mina corridor, the draft EIS must evaluate impacts resulting from the use of the UP mainline railroad from Hazen east to the Utah border and from Hazen west to the California border, including impacts of SNF and HLW shipments and repository-related rail operations on all of the communities located along the UP mainline railroad in Nevada. The draft EIS should contain a comprehensive assessment and comparison of the impacts of the proposed Caliente and Schurz-Mina alternatives, including connecting and mainline rail roads, from Yucca Mountain to the Nevada state boundaries.

### **Analysis of Alternatives**

The draft EIS must, according to DOE NEPA guidance, provide “a rigorous exploration and objective evaluation of reasonable alternatives, including the no action alternative.” The guidance document warns: “The failure to consider alternatives that seem reasonable affects the credibility of an otherwise adequate NEPA review.” *Recommendations for the*

*Preparation of Environmental Assessments and Environmental Impact Statements*, U.S. Department of Energy Office of NEPA Oversight, May 1993, p. 9.

As part of the evaluation of alternatives and the assessment of impacts related to identified alternatives, the draft EIS must also thoroughly discuss options for operation and management of the proposed rail line. These include at least two major options: (1) a dedicated, single-purpose rail line owned and operated by DOE for the sole purpose of shipping SNF and HLW to Yucca Mountain; and (2) a multi-use/shared-use rail line operated by DOE and/or another entity that would be used for the movement of other cargoes in addition to SNF and HLW to Yucca Mountain. A thorough and comprehensive assessment of impacts arising from each alternative specific to each potential rail line evaluated in the draft EIS must be conducted in a fashion that allows for direct comparisons. The draft EIS should contain an adequate feasibility analysis documenting any identified shared use for the rail lines, identifying pros and cons of such use, and assessing cumulative impacts of multiple-use operations (i.e., increased traffic; increased risk from operations and/or from other cargoes such as toxics, explosives, and the like; etc.). Shared use would likely mean that trains, instead of returning to the railhead with only empty casks, would be carrying other cargoes that could increase risks and consequences of accidents or result in other synergistic impacts with respect to in-bound SNF and HLW shipments.

The draft EIS must also evaluate, in the same level of detail as the proposed action, alternatives that involve proposed intermodal operations/scenarios, including (1) heavy-haul truck transport of large rail casks from identified intermodal facilities, and (2) legal-weight truck shipments of casks off-loaded from rail cars at the intermodal facilities. The discussion of intermodal scenarios and the assessment of intermodal impacts must also encompass the various operational scenarios posited by DOE, including (1) intermodal operations for some period of time until a rail line direct to Yucca Mountain can be constructed, (2) intermodal operations in lieu of a Yucca Mountain rail line, and (3) concurrent and/or overlapping direct rail and intermodal operations.

### **The Proposed Action: Shipment Characteristics**

In the draft EIS, DOE must provide updated information on the radiological characteristics of the SNF and HLW that would be shipped on the proposed rail line. Since publication of the Repository Final EIS in February 2002, several developments have occurred that could significantly change the radiological characteristics of the SNF and HLW shipped to the repository. Developments regarding civilian SNF include: 1) the decision to utilize multi-purpose transportation, aging, and storage shipping containers (TADs); 2) extension of current reactor operating licenses; 3) utility fuel management practices that result in higher-burnup SNF; and 4) utility interpretation of the Standard Contract in a manner that will force DOE to abandon plans for shipping oldest fuel first. Despite DOE's proposal to use TAD shipping containers, these developments could result in rail shipments of five-year cooled, high-burnup SNF in large transport casks without welded internal canisters. Additionally, DOE has proposed changes in the definition of HLW that could alter the characteristics of DOE shipments to the proposed

repository. Therefore, the draft EIS must provide thoroughly updated information on shipment characteristics, both for logistics analysis and for risk assessment. Expected changes in the radiological characteristics of SNF and HLW could significantly increase the human health and economic consequences of severe transportation accidents and incidents of terrorism and sabotage. DOE cannot adequately address this issue by adopting by reference the out-of-date SNF and HLW inventory information provided in the 2002 Yucca Mountain Repository Final EIS.

### **Need for a Meaningful Basis for Rail Corridor Selection**

In the draft EIS, DOE must assess and compare proposed rail corridors other than just the Caliente and Schurz-Mina corridors. Neither the final Yucca Mountain EIS nor any subsequent DOE NEPA analysis has provided a meaningful basis for the corridor selection. To date, the identification of, first, the Caliente corridor and, subsequently, the Schurz-Mina corridor has been arbitrary and apparently driven by federal agency whim rather than by any defensible NEPA decision process.

### **Need for a Meaningful Discussion of Rail Construction Costs**

The NOI's list of impacts DOE intends to evaluate include the "irretrievable and irreversible commitment of resources." 71 F.R. 60489. Obviously, the financial resources and appropriations necessary to implement proposed action must be considered, including both past and future commitments. Accordingly, DOE must now identify and evaluate all costs associated with any proposed rail line construction and operation activity. In late 2005, DOE estimated the cost of constructing a rail line along the Caliente corridor at about \$2 billion, or about \$6.25 million per mile. To our knowledge, DOE has not released any details of how the new cost estimate for Caliente was developed, nor has DOE explained why the new figure was significantly higher than the approximately \$800 million construction cost estimated in the FEIS in 2002.

The Mina Route Feasibility Study, prepared for DOE by Bechtel-SAIC in October 2006, estimates the cost of constructing a rail line along the Schurz-Mina corridor at about \$1.6 billion, also about \$6.25 million per mile. Again, DOE has provided no details in support of the cost estimate. During the recent scoping meetings, DOE staff and contractors were generally unwilling to discuss cost details.

In the draft EIS, DOE must provide comparable cost estimates for each corridor evaluated and explain in detail how these costs were developed. The cost methodology and data must be transparent, and the costs of specific route segments and structures (such as bridges) must be provided.

The draft EIS must also discuss the implications of rail line construction costs for route selection decisions. For example, DOE dropped from consideration an alternative segment of the Caliente route that would have avoided Garden Valley and the "City" sculpture installation. (NOI, p. 60487) It is our understanding that the dropped alternative

would have increased the total cost of the Caliente rail line by less than 10 percent. Does DOE have some hard-and-fast cost criteria for segment selection decisions?

Additionally, the draft EIS must discuss the implications of rail line construction costs for program decisions, such as the selection of the preferred corridor or the preferred shipment mode. The estimated construction cost of the Caliente rail line increased from \$800 million in 2002 to \$2 billion in 2005. Additional cost increases could occur when the draft EIS is published. Is there some cost threshold where construction cost would become the major factor in selecting the preferred rail corridor? Is there some cost threshold for rail access that would trigger a reconsideration of the preferred transportation mode? These questions must be addressed in the draft EIS.

### **No Action Alternative: The Mostly Legal-Weight Truck Scenario**

Considering the “no action alternative”, the NOI states, “in the event that DOE were not to select a rail alignment in either Caliente or Mina corridors, the future course that it would pursue is uncertain”. “Uncertainty” is not a recognizable alternative nor can it be a “no action alternative”. The “mostly legal-weight truck” scenario described in the Repository Final EIS is the only realistic no action alternative<sup>2</sup>, and it must be fully and completely analyzed in the draft EIS. The Council on Environmental Quality interprets the “no action” alternative as “the federal agency not acting at all” (i.e., in this case, not constructing a rail line or any new facilities). This means that neither intermodal shipment scenario (rail to heavy-haul truck or legal-weight truck casks shipped by rail to an intermodal transfer facility) can be considered as a no-action alternative, since to realize any of these scenarios, DOE would have to develop new facilities that do not now exist. As discussed below, both intermodal proposals must be considered as alternative actions to the proposed action. The no-action alternative, the “mostly legal-weight truck” scenario, must be elucidated and evaluated in a manner comparable to and to the same degree of specificity as the proposed action and other alternatives that are considered.

Moreover, there have been numerous important developments in industry and government that affect the credibility and impact analysis associated with DOE's evaluation of the no-action alternative. First, the industry's Private Fuels Storage facility on the Goshute Indian Reservation in Utah received a license this year for the long-term interim storage of very substantial quantities of commercial spent nuclear fuel. The no-action alternative did not evaluate regional consolidation of interim storage, which affects costs, transportation, and institutional impacts. Second, there is pending legislation in the U.S. Congress to spur development of on-site and/or regional interim spent fuel storage.

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<sup>2</sup> At its most basic, the No Action Alternative means that the proposed action defined in the NOI--here, the rail alignment decision--would simply not take place. It is possible, however, that the Yucca Mountain project will not go forward. In that case, the No Action Alternative would need to evaluate the prospect that nothing would be shipped. Where a "no action" decision would result in predictable actions by others, that consequence must also be included in the analysis. If the "mostly legal-weight truck scenario" is the predictable consequence of a decision not to approve the proposed action, it would also need to be included in the No Action analysis. If, however, a number of things could happen and the legal-weight truck scenario isn't really a predictable consequence, it should be evaluated as another project alternative rather than as part of the No Action assessment.

Third, since the original FEIS was published, utilities have developed a number of additional on-site spent fuel storage facilities. And finally, utilities have settled several lawsuits with DOE concerning damages and costs associated with interim storage due to DOE's failure to adhere to the Nuclear Waste Policy Act's 1998 deadline. The dollar-figures associated with these settlements strongly suggest that DOE has greatly overestimated the costs of interim dry storage at utility sites in its FEIS. In sum, DOE's "no action" alternative needs massive re-working.

### **Potential Alternative: Legal-Weight Casks-on-Rail Scenario in the March 2004 Supplemental Analysis**

The October 13, 2006 NOI misleads everyone when it presents the scope of the "proposed action" in terms of the "mostly rail" activity identified as the preferred transportation scenario in the FEIS. The NOI makes no mention of DOE's Supplemental Analysis (SA) issued March 10, 2004 which diverges from the Yucca Mountain FEIS by selecting a scenario not analyzed in that document, i.e., the legal-weight truck/rail intermodal scenario of transportation nationally and in Nevada for the first six years and possibly longer, pending completion of construction and operation of a rail line to Yucca Mountain.

The SA leaves open the possibility that DOE would implement transportation nationally and in Nevada by legal-weight truck (LWT)/rail intermodal service for six years. Significantly, the LWT cask-on-rail intermodal scenario was summarily rejected in the Yucca Mountain FEIS as being "impractical", increasing shipment activity by more than a "factor of 5", and leading to the "highest estimates of occupational health and public health and safety impacts". See Chapter 6, *Environmental Impacts of Transportation*, p. 6-33; Appendix J, *Transportation, J.2 Evaluation of Rail and Intermodal Transportation*, pp. J-74 and 75.

The legal-weight truck/cask-on-rail proposal represents significant impact activity. For example, instead of the 30 sites nationwide for initial legal-weight truck pickup (6 sites without rail service and 24 sites without ability to load rail casks) considered in the FEIS, DOE's intermodal SA proposal now includes all 77 sites that will require intermodal truck cask loading, transfer and interline facilities to join the national rail system well before entry into Nevada. Similar intermodal transfer facilities will also be required at points of departure from the national rail system.

As an alternative to constructing a rail line to Yucca Mountain – or in the event of delays in constructing such a rail line – DOE must, as an alternative in the draft EIS, undertake a "reasoned analysis" of the environmental impacts of legal-weight truck/rail intermodal transportation nationally and in Nevada – something that was not done in the repository FEIS or the Supplemental Analysis.

In the absence of having considered the specific environmental impacts of intermodal activity as a general matter nationally in the repository FEIS, the NOI cannot now properly attempt to "tier" consideration of intermodal as a "lesser included scenario" in

Nevada only. (See 40 CFR 1508.28) Unless the true impact of national intermodal activity overall is fairly evaluated, Nevada, as the recipient of such activity, cannot realistically evaluate the impacts of prior intermodal operations on such activity within its state. Intermodal, by its very nature, involves significant loading, unloading, transfer and interline transportation activities that the repository FEIS found to give rise to increased impacts and risks to the environment, worker safety, and general public health and safety.

### **Potential Alternative: Heavy-Haul Truck/Rail Intermodal Transfer**

In the repository FEIS, DOE considered the use of rail to heavy-haul trucks for shipping large rail casks to Yucca Mountain. Since DOE is, apparently, not ruling out this scenario, it must also be fully evaluated as an alternative in the draft EIS. DOE should specify the ratio of rail use to heavy-haul truck use, delineate the procedures for the intermodal transfers of waste, locations, needed safety measures and routes, and comprehensively assess impacts in a manner that affords comparisons among alternatives.

### **The Proposed Action: Shipment Numbers**

In the draft EIS, DOE must provide accurate and updated information on the expected number of rail and truck shipments to the proposed repository. DOE must reexamine both the bounding scenario approach (mostly rail and mostly legal-weight truck) and the site-specific inventory and transport capability assumptions used to estimate rail and truck shipments in the Repository Final EIS, published in February 2002.

In the Repository Final EIS, the DOE mostly rail scenario was intended to bound or bracket the maximum percentage of rail shipments reasonably achievable from 77 sites. Under the mostly rail scenario, DOE assumed that up to 71 sites could ship solely by rail, and 6 sites could ship partly by rail and partly by legal-weight truck, resulting in a maximum reasonable estimate of 9,646 rail cask-shipments and 1,079 truck cask-shipments over 24 years. The mostly rail, and the corresponding mostly truck, shipment estimates represented the "the two extremes in the possible mix of transportation modes." [FEIS, p. 6-35] These numbers were never intended to represent the actual number of shipments that would occur, "because, more than 10 years before the projected start of operations at the repository, it [the analysis] cannot accurately predict the actual mix of rail and truck transportation that would occur from the 77 sites to the repository." [FEIS, p. J-10]

DOE spokespersons have misrepresented these shipment estimates by stating that only 175 combined rail and truck shipments per year would be needed to move the entire waste inventory from reactors around the country to Yucca Mountain. This misrepresentation is repeated in the Record of Decision published in the Federal Register on April 8, 2004, where DOE states that "about 9,000 to 10,000" rail casks in "about 3,000 to 3,300 total shipments" would "travel on the nation's rail network over the anticipated 24-year period," in addition to "about 1,000" legal-weight truck shipments. [Page 18559]

In fact, the actual modal mix and number of shipments, under the mostly rail scenario, cannot be accurately predicted based on the information presented in the Repository Final EIS. The information presented supports a wide range of possible modal mix percentages and shipment number estimates. For example, if the six reactors assumed to make partial shipments by legal-weight truck instead were assumed to make all of their shipments by legal-weight truck, there would be 9,460 rail and 2,327 truck cask-shipments over 24 years. Further, if the 26 reactors that cannot currently load rail casks or ship directly by rail are assumed to make all of their shipments by legal-weight truck, there would be 7,390 rail and 14,201 truck cask-shipments over 24 years. The draft EIS must thoroughly reexamine the potential number of cask shipments and total shipments (assuming multiple rail cask shipments per train).

The draft EIS must also estimate the number of shipments that could occur under the DOE alternative of shipping legal-weight truck casks by rail to an intermodal transfer facility in Nevada (ref. DOE's Supplemental Analysis published March 10, 2004). Based on the shipment estimates used in the Repository Final EIS, there could be about 53,000 cask-shipments over 24 years for the current 70,000 MTU scenario and about 109,000 cask-shipments over 38 years for the 120,000 MTU scenario. Even if DOE is able to ship 5 legal-weight truck casks per train, there would still be 10,600 - 21,600 cross-country train shipments and 53,000 - 109,000 truck shipments within Nevada.

Since DOE has not ruled out shipping SNF as general freight (as opposed to using dedicated or single-purpose trains), the draft EIS must examine the impacts to rail operations nationally of having SNF casks interspersed with other cargoes. The operation implications of managing and handling cask shipments that arrive in general freight at the rail line must also be evaluated.

If DOE intends to use dedicated trains comprised of three or more cask-carrying rail cars, the draft EIS must assess impacts to the railroads and rail yards where SNF from reactors would have to be consolidated and where trains would be compiled. In addition, impacts of such consolidation of waste on the local communities/cities where rail yards are located must be fully assessed.

### **Impact Areas**

The draft EIS must address all of the standard impact categories routinely covered under a NEPA analysis (i.e., land use, visual resources, noise, socioeconomics, cultural resources, water resources, geology and soils, air resources, biological resources, traffic and transportation, human health and safety, environmental justice, infrastructure, waste management, etc.). In addition, the draft EIS must address the impacts of the project that derive from the nuclear nature of the effort (i.e., the transportation of SNF and HLW), the public's high perception of risk, and now post-9/11 security regarding all things nuclear and the impacts that derive from such perceptions, and possible stigmatizing effects resulting from the proposed action.

In addition to addressing the full suite of impacts for the rail line, DOE must also assess impacts related to proposed/potential intermodal facilities and intermodal operations (both heavy-haul truck and legal-weight truck) and all other facilities and activities, either in Nevada or elsewhere, related to the proposed action and any alternatives that are considered. Examples include maintenance and support facilities, staging areas, temporary rail yards, storage facilities, improvements/alterations to existing rail or highway facilities, etc.

### **Regions of Influence**

DOE must reevaluate the regions of influence identified in the Repository Final EIS for specific impact areas associated with the Shurz-Mina, Caliente and other rail corridors, rail line construction, and rail operations. These regions of influence are areas that would be impacted by the proposed withdrawal of land and any activities outside the physical boundaries of the eventual right-of-way. The largest regions identified by DOE are for public health and safety, 800 meters (one-half mile) on each side of the track for routine (incident-free) operations, and 80 kilometers (49.7 miles) “radius for potential impacts from accident scenarios.” [FEIS, p.3-124]

Many of the impacts on rural Nevada will result from activities outside of the identified corridor. These activities are currently poorly defined and will occur in areas where baseline environmental data has not been collected. DOE needs to accurately define all regions of influence from all activities associated with the construction and operation of the rail line. Once the areas of influence are described, adequate baseline data must be collected for these areas.

Considering impacts such as noise and aesthetics, these regions can extend far beyond the 400 meters limit used by DOE to bound impacts on adjacent lands. For example, rural residents near newly constructed railroads in Wyoming report that train noise can be heard several miles away from the rail line. Although the noise level is low, it is new noise in an area that had little experience with man-made noise in the past and is considered by residents to be a significant adverse impact that was not predicted or assessed in the environmental impact statement for the railroad. Visual impacts may similarly extend far beyond the specified region of impact.

For linear facilities such as a rail line, an assessment of land use impacts should also include an evaluation of the impacts of bisecting current and future land uses. Splitting a ranching operation with a rail line can have significant impacts on the entire operation, not just the area within the right-of-way. Therefore, the region of influence for impacts to ranching operations should include the entire area of all ranches crossed by the rail line, including grazing allotments.

The region of impact for wildlife, particularly big game, should include the entire range used by the wildlife, including summer range, winter range and critical habitat. These ranges should be determined based upon current and historic migration patterns of wildlife.

### **Cumulative Impacts**

The draft EIS must thoroughly assess cumulative impacts from other DOE activities (i.e., low-level radioactive waste, mixed LLW and hazardous waste, and transuranic waste activities at the Nevada Test Site (NTS); other ongoing or planned DOE programs at the NTS and the Tonopah Test Range; past weapons testing activities at NTS and at other locations proximate to or impacted by potential rail corridors; commercial/private industry activities at/near the NTS; ranching; mining; any planned highway or other infrastructure activities ongoing or planned for the areas surrounding the proposed rail lines; and any and all other existing or reasonably foreseeable activities that might affect or be affected by the proposed action. The draft EIS must also assess cumulative impacts with respect to DOE/National Nuclear Security Administration's proposed Complex 2030 initiatives.

### **Impacts on Ranchers and Other Users of the Land**

Ranchers who have grazing allotments and other legitimate reasons necessitating ongoing access to the lands impacted by potential rail lines are being and will continue to be substantially affected. DOE has a proactive responsibility to inform affected parties of the contemplated action and its impacts and seek their input prior to having made a decision regarding the selection of one corridor over others under consideration.

DOE must consider in detail the impacts on ranching of constructing and operating all of the proposed rail lines. For example, the DOE proposal for rail development in the Caliente corridor would adversely affect more than 40 ranching operations in Lincoln and Nye Counties while the proposed Schurz-Mina corridor would affect more than 20 ranching operations in Churchill, Mineral, Esmeralda, and Nye counties.

The DOE corridor preference criteria, particularly avoidance of privately owned land, ignores the realities of ranching in Nevada. Land ownership does not accurately reflect land use. Most ranching operations are based upon a combination of privately owned land and grazing leases on publicly owned lands. Splitting an existing operation with a rail line that will limit access to the leased land can have significant adverse effects on the operation of the ranch. If the rail line is fenced, the splitting of ranching operations will be perhaps the most significant impact. The rail line will bisect many local roads, and grade-separated crossings will be limited to major roads.

Ranching operations would be the most affected by the barrier to movements created by the proposed rail line. Box culverts and bridges are commonly used to provide underpasses under railroad tracks for the movement of livestock and equipment.

Underpasses will be limited to locations where underpasses can be constructed based on the topography and the profile of the proposed rail line. The degree of impact is a combination of the proposed at-road crossings (either at-grade or grade-separated) and proposed drainage structures.

Any of the proposed rail lines will unavoidably split existing ranching operations. Movement of vehicles, equipment and livestock will be complicated by the necessity of crossing the rail line. The increased noise and activity associated with the operation of the rail line will significantly change the environment of rural Nevada.

It should be noted that where ranches are located near existing rail lines, historically the ranch operations and lands were acquired based upon the location of property with respect to the rail line. Ranchers seldom acquired land on opposite sides of a rail line, since they recognized that the land would be difficult to operate and maintain. A new rail line, however, will split existing operations, causing significant economic impacts on these operations.

A detailed assessment of the impact on these existing operations is necessary. This would begin with an assessment of the number of pastures split, the location of watering sources in the split pastures, and the number of parcels split that result in parcels small enough to be unusable. The impact on pastures, feeding operations, and movement of equipment and supplies should also be assessed.

Livestock may be killed by trains. The economic impact of un-recovered livestock losses should be assessed. Even if the railroad is a sole-use operation, with only a few trains per week, livestock kills may be significant since the trains will be running at maximum speed (50-60 miles per hour) on the gentle grades through valley grazing areas. On a shared-use line, this impact would be a greater concern, particularly if there were multiple trains per day, as would be expected, for example, with fuel deliveries to a coal-fired power plant, or with freight deliveries to and from an intermodal transfer and distribution facility.

Access and maintenance roads for the rail line will create numerous new access points for trespass. The impacts of this trespass on ranchers (as well as on local and state law enforcement/public safety agencies that would have to deal with it) should also be fully assessed.

Construction of the rail line, particularly if it is fenced, will limit access to springs and wells. This will significantly reduce the grazing value of land unless other sources of water are available for livestock. It should be noted that livestock do not readily use underpasses under rail lines. Therefore, just providing underpasses will not mitigate this impact. The impact of splitting existing pastures, and particularly, isolating portions of pastures from sources of water should be assessed.

In addition, railroad yards, borrow areas, areas for disposal of surplus fill, staging areas, construction camps, lay down areas, access roads to construction initiation points, and

other construction and maintenance activities will result in impacts on ranching well outside of the identified corridor.

Construction of a rail line will also likely adversely impact both paved and unpaved roads traversed by the railway.

Fencing is extremely detrimental to wildlife migration as well as to grazing permit-holders, private property owners, and the general public.

The draft EIS should consider all impacts the rail line will have on local land use plans, zoning and existing land uses specific to each of the potential rail corridors/alignments evaluated.

### **Impacts to Las Vegas and Clark County**

Because the proposed Caliente rail line does not eliminate SNF and HLW shipments from the heavily populated Las Vegas metro area, the draft EIS must include a comprehensive assessment of impacts to Las Vegas and Clark County that result from a Caliente rail line and/or rail-to-truck intermodal operations originating from a Caliente intermodal facility.

Current DOE policy is that rail carriers will determine the routes used for shipments to Yucca Mountain. Four major cross-country rail routes are available for east-west shipments. A number of factors could result in the vast majority of shipments from the east traveling to Nevada on the Burlington Northern-Santa Fe or Union Pacific routes across Texas, New Mexico, Arizona, and California. All rail shipments to Yucca Mountain, except those from the Pacific Northwest and Idaho, could therefore travel to Caliente through downtown Las Vegas under credible alternative routing scenarios.

If a Caliente rail line were constructed, studies done for the State of Nevada on rail routing suggest that the railroads could find it expedient for a variety of reasons (economics, logistics, convenience, etc.) to route spent fuel and HLW shipments along southern cross-country rail corridors, meaning that shipments would come west on the Burlington Northern and Santa Fe Railroad to Barstow, California (Daggett interchange) and then travel east on the Union Pacific line through Las Vegas to Caliente. According to DOE's pronouncements, it will be the railroads that will ultimately select the rail routes for SNF and HLW shipments, and bad weather and heavy traffic congestion along northern cross-country rail corridors will very likely make the southern routing option attractive, at least for a significant portion of each year. Under this scenario, Las Vegas could see over 80% of shipments destined for Yucca Mountain, if a Caliente rail line is built.

Even if the railroads do not employ a southern routing strategy, hundreds of shipments of spent fuel from all of the California, Arizona and Texas reactors (and possibly from reactors in Louisiana, Washington and Oregon) would access a Caliente rail line via the

Burlington Northern and Santa Fe line, connecting with the Union Pacific line in Barstow, California and travel on to Caliente through Las Vegas.

If DOE constructs a new rail line from Caliente to Yucca Mountain, tens of thousands of Clark County residents would be affected by the shipments. Moreover, these shipments could continue for a period of four decades or more. The potential for large-scale rail shipments through Las Vegas is a major concern for the State of Nevada, Clark County, and the Cities of Las Vegas and North Las Vegas. In addition to the potential impacts on residents, the proximity of the Union Pacific mainline to the world-famous Las Vegas Strip and to other major commercial properties create truly unique local impact conditions.

### **Impacts on Bureau of Land Management Resource Management Plans**

The draft EIS must address all needed changes to the affected Bureau of Land Management (BLM) resource management plans and the appropriateness of those changes. Existing resource management plan policies or land use maps should not be changed simply as a reaction to the draft EIS.

### **Impacts to Mining and Mining Claims**

Construction and operation of a proposed rail line also has the potential to impact mining claims and minerals exploration in a wide swath of land. The proposed action has the potential to cause impacts in two areas of concern. One is the status of existing mining claims that may be located within or in proximity to the proposed rail line. The other is the status of potentially hazardous abandoned mine openings that may exist in the rail corridor.

Owners of existing mining claims in the proposed corridors should, at a minimum, be guaranteed access to their claims and be allowed to develop them. Mineral exploration and mining are vital to the state's economy. The draft EIS must fully assess impacts to mining and mineral exploration.

It is possible that potentially hazardous abandoned mine openings may exist within or proximal to the rail corridor. The Nevada Legislature has charged the Division of Minerals with the task of discovering and securing hazardous abandoned mine openings within the state. In the event the rail line is constructed and hazardous mine openings are discovered within the corridor, such mines must be secured by those constructing the rail line. At a minimum, the Division of Minerals must be given access to the corridor for the purpose of securing such mines.

The Nevada Division of Minerals advises that a new mine is being developed in the Goldfield area that will impact US 95 and could also affect the proposed rail alignment. The draft EIS must assess any impacts of the rail line on this new mine and on any existing or planned mining activities.

## **Impacts to the Nellis Test and Training Range**

Portions of the proposed rail alignments border and in some instances intrude upon land withdrawn for the U.S. Air Force Nellis Test and Training Range (NTTR). The proposed draft EIS must thoroughly and comprehensively assess impacts of all aspects of the proposed rail line (including evaluation, construction, rail operations, maintenance, etc.) on Air Force missions and activities related to the NTTR. Such analyses must not only consider physical impacts to the NTTR, but also potential impacts to NTTR activities, such as in-flight training missions, as a result of restrictions required due to the need to protect SNF and HLW shipments from risks associated with aircraft accidents/crashes. The assessment of such impacts must not be limited only to areas adjacent to or within the NTTR, but must include the entire length of the proposed rail corridor and connecting or main line railroads where Nellis flight operations currently occur or are assumed to occur in the future.

Conversely, the draft EIS must thoroughly assess all impacts of NTTR activities (both current and planned) on the proposed rail line and rail operations. Such analysis must include evaluation of risks and impacts associated with aircraft over-flights and aircraft crashes into trains, heavy-haul trucks, or legal-weight trucks carrying SNF and HLW.

The absent assessment of these impacts echoes a similar issue, unresolved, but at least addressed, in DOE's analysis of aircraft accidents/crashes that could impact the Yucca Mountain repository site, particularly its surface facilities. In assessing those risks, DOE has touted their mitigation via establishment of a restriction on the use of air space by NTTR (or a "no-fly zone"). Having tried and failed to secure a Memorandum of Understanding with the United States Air Force establishing such flight rules (which would adversely impact NTTR's training mission), DOE has sponsored a legislative package designed to facilitate such flight restrictions, a package which has shown no hint of being passed. Now, in the context of the draft EIS, DOE would entirely ignore the necessity for an impact assessment of aircraft hazards.

## **Impacts to Wildlife**

In previous impact assessments, DOE has significantly understated the impact to biological resources in general when assessing the impact of the various rail corridors. Loss of habitat would not be limited only to the physical loss of habitat due to the construction of the rail line. The operation of the rail line would reduce the value of habitat crossed or near to the line, resulting in significantly greater loss of habitat than just the area physically within the rail line right-of-way.

Critical habitat is absolutely necessary for wildlife. Human activity, such as the operation of a rail line, in or even near critical habitat can seriously degrade the value of that habitat for wildlife. This is especially true of linear facilities, such as a rail line, that pass through habitat areas. Without undisturbed access to critical habitat, the wildlife using that habitat may abandon large areas of year-round habitat.

Critical habitat near the rail corridor includes sage grouse strutting grounds or leks. Even if the proposed route does not cross leks, they may be close enough to the proposed route that construction and operation of the rail line may adversely impact the use of the leks. Impact of the construction and operation of the rail line on all leks in proximity to the rail line should be assessed.

Big game can also be adversely impacted by linear facilities such as the rail line if the facility blocks their migration paths. This is particularly true if the right-of-way is fenced. Pronghorn rarely jump a fence, but rather go under fences. Therefore, the type of fencing, if used, to fence the right-of-way is critical. Big game biologists generally recommend that the bottom strand be at least 18 inches above the ground to allow pronghorn to pass through a fence. The location and type of fencing, if used, should be described in detail.

Rail lines typically blow clear of snow in areas of heavier snowfall. Wildlife tend to use these cleared areas for travel, resulting in significant wildlife mortality from railroad operations. The impact on wildlife from impacts with trains should be assessed in detail.

### **Impacts to Threatened and Endangered Species**

A complete and thorough assessment of flora and fauna in the rail corridors must be undertaken as part of the EIS process.

Livestock and wildlife are frequently killed by trains when they are on the tracks. This carrion then attracts other species, particularly eagles and other raptors, which then are killed by trains. These impacts on threatened and endangered raptors should be assessed.

### **Impacts on Soils**

Soils in some areas may be strongly alkaline in nature. The floor of the valleys crossed may also include a number of playa deposits that consist of finer grained sediments. There may also be areas of alkali flats. These soil types are generally more difficult to re-vegetate following disturbance. Re-vegetation will also be difficult due to the arid climate. Construction of the rail line will result in loss of soils through wind erosion, with some degradation of air quality as a result. These impacts must be assessed.

Impacts on delicate desert soils also need to be addressed. Desert soils are fragile and can be easily damaged by human activities, and recovery often takes hundreds of years. DOE needs to evaluate the impact of construction and operation of a rail line on ecologically sensitive soils and environmentally sensitive lands.

### **Impacts to Native American Interests**

The DOE proposal for rail development in both the Schurz-Mina and Caliente corridors would adversely affect Native American interests. The proposed repository location at Yucca Mountain is a very old border between the Western Shoshone and the Southern

Paiute. In the immediate area are several federally recognized tribes and their reservation communities, as well as other urban and rural Native American residents, and organizations such as the Western Shoshone National Council. Most Native Americans in Nevada do not want the disturbance of cultural resources that they see as the inevitable outcome of the Yucca Mountain project and the proposed rail line.

The Schurz-Mina and Caliente corridors lie within lands claimed by the Western Shoshone Nation under the Ruby Valley Treaty. DOE has acknowledged that the corridors may cross traditional holy lands important to the Southern Paiute, Western Shoshone, and Owens Valley Paiute and Shoshone peoples. The Bonnie Claire alternate portion of the shared Schurz-Mina/Caliente corridor near Scotty's Junction would traverse lands held in trust for the Timbisha Shoshone Tribe.

According to DOE, "archaeological surveys have been conducted in less than 1 percent" of the total area for the Caliente corridor, and even less has been done along the Schurz-Mina corridor. [FEIS, 3-151] The Schurz-Mina corridor bisects the Walker River Paiute Reservation and traverses many areas of potential conflict with cultural resources. The Mina Route Feasibility Study prepared for DOE by Bechtel-SAIC states that previous field investigations have assessed less than 5 percent of the route and concludes "archeological resources will be encountered that will require mitigation through avoidance or treatment." [Pp. 19-20]

Rail shipments to a Caliente rail line from California on the existing Union Pacific mainline would traverse almost the entire length of the Moapa River Indian Reservation. All of the truck shipments required under the DOE mostly rail scenario would cross the Moapa River Indian Reservation on I-15 and the Las Vegas Paiute Reservation on U.S. 95.

Rail shipments to a Schurz-Mina line would impact Native American communities in Elko, Lander, Eureka, Pershing, Churchill, Washoe, Lyon, Mineral, Esmeralda, and Nye counties, as well as Native Americans in California and Utah through which collectively all of the waste destined for Yucca Mountain must pass.

Tribes potentially affected by the proposed DOE rail line to Yucca Mountain have identified the following concerns: DOE and Bureau of Indian Affairs failure to formally recognize affected tribe status and provide financial and technical assistance; protection of religious and cultural sites, and plants and animals, both on and off reservations; implications of rail line right-of-way acquisition for Western Shoshone land claims (Ruby Valley Treaty); cultural implications of possible radiological contamination and cleanup activities on tribal lands; stigma impacts on tribal businesses; tribal authority to regulate shipments across reservation lands, including pre-notification and monitoring; and tribal roles in emergency preparedness planning and training and emergency response.

DOE must also thoroughly assess impacts of rail construction and operations on cultural resources, archeological sites, artifacts, and other historic and prehistoric occurrences

within the withdrawal area in full compliance with 43 USC and do so with respect to each specific rail corridor evaluated.

### **Impacts on Current and Future Water Resources, Water Users, and Water Quality**

The operation of a rail line will have significant impacts on water resources within the area of the rail corridor and for stakeholders outside the actual corridor who currently use or who intend to use such water resources. Likewise, DOE activities in the course of implementing the plans for the rail line, such as construction activities, gravel mining and land disturbance, rail line operations, waste disposal, etc. will have deleterious impacts on both water supplies and water quality. In addition, the areas proposed for the rail line include numerous spring areas, which, if degraded in any way, could adversely impact wetland habitat, wildlife, and livestock. All of these impacts must be thoroughly assessed in the draft EIS.

In this regard, DOE must also evaluate the impact of the proposed Caliente rail corridor on applications for water rights filed by the Southern Nevada Water Authority with the State of Nevada Division of Water Resources as well as water rights applications that may be affected by the Schurz-Mina rail corridor. In addition, rights-of-way for future pipeline corridors may be transected by the proposed rail corridors and should be analyzed for purposes of the draft EIS.

Portions of the proposed rail corridors include areas that are located in areas needed for the development of future wells to monitor groundwater that flows through the Pahute Mesa nuclear blast cavities. Impacts of the rail line and related land uses on the future ability to monitor impacts of past nuclear testing on groundwater must also be assessed.

The draft EIS must also address the issue of how DOE plans to obtain water required for the construction of the proposed rail line, rail operations, and other activities. This is especially relevant since the State Engineer has already denied DOE permanent water rights for the proposed Yucca Mountain repository on the grounds that the use of water for the construction and operation of the proposed repository is not in the public interest. It is difficult, therefore, to see how a rail line for the importation of radioactive waste into Nevada will pass the public interest test.

Significant cuts may be required to maintain grade and curve requirements. In locations where the groundwater is close to the surface, these cuts may intercept aquifers, causing groundwater to seep from the cuts to the surface and thereby creating water quality concerns. Areas of groundwater that may be intercepted by cuts should be identified, and the impact of any seepage from aquifers should be assessed.

### **Impacts on Air Quality**

Impacts on air quality will occur during both construction and operation of the rail line. During construction, fugitive dust emissions from construction activities should be

assessed. During operations, fugitive dust emissions will occur from access and maintenance roads. These fugitive dust emissions should be assessed. Methods of controlling fugitive dust during both construction and operations should be described, and the impacts of any such dust suppression activities must also be thoroughly analyzed.

### **Impacts on Visual Resources**

The rail line's impacts on visual resources must be addressed in the draft EIS, especially in close proximity to state parks, existing highway corridors, wilderness study areas, communities and any other areas that the public input process deems appropriate.

The draft EIS must evaluate in detail specific visual resource conflicts, such as the previously identified adverse impacts of the Caliente corridor on the "City" sculpture installation in Garden Valley, and newly identified potential conflicts, such as the proposed state park north of Blair Junction (intersection of US95 and SR 265) along the Schurz-Mina corridor.

### **Re-suspension of Radioactive Particles from Past Fallout Events**

Portions of both the Schurz-Mina and Caliente rail corridors lie in the path of many of the radioactive fallout clouds that left the NTS during atmospheric weapons and cratering nuclear explosion tests. These particles, which remain hazardous for hundreds of years, lie in the soil and will pose a hazard during any period of land disruption (i.e., rail construction). The railroad work will involve the movement of massive quantities of desert soils that will likely result in the radioactive particles being lofted into the atmosphere, creating hazards for railroad workers and the public. DOE must assess the risks and impacts associated with soils disruptions and re-suspension of any residual radioactive fallout particles.

Preparatory to developing the draft EIS, DOE should conduct extensive baseline surveys of the area within the proposed rail corridors – and any other areas that would be disturbed by construction or other activities – to develop baseline data on the extent of contamination against which impacts of rail construction and operational activities can be assessed.

### **Socioeconomic Impacts**

The socioeconomic impact of construction and operations on the rural communities must be assessed in detail. Large construction workforces can cause significant disruption of services, create significant demands for housing, place significant demands on local schools, etc. These impacts must be assessed in detail.

DOE should provide detailed information on the number and type of construction workers required for the project. This should include construction workers required for support facilities such as the construction of the operations center, locomotive shop, maintenance headquarters, automotive vehicle maintenance facility, emergency station,

dormitory, fueling station, railroad car repair shop, and storage tracks.

Current school bus routes may be affected by the location of the rail line. The rail line bisecting school districts could limit the flexibility of the school districts in the future if they wanted to change the enrollment areas for the students. Such impacts must be assessed in the draft EIS.

In a largely rural area, the construction of a new industrial facility such as a rail line significantly changes the rural atmosphere enjoyed by residents. According to one ranch family crossed by a new coal line in rural Wyoming, this is the most significant impact of a new rail line on their lives. The social impact on the wellbeing of rural residents must be adequately assessed.

The mere fact that the rail lines and/or intermodal facilities and activities will involve nuclear waste transportation also has the potential to stigmatize both the lines/access routes themselves and surrounding areas, resulting in potential impacts to property values and other economic consequences for users of adjacent or nearby lands. The draft EIS must assess impacts from risk perception and stigma attached to nuclear-related activities/facilities.

### **Other Construction Impacts**

All construction activity should be described, including the construction of support areas and construction of access roads to construction initiation points. The number and location of construction support areas or construction initiation points should be described, the route selected, length of the route, the schedule, the number of structures required, and the location of existing roads. The location, size and duration of construction camps constructed to provide living facilities for workers and for construction support must also be described. DOE should also describe the amount and types of materials and equipment delivered to temporary storage yards or lay down areas in the construction support areas.

Construction of major structures such as bridges across major drainages and highway grade separations should be described. Most of the construction of these structures will involve the placement of precast concrete structures. Construction activities including site preparation, pouring of footings, and placement of precast structures should be detailed. DOE should identify locations for the precast plant and staging yard.

DOE should describe in detail the construction and preparation of the rail bed. If construction will begin simultaneously at multiple locations, these locations should be given. Methods of removing and storing topsoil should be described, including steps required to maintain viability of the topsoil. Any temporary construction access roads built along and within the right-of-way should be described.

Locations of local road underpasses, livestock underpasses and culverts should be provided. The size and type of construction for local road underpasses and typical

livestock underpasses should be provided.

To maintain the required grades, significant cut and fill will be required. Equipment used for rail bed construction should be described, including scrapers, dozers, power shovels, drag lines, front-end loaders and belly dump trucks. Blasting required as part of the cut activities should be described.

General practice is for cut material to be used as fill to the maximum extent feasible and efforts made to balance cuts and fills. However, haul distances between cuts and fills or additional fill requirements may require borrow areas outside of the right-of-way. Additional rights-of-way required for disposal of cut material not useable because of its composition or excessive haul distances should be described.

Gravel and other fill may be acquired from local sources to minimize haul distances. Locations and quantities of these materials should be provided, and impacts on the overall supply of such materials and the effects on other users should be assessed.

Quantities and source of ballast material should be provided, including an assessment of the impact of acquiring this material.

DOE should identify sources for sub-ballast material. It is usually obtained locally from gravel pits at various points along the right-of-way.

DOE should describe the method of replacing topsoil on disturbed areas and the method of re-vegetation to be used, including vegetation types and seeding and mulching options. Methods to control runoff and erosion such as silt fences, plastic netting, and other silt control devices should be described.

Significant quantities of steel will be required for the rails. DOE should assess the impact such acquisition of rails will have on the national steel market, including the cumulative impacts from other DOE activities, such as cleanup at other DOE sites. The location of rail welding facilities should be provided. The impact on transportation facilities in the region of trains transporting the rail to the construction site should be assessed.

Solid waste generated during construction consists of scrap rails, ties, bridge timber, and track fastenings. Although some of this material is usually salvaged as scrap, much of it will be disposed of in local landfills. The impact on publicly owned landfills, if used, should be described. If DOE develops new landfills, their location should be described and the impacts assessed.

The draft EIS should clearly define construction haul routes and how these routes affect local communities and the public's ability to utilize the public lands in a multi-use capacity.

## **Impacts on Emergency Response, Public Health, Security, Public Safety, and Operational Oversight Resources**

The draft EIS must assess the adequacy of emergency response and security resources (local, state, federal) all along the proposed rail lines and identify the measures required to assure the safety and security of the shipments in a location-specific manner. Impacts to local and state first responders and public safety personnel are especially troublesome, since the proposed rail line's location in isolated sections of rural Nevada makes response to any sort of incident or accident extremely problematic and response to a nuclear incident especially difficult. Impacts should be assessed in relation to personnel, equipment, training, funding, incident response, incident management, communications, etc.

Impacts on such State and local resources would be extensive and of long duration. Corridor emergency response personnel, including affected state agencies, will need additional training to deal with emergencies related to rail shipments of radioactive materials. Hospitals, both along the route and in Las Vegas and Reno-Sparks (the nearest regional and full-service medical facilities), would need extensive training and equipment. Such impacts will not be one-time occurrences, but will continue for as long as the rail line (or intermodal facility) remains operational. The draft EIS must, therefore, examine such impacts in a longitudinal context and assess the decades-long requirements for emergency management, emergency response, and public health and safety.

In addition to impacts related to emergency preparedness and security, the draft EIS must assess impacts to state and local agencies of operational oversight for the shipments. Such impacts include costs (in terms of funds, personnel, equipment, etc.) of continuous inspection and escort operations that will be required, whether the rail line functions independently or in concert with intermodal operations.

A degradation in emergency services provided by volunteer fire departments will be a critical impact caused by delays at at-grade crossing. When the at-grade crossing is blocked, responses to calls could be delayed. The option for the responding units would be to wait for the tracks to clear, which could cause significant delays in response.

Railroad-caused wildfires can be a significant impact on emergency services. In rural areas, residents are usually aware of the potential for lightning-caused fires and keep close watch during thunderstorms for possible wildfires. Railroad fires, however, can occur at anytime. Therefore, fires caused by railroads go undetected much longer than naturally caused wildfires. This can create much more difficult conditions for controlling the fires. Impacts of railroad-caused wildfires on emergency response services and rural residents should be assessed.

## **Areas Under Consideration for Designation as “Wilderness”**

There are a number of areas located within or adjacent to the proposed corridors that are currently under consideration for designation as federal “wilderness” areas. The Sierra Club and others commented on this issue at the House of Representatives Railroad Subcommittee hearing in Las Vegas on March 5, 2003. That testimony is incorporated by reference in these comments. DOE must assess the impacts of the proposed action on these wilderness study areas.

## **Impacts to Wild Horses and Burros**

The federal Wild Horse and Burro Act guarantees each herd full access to herd management areas as delineated by the Bureau of Land Management and assures that horses and burros maintain their free roaming nature. The proposed draft EIS must identify all possible impacts to wild horses and burros within the areas affected by the rail corridors and the cumulative impacts to each herd. Any construct or other activities associated with the proposed action must take into consideration special seasonal impacts, such as foaling season and migration. Impacts of the project affecting access to water sources and restriction of movement to and from or within management areas must be identified and addressed.

## **Impacts to Agriculture**

The Nevada Department of Agriculture has posed a number of questions that must be addressed through the draft EIS and DOE NEPA process. These include:

1. How will the withdrawal of BLM land affect current permitted uses of BLM-managed lands? Does DOE have to recognize existing uses of public land such as grazing, mining etc. and compensate or mitigate adverse impacts?
2. What affect does the FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLMPA) have upon the proposed railroad, input from the public and effects upon other multiple uses of the public lands that would be affected?
3. Livestock, horses and wildlife have utilized the areas within and around the proposed rail corridors with few to no fences and/or obstructions to their movement for more than 100 years. Numerous livestock operations have developed under this open range characteristic that has become increasingly rare in the west. Wild horses and wildlife have also adapted to this open range characteristic. Fencing a corridor along 200+ to 300+ miles of Nevada’s open range will radically change the biological and cultural character of the State and have tremendous biological and economic impacts, creating a myriad of problems

for livestock and wildlife. How does DOE intend to determine and document these impacts and how do they intend to mitigate, if possible, or compensate the state, its industries and its citizens for these impacts?

4. If the rail corridor is fenced, how wide will the easement be, will the livestock interests be able to have inputs as to fencing specifications for excluding livestock, and what measures will be offered as mitigation for forage loss within the easement area and added cost of operation due to the fence, i.e., develop new water, loss of distribution of livestock, increased travel to manage livestock, etc.?
5. Who will have responsibility for maintenance of any fencing projects that might become necessary as part of the proposed project?
6. If the rail is not fenced and livestock losses occur as a result of rail traffic, what will be the process of documentation and compensation for the lost livestock?
7. Has the DOE identified leks and/or nesting, brooding or winter habitat for sage grouse in the proposed alignments? How will DOE determine and document potential impacts to sage grouse specifically and other sensitive wildlife species. What mitigation factors is DOE going to use to reduce direct impacts (habitat loss/fragmentation, lost water sources) and indirect impacts (fencing and transmission lines, increase in predator advantages in habitat, etc.)?
8. How does DOE intend to prevent introduction and spread of invasive and other weeds through their disturbance of the land for any part of construction of the rail line or support roads and support facilities? What steps will be taken to assure consistent and effective control of invasive weed species over the life of the railroad?
9. Does DOE intend to re-vegetate disturbed areas, and with what plant species? Will state agencies, BLM and permittees be included in the determination of re-vegetation species (re-vegetation may result in an attractive nuisance for livestock and wildlife)? The accomplishment of successful re-vegetation is highly dependent upon proper planting, seed viability and climate (i.e., moisture and growing temperatures). Does DOE intend to irrigate re-vegetation areas if and when necessary?
10. How will both the Caliente and Schurz-Mina rail lines affect public access across the rail and support roads? Will permittees be able to extend pipelines/water lines and support roads across the rail line to improve livestock distribution and decrease potential conflicts between the rail line and livestock operations?
11. What kind of security will DOE implement along the rail corridor? What limitations will be placed on the livestock permittees and general public with respect to normal land use activity?

12. DOE will require water for construction of the rail line, support facilities and ongoing rail and truck operation. How will DOE determine, document, and compensate existing water right holders for any negative impacts?
13. Will water developed as part of the project be available for livestock, wildlife, recreation, safety and emergency services?
14. How will DOE compensate the state and counties for the degradation of paved and gravel roads due to heavy traffic during construction and the increased traffic resulting from ongoing operations of the rail line and truck traffic to Yucca Mountain?
15. Will DOE assist counties and rural communities that have limited resources meet the increased demands for public services due to the influx of construction and support personnel and their families?

### **Impacts on Law Enforcement and Public Safety**

The proposed rail line from Caliente to Yucca Mountain for the transportation of nuclear waste to Yucca Mountain lies entirely within the Central Command of the Nevada Highway Patrol Division (Division). The proposed Schurz-Mina rail corridor spans the Northern and Central Commands. While the Nevada Department of Public Safety/Highway Patrol Division does not have regulatory authority that relates to rail or transportation of materials by rail, State policy would require the Division to inspect and escort shipments before proceeding to the repository. Consequently, in addition to any other training or resources required by local government agencies or local first responders, DOE will need to assess resources required by the State to carry out mandated responsibilities and address impacts, including but not limited to the inspection, security, and escort of these shipments. This would also be a requirement for all legal-weight and heavy-haul truck shipments as well.

Some impacts of this shipment campaign, but not necessarily all, would be:

- Required inspection and escort personnel
- Inspector and escort vehicles and other necessary equipment
- Inspector and escort personnel training and related expenses
- Inspection facilities at points of entry in the State
- Enroute facilities for inspection and repair of vehicles
- Radio communication system in transportation corridor and connect ability to other State Public Safety and local government agencies communication systems

Should an incident occur, additional public safety concerns include the probability of the closing of US 95 for extended periods of time (other routes may also be impacted as well and need to be evaluated) to allow first responder and other recovery vehicles and personnel to enter the area and perform recovery and mitigation. Some possible consequences that have impacts requiring assessment could involve:

- Rerouting vehicular traffic
- Indefinite route closure
- Negative impact on Division resources and operations due to maintaining perimeter control and routine patrol for the areas affected

An incident need not necessarily involve the breach of a shipping container to cause significant impacts. It could involve a derailment or other situation requiring a train to stop for a period of time for mechanical repair or a truck shipment, legal-weight or heavy-haul, unable to move because of a mechanical problem or waiting for repair.

During the construction phase of the proposed rail line, the Division will be impacted by a significant increase in vehicle traffic that must be addressed in the draft EIS (i.e., increased personnel, training, vehicles, and equipment).

The issues addressed above need to be extended to the entire statewide Highway Patrol Division because of the large geographical area the proposed corridor alternatives would cover, as well as the resources that may have to be drawn upon across Command areas.

Finally, the comments the Highway Patrol Division made in response to the Department of Energy's Draft Environmental Impact Statement for the Yucca Mountain Repository in November 1999 should be considered and are incorporated by reference.

### **Radiological Impacts of Routine Rail Shipments**

In the draft EIS, DOE must provide a thorough evaluation of potential radiation exposures from routine transportation activities, the health effects resulting from such exposures, the potential socioeconomic impacts of routine radiation regardless of health effects, and any DOE plans for mitigating routine radiation exposures. The draft EIS must address the potential for non-lethal health consequences, that is health effects other than, or in addition to, latent cancer fatalities. The draft EIS should also provide a full discussion of relevant issues in the health physics community, including the current debates over: background radiation levels from natural and man-made sources; use of different dose conversion factors for different health effects and different population groups; the linear no-threshold theory; and the radiation hormesis theory.

The Repository Final EIS acknowledged that routine radiation from shipping casks poses a significant health threat to certain transportation workers. Nevada studies estimate that cancer risks would be 50% higher than DOE estimates and that other health risks ignored by DOE, such as risks to pregnant female workers and their unborn children, could be 7-10 times higher than cancer risks.

Tens of thousands of urban Clark County or Washoe County residents and their real properties would be exposed to small additional radiation doses as a result of rail shipments to Yucca Mountain via the proposed new rail line within the Caliente or Schurz-Mina corridors. Moreover, these shipments could continue for a period of four

decades or more. The potential health impacts of this increase in radiation dose must be evaluated.

While additional studies are needed, rail shipments to Yucca Mountain would clearly create elevated radiation exposure zones on private properties along the route. The same elevated exposure zones would be created at certain locations along highway routes used by legal-weight truck shipments and/or heavy-haul truck shipments to Yucca Mountain. Further analysis of socioeconomic impacts must consider the extent to which DOE's proposed action constitutes a taking of property rights.

### **Impacts of Severe Rail and Truck Accidents**

In the draft EIS, DOE must thoroughly and completely re-examine the impacts of severe rail accidents, and must specifically evaluate the consequences of a maximum reasonably foreseeable rail accident in urban Clark and Washoe counties, as well as in rural Nevada. Since some legal-weight truck shipments would be required under the mostly rail scenario or under reasonable alternatives, the draft EIS must also include an updated analysis of severe truck accidents. DOE accident analyses must reflect the changes in expected radiological characteristics of repository shipments noted in our comments on the description of the proposed action.

DOE must address Nevada's concerns about the misapplication of probabilistic risk analysis generally, and specifically address Nevada's concerns about the use of NUREG/CR-6672 in transportation accident impact analyses. This includes Nevada's contention that the maximum reasonably foreseeable accident scenarios for Nevada are not the same as for national transportation. Unique local conditions in Nevada require special consideration of truck and rail accidents involving commercial and military explosives; massive infrastructure failures resulting from severe earthquakes or floods; and a rail or truck cask involved in an accident with a military aircraft carrying live munitions or inert practice bombs.

In both the Yucca Mountain Repository Draft and Final EISs, DOE acknowledged that a very severe highway or rail accident could release radioactive materials from a shipping cask, resulting in radiation exposures to members of the public and latent cancer fatalities among the exposed population, as well as costly cleanup and recovery operations.

In the Repository Draft EIS, DOE evaluated a "maximum reasonably foreseeable accident scenario" involving a rail cask at a generic urban location. Following the accident severity categories designated by the NRC Modal Study, DOE estimated the consequences of the most severe (category 6) rail accident using the RISKIND computer code. DOE estimated that the accident would release and disperse enough radioactive material to inflict a collective population dose of 61,000 person-rem (enough to give 61,000 persons a one rem dose) and cause about 31 latent cancer fatalities.

In the Repository Final EIS, DOE changed the basis of its transportation risk assessment, relying solely upon a controversial new NRC contractor report prepared by Sandia

National Laboratories (NUREG/CR-6672). As a result, the DOE-estimated consequence of the “maximum reasonably foreseeable accident scenario” involving a rail cask was reduced to a collective dose of 9,900 person-rem and 5 latent cancer fatalities. [FEIS, Pp. 6-45 to 6-47, 6-49 to 6-50]

The FEIS acknowledged that the July 2001 Baltimore rail tunnel fire was so severe that it would have resulted in a release of radioactive materials if a rail cask had been involved. [FEIS, p. 6-50] The FEIS also acknowledged that cleanup costs following a severe transportation accident could range from \$300,000 to \$10 billion. [FEIS, p. J-73]

As part of its review of the Repository Draft EIS (DEIS), the State of Nevada commissioned several SNF accident consequence analyses by Radioactive Waste Management Associates (RWMA). In 2000, RWMA reexamined the DEIS truck and rail accident estimates, using the RADTRAN and RISKIND computer models and a range of credible alternative assumptions. In 2001, RWMA estimated the consequences of a rail SNF accident similar to the July 2001 Baltimore rail tunnel fire. Also in 2001, RWMA studied the consequences of credible worst-case truck and rail accidents at representative urban and rural locations along potential Nevada highway routes. These studies concluded that DOE systematically underestimated the consequences of severe transportation accidents. The results of these studies are reported in the State of Nevada impact report, “A Mountain of Trouble: A Nation at Risk – Report on Impacts of the Proposed Yucca Mountain High-Level Nuclear Waste Repository,” that can be accessed on the web at <http://www.state.nv.us/nucwaste/yucca/impactreport.pdf>, and are incorporated by reference as part of these comments.

RWMA conducted a study of credible worst-case rail accidents at representative urban and rural locations along potential Nevada rail routes. Using the same Modal Study accident severity categories considered in the Repository Draft EIS, RWMA evaluated category 5 rather than category 6 accidents. RWMA assumed that the accidents involved hotter SNF than DOE assumed and used higher cesium gap inventory estimates. DOE assumed 26-year cooled fuel in the DEIS. Current rail cask designs assume shipment of 10-year cooled SNF. RWMA assumed that 5-year cooled fuel, which has a 30 percent higher fission product inventory, represented a credible worst-case accident source term. Table 1 compares the RWMA and DOE accident scenarios.

**Table 1. Comparison of RWMA and Repository Draft EIS Accident Scenarios**

<b>Yucca Mountain DEIS</b>	<b>RWMA</b>
“Maximum Reasonably Foreseeable” accident scenario based on probability	No estimate of probability
Risk and Consequence Assessments performed	Consequence Assessment only
Estimated consequences for severity category 6 truck and accidents in urban locations and a severity category 6 truck accident in a rural location	Estimated consequences for severity category 5 and 6 truck and rail accidents in urban and rural locations
26 year-cooled PWR fuel having a burnup of 39,560 MWD/MTU assumed	5 year-cooled PWR fuel having a burnup of 39,560 MWD/MTU assumed
0.3% of cesium inventory assumed in Fuel-Clad Gap	9.9% of cesium inventory assumed in Fuel-Clad gap
Meteorological conditions based on national averages	Site-specific meteorological averages used
CRUD inventory not explicitly modeled	Assumes that all CRUD is released to environment in the event of a rod failure
No discussion of economic impacts	Economic impacts, including cost of decontamination and evacuation, discussed

For each accident scenario, RWMA provided two separate consequence assessments: a category 5 and category 6 accident. The category 6 accident scenario is considered by DOE to be the most severe accident that could credibly happen en route to the Yucca Mountain Repository. For the specific accident locations chosen in this study, RWMA concentrated on the category 5 accident scenarios, after judging them to be the most credible severe accidents. Therefore, the accidents postulated in the RWMA report are not “worst-case” scenarios in the sense that one could not imagine a worse situation happening. Rather, they are severe, yet credible, accidents, with the understanding that they are meant to be representative of the types of severe accidents that could happen in different areas of Nevada and the country.

For the urban accident evaluation, a location was identified on the Union Pacific (UP) rail line between Flamingo Avenue and Spring Mountain Road in Las Vegas. Along this stretch, the UP goes underneath I-15 and, at one point, is approximately 20 feet from the parking lot of a hotel. Potential accident scenarios include derailment of a runaway train and/or collision with a train hauling explosive or flammable materials. There is a petroleum pipeline running alongside the railroad tracks at this point, creating the possibility for a severe thermal environment in the event of an accident. The same meteorological data used in the Las Vegas truck accident scenario was also employed here.

A rural rail accident location was also identified on the Union Pacific line that runs near I-80 in Elko County at the entrance to the Carlin Tunnel. This accident location was chosen because it is upwind of farming areas, a major river, and the City of Elko. An accident at this location would also likely cause the closure of I-80. Hazardous materials are routinely shipped along this route, including tanker shipments of propane to a terminal at Beowawe. In the event of a derailment involving cars containing flammable materials, the tunnel creates the possibility of a long-duration fire. Wind data was obtained from the Elko Airport, approximately 20 miles to the northeast of the proposed accident location.

Two computer programs, RISKIND and HotSpot, were used to develop contaminant plumes for the two rail accident scenarios. Both use standard Gaussian plume dispersion equations to estimate airborne concentrations and ground deposition of radionuclides. The SNF inventory obtained from RISKIND was used to develop the spent fuel inventory for use in both computer simulations.

RWMA assumed average, site-specific meteorological conditions and wind speeds. RWMA further assumed a severe impact would lead to a ground level puff release of radioactive particulates. The release estimates did not consider the accident scenario involving “fire-only” conditions, which would result in a more protracted release of material and a higher effective release height.

Following the rail accident, acute radiation doses due to inhalation of a passing radioactive cloud would be in the hundreds of rems close to the release location. This is a thousand times what a person receives from background radiation in a year. Thousands of people are likely to be in the downwind path. RWMA estimated that over 138,000 persons would be affected by a severe rail accident releasing radioactive material in Las Vegas. Persons indoors would also be exposed. If ventilation systems were not shut off, radioactive particulates would settle within hotels and other buildings, contaminating rugs, furniture, and beds, causing a radiation dose to those inside.

Discussions with emergency personnel in Las Vegas and Clark County clearly indicate the accident would overwhelm local response capabilities. Before local emergency responders could accurately assess the problem, the radioactive plume would have already contaminated an extensive area. Radioactive particulates settling on roads and highways are likely to be spread by traffic, possibly contaminating distant locations and extending the area of contamination past that assumed in this study. This may result in the contamination of many more people than was estimated in the report.

Given the high number of people exposed, local responders would not be able to identify, let alone effectively quarantine, contaminated people. Thus, it would be extremely difficult to stop the spread of contamination. Initial decontamination efforts would probably be limited to emergency responders and people in the closest vicinity of the accidents. Decontamination of the affected population in general would be a massive effort.

Evacuation would be difficult at best. Spontaneous evacuation by people not in the contaminated area would probably occur in great numbers, making the targeted evacuations much more difficult to complete. At a minimum, the evacuation of highly contaminated areas would be necessary. For a rail accident, evacuation would have to be in a radius greater than one kilometer; this would represent a large number of people if the accident took place within downtown Reno-Sparks or near the Las Vegas Strip. In Las Vegas, Reno and Elko, for example, evacuation would be complicated by the need to close the segments of I-15 and I-80 contaminated by the plume.

In the case of an accident in Las Vegas, consideration would have to be given to closing McCarran airport in order to prevent the migration of contaminated persons, while in the Reno-Sparks area, the Reno-Cannon International Airport could be affected. All passengers would have to be screened for contamination. This would require a huge amount of resources that could be better utilized dealing with the major issues.

The incident would overwhelm the capability of the local medical community. Blood and urine samples of contaminated people should be taken to track the levels of contamination and exposure, but this would be very difficult given the number of contaminated and potentially contaminated individuals. Mental health resources would be overwhelmed as well.

Unless radionuclides, particularly cesium, were removed from surfaces, remaining residents would be exposed for long time periods. Complete decontamination would be prohibitively expensive and would also expose workers; a balance would take place between clean-up costs and long-term radiation exposures. RWMA chose the EPA's Protective Action Guide as criteria for decontamination that assumes a person should not receive more than 5 rems over a 50-year period, including initial inhalation due to the passing cloud. If areas are not decontaminated, RWMA estimated between 6,000 and 41,000 latent cancer fatalities would result from exposure to radiation resulting from the accident in Las Vegas, depending on the risk model. If radioactive contaminants were not remediated, there would be continuous direct gamma exposure to remaining residents. Further, this would result in a tremendous concomitant economic cost to the tourist industry. Social stigma costs are beyond the scope of this report.

Using the economic model of RADTRAN 5, evacuation and decontamination in Las Vegas would cost \$15.4 billion for the category 5 accident evaluated by RWMA. The same costs for the category 6 accident described in the DEIS would be \$189.7 billion. These potential costs greatly exceed the amount of insurance coverage held by nuclear utilities or the Department of Energy. This raises the question of how such an expensive endeavor would be financed. Government financing of cleanup would require an act of Congress, which would significantly delay remedial action.

While the population densities are obviously lower in a rural area, a rail accident near the Carlin Tunnel in Elko County would also have serious consequences. RWMA did not separately calculate decontamination costs for the Elko County accident, but previous

studies indicate cleanup could cost as much as \$500 Million to \$1 Billion. [Sandquist, et al., 1985] If areas were not decontaminated, between 100 and 600 latent cancer fatalities would result from exposure to radiation resulting from the rail accident.

I-80 is the main route across Northern Nevada, as well as a major cross-country thoroughfare. A rail accident that spread radioactive contamination could force closure of I-80 and either leave cars trapped or have vehicles spread the contamination miles down the highway. A rail accident near the Carlin Tunnel, in a canyon adjacent to the Humboldt River, would lead to contamination of the river bed and water for miles downstream and leading to accumulations in slowly moving sections of the river. Use of the river for recreation or drinking would be curtailed for years to come.

The RWMA study showed the potentially disastrous consequences of an accident leading to the release of radioactive material from a spent fuel transportation cask. It also underscored the importance of preparation of emergency response for such an accident. Acknowledgement of the potential for disaster, even if the probabilities are not high, is important in attempting to prepare for an unprecedented spent fuel transportation campaign.

The tables below summarize the findings of the RWMA study. Table 2 presents a comparison of the Las Vegas rail accidents with the urban 'maximum reasonably foreseeable' accident scenarios listed in the DEIS. Table 3 presents impact estimates for the Elko County accidents. DOE did not evaluate a rural 'maximum reasonably foreseeable' accident scenario in the DEIS. The consequences estimated by RWMA are significantly higher than those estimated in the DEIS, primarily due to the assumption of a higher population density and an increased release fraction for cesium.

Table 2. Comparison of RWMA and Repository Draft EIS  
Urban Rail Accident Consequence Assessments

	<b>Urban Rail Accident</b>			
	State of Nevada, Cat.5 <sup>a</sup>	State of Nevada, Cat.6 <sup>a</sup>	YM DEIS, Cat. 5 <sup>a</sup>	YM DEIS, Cat. 6 <sup>a</sup>
Acute (24-hour) Population Dose (person-rem) <sup>b</sup>	26,171	not calculated	Not calculated	Not calculated
Expected Latent Cancer Fatalities <sup>c</sup>	13-444	not calculated	Not calculated	Not calculated
1-year Population Dose (person-rem) <sup>b</sup>	915,968	not calculated	Not calculated	61,000
Expected Latent Cancer Fatalities <sup>c</sup>	458-2,931	not calculated	Not calculated	31
50-year Population Dose (person-rem) <sup>b</sup>	12,771,207	not calculated	Not calculated	Not calculated
Expected Latent Cancer Fatalities <sup>c</sup>	6,386-40,868	not calculated	Not calculated	Not calculated
Dose to Maximally Exposed Initial (rem) <sup>d</sup>	22.5	224	Not calculated	26
Area contaminated to greater than 5 rem long-term dose (km <sup>2</sup> )	104.7	1208.4	Not calculated	Not calculated

Table 3. Comparison of RWMA and Repository Draft EIS  
Rural Rail Accident Consequence Assessments

	<b>Rural Rail Accident</b>			
	State of Nevada, Cat.5 <sup>a</sup>	State of Nevada, Cat.6 <sup>a</sup>	YM DEIS, Cat. 5 <sup>a</sup>	YM DEIS, Cat. 6 <sup>a</sup>
Acute (24-hour) Population Dose (person-rem) <sup>b</sup>	393	not calculated	not calculated	not calculated
Expected Latent Cancer Fatalities <sup>c</sup>	0.2-1.3	not calculated	not calculated	not calculated
1-year Population Dose (person-rem) <sup>b</sup>	13,760	not calculated	not calculated	not calculated
Expected Latent Cancer Fatalities <sup>c</sup>	7-44	not calculated	not calculated	not calculated
50-year Population Dose (person-rem) <sup>b</sup>	191,859	not calculated	not calculated	not calculated
Expected Latent Cancer Fatalities <sup>c</sup>	96-614	not calculated	not calculated	not calculated
Dose to Maximally Exposed Initial (rem) <sup>d</sup>	26.9	267	not calculated	not calculated
Area contaminated to greater than 5 rem long-term dose (km <sup>2</sup> )	118.6	1202	not calculated	not calculated

The Nevada-sponsored study of the July 2001 Baltimore rail tunnel fire concluded that it would have resulted in significant release of radioactive materials. It burned for more than three days with temperatures as high as 1500°F. A single rail cask in such an

accident could have released enough radio-cesium to contaminate an area of 32 square miles. Failure to clean up the contamination, at an estimated cost of \$13.7 billion, would cause 4,000 to 28,000 cancer deaths over the next 50 years. Between 200 and 1,400 latent cancer fatalities would be expected from exposures during the first year. An NRC study of the Baltimore accident concluded there would not have been a radioactive release if the accident had involved a rail cask using a welded internal canister. The Caliente Rail Draft EIS should include a thorough review of the Baltimore fire studies by NRC and Nevada.

The Nevada Agency for Nuclear Projects has recommended to DOE the following measures for comprehensive transportation risk management:

1. A comprehensive risk assessment (CRA) should cover all transportation system phases, events, and consequences as suggested by Golding and White (1990). CRA calculates probabilities only where there is existing data, theories, and models that are sufficient to support use of rigorous quantitative methods, and uses sensitivity analysis to illustrate impacts of differing assumptions and variations in quality of data.
2. CRA should be used as a working risk management tool throughout the life cycle of the Yucca Mountain project, with ongoing public participation.
3. CRA should be the basis of risk communication throughout life cycle of the Yucca Mountain project.

Comprehensive risk assessment is a precursor of a growing trend in risk analysis and regulation away from “point estimates” in which a single number is presented as a meaningful risk estimate. Instead, a range of possibilities is presented with an associated likelihood, when that likelihood may be estimated. Nevada recommends that DOE use comprehensive risk assessment as a substitute for the probabilistic risk assessment approach used in NUREG/CR-6672.

The Nevada Agency for Nuclear Projects has recommended to DOE the following measures for accident prevention and emergency response:

1. Maximize use of regional organizations such as Western Governors Association (WGA) and Western Interstate Energy Board (WIEB) for planning, implementation, and program evaluation.
2. Coordinate with relevant corridor Indian Tribes and local governments.
3. Develop a comprehensive safety program modeled after WGA-State-DOE WIPP Transportation Program.
4. Adopt the WIEB (September 1994) proposal for evaluation and final designation of preferred shipping routes.
5. Implement Section 180(c) for financial assistance to state, local, and tribal governments through rulemaking.
6. Revise the DOE Plan for Privatization of Transportation Services to emphasize safety and public acceptance.

The Nevada Agency for Nuclear Projects has recommended to DOE the following measures for development of a preferred transportation system for all shipments to Yucca Mountain:

1. Develop dual-purpose casks for at-reactor storage and transport.
2. Ship the oldest fuel assemblies first, that is, those with at least 20 years at-reactor cooling.
3. Adopt the transportation modality that makes maximum use of rail.
4. Make mandatory use of dedicated trains, special safety protocols, and special car designs as recommended by the American Association of Railroads.
5. Insist that DOE and carriers make early identification of preferred cross-country mainline routes in consultation with stakeholders.
6. Encourage early involvement of corridor states and Indian Tribes, including financial assistance under Section 180(c), as part of the route selection process.

Regarding full-scale cask testing, NRC regulations specify rigorous accident performance standards for spent fuel shipping casks. NRC does not require full-scale physical testing to demonstrate compliance with these regulations, and none of casks currently in use have been tested full-scale. NRC has proposed demonstration testing of one rail cask, and possibly also one truck cask, as part of the Package Performance Study (PPS). The State of Nevada has recommended an alternative approach to cask testing. Nevada also recommends greater involvement by the Federal Railroad Administration in development of PPS testing protocols. Because of the extremely heavy weight of the new cask-railcar combinations (455,000 lbs as opposed to 255,000 lbs for a normal railcar), NRC should not assume that existing data reflect the type, severity, and frequency of accidents that may occur with the new railcars.

The Nevada Agency for Nuclear Projects has recommended to DOE and NRC the following measures for full-scale cask testing:

1. A meaningful stakeholder role in development of testing protocols, selection of test facilities, and input on personnel.
2. Full-scale regulatory testing (sequential drop, puncture, fire, and immersion) prior to NRC certification, or DOE procurement, of all casks designs used for shipments to Yucca Mountain.
3. Additional testing (casks, components, models) and computer simulations to determine cask performance in extra-regulatory accidents and to determine failure thresholds.
4. Reevaluation of the Modal Study findings, and if appropriate, revision of NRC cask performance standards.
5. Evaluation of the costs and benefits of destructive testing of a randomly selected production model cask.

The Association of American Railroads has endorsed full-scale cask testing and has specifically recommended to the NRC that the testing program be designed to determine

cask failure thresholds and to compare these failure thresholds with the forces generated in real world accidents.

### **Impacts of Successful Terrorist Attacks or Sabotage Incidents**

In the draft EIS, DOE must thoroughly and completely re-examine the impacts of successful terrorist attacks or sabotage incidents against rail shipments and do so in a manner that accounts for unique conditions and factors associated with the rail corridors being evaluated in the draft EIS. Since some legal-weight truck shipments would be required under the mostly rail scenario or under reasonable alternatives, the draft EIS must also include an updated analysis of terrorism and sabotage against truck shipments. Multiple shipments of legal-weight truck casks by rail (5 casks per train) to an intermodal facility in Nevada, as DOE suggested in its March 10, 2004 Supplemental Analysis, represent a special case for vulnerability assessment. DOE analyses must reflect the changes in expected radiological characteristics of repository shipments noted in our comments on the description of the proposed action. DOE should also consider Nevada's recommendations for enhanced shipment security and consequence assessment as presented in Nevada's petition to the NRC for rulemaking, Docket PRM 73-10, in June 1999.

According to studies sponsored by DOE and NRC in the 1980s, an off-the-shelf, Korean War-era, military demolition charge could breach the wall of a truck cask, deeply penetrate the cask interior, and eject one-percent of the spent fuel cargo, including a small but dangerous respirable release. U.S. Army peer review of these studies confirmed the findings. The Army reviewers added that the reference weapon would completely perforate current generation truck casks (which have thinner walls than the obsolete cask that was used during this test) and that the use of two explosive devices, one to breach the cask wall and another to disperse the cask contents, could significantly increase the amount of radioactive materials released. Other reviewers commented that commercial shaped-charge explosives and military antitank weapons could cause equal or greater damage to a cask and its contents, and that the release and dispersion of radioactive materials could be greatly increased if coupled with the use of incendiary devices.

In 1999, DOE sponsored a study of cask sabotage by Sandia National Laboratories (SNL) in support of the Repository Draft EIS. SNL re-evaluated the earlier tests and conducted additional simulations and analyses, but did not perform any additional full-scale or scale model tests. This research concluded both truck and rail casks could be breached by military shaped charges and by antitank weapons. SNL concluded that the respirable release would be six times larger than previously reported, due mainly to blowdown from the pressurized fuel rods. The SNL study also found that if the weapon used fully perforated the cask, the amount of respirable radioactive material released could be ten times greater than even these new release estimates.

In 1998, an additional test of rail cask vulnerability was sponsored by a private company, International Fuel Containers, at the U.S. Army Aberdeen Test Center. In that test, U.S. Army experts demonstrated that a TOW missile warhead could breach a large, nodular

cast iron cask of the type currently used for rail transport in Europe. While the European cask that was tested is not certified for transport use in the U.S., it is similar to the new U.S. rail casks in its overall design, wall thickness, and capacity. A study prepared for the State of Nevada compared the vulnerability of cask walls constructed of iron, steel, and steel-lead-depleted uranium. That study concluded the new U.S. casks being designed for rail shipments to Yucca Mountain would be equally vulnerable to an attack using a TOW missile, and that the TOW missile would completely perforate the truck cask design assumed for Yucca Mountain shipments.

In the Repository Draft EIS, DOE estimated that a successful attack on a GA-4 truck cask in an urbanized area under average weather conditions would result in a population dose of 31,000 person-rem, causing about 15 cancer fatalities among those exposed to the release of radioactive materials. An attack using the same weapon against a large rail cask under the same conditions was estimated to result in a population dose of 4,900 person-rem, causing about 2.4 cancer fatalities. [DEIS, pp. 6-33 to 6-34]

In the Repository Final EIS, DOE updated its sabotage analysis, assuming the cask contained more radioactive SNF, assuming more radioactive materials released, and assuming a higher future average population density for U.S. cities. The Repository Final EIS estimated that the same successful attack on a truck cask would result in a population dose of 96,000 person-rem and 48 latent cancer fatalities. An attack using the same weapon against a large rail cask under the same conditions was estimated to result in a population dose of 17,000 person-rem, causing about 9 cancer fatalities. [FEIS, Pp. 6-50 to 6-52] In neither case did DOE evaluate any environmental impacts other than health effects. In particular, DOE ignored the economic impacts of a successful act of sabotage in both the Repository Draft and Final EIS. Cleanup requirements would likely be similar to a worst-case transportation accident, estimated by DOE to cost between \$300,000 and \$10 billion.

Analyses prepared for Nevada by RWMA estimated sabotage impacts would be considerably greater than the DOE estimates. RWMA replicated both the Draft and Final EIS sabotage consequence analyses, using the RISKIND model for health effects and the RADTRAN model for economic impacts, the SNL study average and maximum inventory release fractions, and a range of population densities and weather conditions.

The Nevada-sponsored study of the Repository Final EIS scenario concluded that an attack on a GA-4 truck cask using a common military demolition device could cause 300 to 1,800 latent cancer fatalities, assuming 90% penetration by a single blast. A similar attack on a large rail cask could cause 50 or more latent cancer fatalities. Full perforation of the truck cask, likely to occur in an attack involving a state-of-the-art anti-tank weapon, such as the TOW missile, could cause 3,000 to 18,000 latent cancer fatalities. Cleanup and recovery costs would exceed \$5 billion for the attack on a rail cask and \$10 billion for the attack on a truck cask.

Beyond attacking a cask with explosives, terrorists might commit radiological sabotage by causing a devastating transportation accident. Published terrorism risk assessments

have not, to date, considered the possibility that an intentional, human-initiated event could disperse radioactive material from a shipping cask, let alone considered the implications of a combined bombing and accident tactic. Concerns about terrorism have prompted calls for reappraisals of risk management and assessment practice in order to better understand risk.

Well before the terrorist suicide attacks of September 11, 2001, concern about the terrorist threat to repository shipments led Nevada's Attorney General to file a petition for rulemaking with the NRC in June 1999. In the petition, Nevada documented the vulnerability of shipping casks to high-energy explosive devices. Nevada also submitted evidence that shipments to a national repository would be dramatically different from past shipments in the United States, and that these differences would create greater opportunities for terrorist attacks and sabotage. The petition requested a general strengthening of the current transportation safeguards regulations and a comprehensive reexamination of the consequences of radiological sabotage.

The NRC published Nevada's petition (Docket PRM-73-10) in the *Federal Register* on September 15, 1999, and accepted public comments through February 2000. The Western Governors Association endorsed Nevada's petition on behalf of 18 western States. Five other states (LA, MI, OK, VA, and WV) also endorsed all or part of the petition. As of this date, the NRC has still not addressed the substance of Nevada's petition.

The State of Nevada has summarized its terrorism and sabotage concerns in two main areas: Pre-September 11, 2001 concerns (prevention and mitigation regulations and risk assessment protocols); and post-September 11, 2001 concerns (emerging factors relative to terrorism and new requirements for risk assessments). These are summarized below.

The State of Nevada petitioned the NRC to amend the following regulations to better deter, prevent and mitigate consequences of radiological sabotage against spent fuel shipments:

1. Reexamine Design Basis Threat for Radiological Sabotage with the intention of creating a transportation specific model at least as robust as the fixed site model - 10 C.F.R. 73.1(a)(1)
2. Expand Definition of "Radiological Sabotage" - 10 C.F.R. 73.2.
3. Strengthen Requirements for Advance Approval of Routes - 10 C.F.R. 73.37(b)(7).
4. Adopt New Requirements for Planning and Scheduling - 10 C.F.R. 73.37(b)(8).
5. Strengthen Escort Requirements for Shipments by Road - 10 C.F.R. 73.37(c).
6. Strengthen Escort Requirements for Shipments by Rail - 10 C.F.R. 73.37(d).
7. Adopt New Regulations to Require All Rail Shipments be made in Dedicated Trains - 10 C.F.R. 73.37(d).

The State of Nevada has petitioned the NRC to conduct a comprehensive assessment of the consequences of terrorist attacks that have the capability for radiological sabotage:

1. Assess attacks against transportation infrastructure used during nuclear waste shipments.
2. Assess attacks involving capture of a nuclear waste shipment and use of high-energy explosives against a cask or casks.
3. Assess direct attacks upon a nuclear waste shipping cask or casks using antitank missiles or other military weapons.

In light of lessons learned from 9/11, the State of Nevada recommends that DOE and NRC transportation terrorism risk assessments consider such emerging factors as:

1. Attacks involving multiple weapons and/or combinations of weapons designed to maximize release and dispersal of radioactive materials.
2. Attacks involving coordinated use of hijacked vehicles, including tanker trucks.
3. Attacks involving large groups of well-trained adversaries, including suicide attacks.
4. Attacks involving terrorist infiltration of trucking and railroad companies (or what is known as the active insider).
5. Attacks at locations with a highly symbolic social, political, or economic value.

In light of lessons learned from 9/11, the State of Nevada recommends that DOE and NRC transportation terrorism risk assessments address:

1. Standard socioeconomic impacts, including cleanup and disposal costs and opportunity costs to affected individuals and business.
2. Economic losses resulting from public perceptions of risk and stigma effects.
3. Impacts on emergency responders and recovery workers, including long term monitoring, care, and health benefits for these first responders.

The draft EIS should also consider the impacts of criticality as a result of a successful terrorist attack. Such an eventuality could greatly exacerbate the impacts of such an attack and lead to significant public health and environmental consequences.

### **Railroad Safety Impacts**

The draft EIS must comprehensively assess impacts to safety from issues raised in the lawsuit brought by workers and employees against the Burlington Northern and Santa Fe Railway Corporation [filed May 2004 in the U.S. District Court for the District of Iowa, Western Division]. That petition was attached to the State of Nevada's comments on DOE's April 8, 2004 Federal Register Notice (State of Nevada Comments on DOE's Notice of Intent to Prepare and Environmental Impact Statement for Alignment, Construction, and Operation of a Rail Line to a Geologic Repository at Yucca Mountain, Nye County, Nevada – May 24, 2004) and is incorporated by reference into these comments. The operational safety deficiencies alleged in the litigation are systemic in nature and have direct relevance to the operation of any rail line to Yucca Mountain. The lawsuit specifically addresses increased risks and the potential for accidents involving spent fuel shipments as a result of railroad safety violations and worker intimidation. The

draft EIS must address these safety deficiencies and assess the impacts on risk, operations, and overall performance. Further, the draft EIS must address these issues in a comprehensive fashion (i.e., their effects on the national Yucca Mountain rail transportation system), not just in relation to the proposed Nevada rail lines.

### **Implications of Price Anderson Act Liability System**

In the draft EIS, DOE must provide a thorough and updated overview of the Price Anderson Act (PPA) liability system, other nuclear insurance programs, and their combined applicability to the Yucca Mountain transportation system. The draft EIS should outline the major provisions of PAA and their specific application to SNF and HLW transportation accidents and incidents.

Special attention must be given to PAA coverage of DOE shipments of civilian SNF, assuming DOE takes title to the SNF when it leaves the reactor site; PAA coverage of DOE SNF and HLW shipments from DOE facilities; any PAA coverage limitations regarding DOE contractor activities; PAA coverage of accidents or incidents involving carrier or DOE contractor negligence; and PAA coverage of terrorist attacks and/or radiological sabotage. The draft EIS should also provide an overview of non-governmental nuclear insurance pools and their applicability to the Yucca Mountain transportation system.

The draft EIS must also specifically discuss the application of PAA and other nuclear insurance to SNF and HLW shipments from the 77 shipping sites to Caliente on existing railroads, and any differences in application of PAA and other nuclear insurance to SNF and HLW shipments on the proposed new rail line from Caliente to Yucca Mountain. The draft EIS must specifically identify any DOE actions or decisions regarding the design, construction, ownership and operation of the proposed rail line that would affect or limit application of PAA.