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January 10, 2008

Dr. Jane Summerson
Mr. Lee Bishop
Environmental Impact Statement Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1551 Hillshire Drive
Las Vegas, Nevada 89134

Subject: The State of California's Comments on the U.S. Department of Energy (DOE) Draft Environmental Impact Statements Related to a Proposed Geologic Repository at Yucca Mountain, Nevada (DOE/EIS-0250F-S1D, DOE/EIS-0250F-SS2D, DOE/EIS-0369D)

Dear Dr. Summerson and Mr. Bishop:

On behalf of the State of California, I am writing to provide comments on the following U.S. Department of Energy (DOE) documents:

- *Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0250F-S1D)
- *Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada – Nevada Rail Transportation Corridor* (DOE/EIS-0250F-S2D)
- *Draft Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada* (DOE/EIS-0369D)

Our comments supplement and update those provided by Ms. Barbara Byron, California Energy Commission, at DOE's public meeting in Reno on November 19, 2007, as well as comments that the State of California previously provided on documents prepared by DOE, as required under the National Environmental Policy Act (NEPA) and the Nuclear Waste Policy Act (NWPA), for the proposed repository at Yucca Mountain, Nevada.

Having reviewed these documents, we have concluded that:

- The environmental analyses required under NEPA and the NWPA for the proposed Yucca Mountain high-level radioactive waste repository in Nevada are incomplete until the necessary route-specific transportation analyses and the analyses needed to evaluate the potential groundwater impacts in California, including impacts to the aquifer in the Death Valley region, have been completed.

- DOE has provided insufficient information upon which to make a decision on the suitability of the Yucca Mountain site and to characterize the potential impacts from the proposed actions.

- DOE has provided insufficient information and analyses on the proposed Transportation, Aging and Disposal (TAD) canister system and the at-reactor impacts compared with alternatives.

- DOE's proposal to transport 70,000 metric tons of spent nuclear fuel to Yucca Mountain would have major transportation impacts in California. The transportation of materials to the repository could impact approximately 22 California counties impacted by potential repository shipments if by truck and 24 counties for repository shipments if by rail. In addition, projected large numbers of spent nuclear fuel and high-level waste shipments from out-of-state would traverse major metropolitan areas in California, could have major impacts on transportation hubs and systems including goods movement throughout the state, and could traverse unsuitable back-country roads in San Bernardino and Inyo Counties.

- DOE's proposed action could have significant groundwater impacts in California. Additional studies are needed to fully evaluate these potential impacts.

- The Draft NEPA documents should be revised to fully characterize and bound the potential impacts in California from the proposed action.

Since the 1980s, California has provided comments on various DOE analyses, proposals, and documents related to the proposed repository and its potential impacts from the proposed actions described in these documents. We have raised concerns regarding the potential major impacts in California -- primarily transportation and groundwater impacts -- that have not been adequately addressed and analyzed by the DOE. DOE should address these major concerns in revised Draft NEPA documents and release them for public review and comment before issuing them in final form.

Our more detailed comments and specific recommendations on these documents are attached. If you have any questions regarding these comments, please contact me or Barbara Byron at (916) 654-4976.

Sincerely,

JAMES D. BOYD, Vice Chair and
California State Liaison Officer to
the U.S. Nuclear Regulatory Commission

Attachment: California's Comments on DOE/EIS-0250F-S1D, DOE/EIS-0250F-SS2D, and DOE/EIS-0369D

cc: Dan Dunmoyer, Cabinet Secretary
Mike Chrisman, Secretary for Resources Agency
U.S. Senator Dianne Feinstein
U.S. Senator Barbara Boxer
Jackalyne Pfannenstiel, Chairman
Melissa Jones, Executive Director

Attachment

STATE OF CALIFORNIA'S COMMENTS ON THE U.S. DEPARTMENT OF ENERGY'S DRAFT REPOSITORY SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT AND DRAFT NEVADA RAIL CORRIDOR/ALIGNMENT ENVIRONMENTAL IMPACT STATEMENTS

January 10, 2008

INTRODUCTION

The State of California (State) submits these comments in response to the following U.S. Department of Energy's (DOE) documents:

- *Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada (DOE/EIS-0250F-S1D)*(DSEIS),
- *Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada—Nevada Rail Transportation Corridor (DOE/EIS-0250F-S2DE)* and *the Draft Environmental Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada (DOE/EIS-0369D)* (RA EIS).

Our comments address these three documents together, since the proposed actions described in these documents are inextricably interrelated and have common issues.

The proposed actions pose significant potential new environmental impacts in California that have not been adequately evaluated. These impacts include potential groundwater impacts in the Death Valley National Park region, spent fuel transportation impacts, at-reactor impacts from the proposed new Transportation, Aging and Disposal (TAD) canister system, and potential impacts to wildlife, parks, and natural resources in California.

DOE estimates that the proposed alternate new Mina rail route to the Yucca Mountain Repository could result in 20% of the rail shipments to Yucca Mountain being routed through California. State of Nevada experts estimate that under DOE's proposed "suite of routes" approach for rail routing, 25-50% or more of the shipments to Yucca Mountain could be routed through California. Clearly, in light of such major potential impacts to California, DOE should provide potentially impacted communities along likely corridors in California an opportunity at public meetings to comment on these EISs.

The proposed actions, taken together, comprise major changes to the Yucca Mountain high-level radioactive waste management program. These changes should be adequately characterized and analyzed. These changes affect the waste disposal packages and engineered barrier systems at the repository, the thermal characteristics of the repository, the long-term performance of the waste isolation system for the

repository and how it is modeled, as well as the waste packaging, storage and transportation activities at commercial reactor sites and DOE facilities throughout the U.S. and the entire national repository waste transportation system.

Since 1989, California has provided input into the federal nuclear waste management and transportation programs. The California Energy Commission, on behalf of California agencies, testified before DOE and/or provided written comments highlighting major deficiencies in DOE's analyses under the National Environmental Policy Act (NEPA) regarding the potential impacts in California from the proposed repository. The State of California has identified several areas of concern regarding these potential impacts.

In 2000, California agencies completed an extensive review of DOE's Draft Environmental Impact Statement (EIS). Thirteen California agencies with statutory and regulatory authority and/or expertise in transportation, emergency response planning, water quality, hydrogeology, and other environmental areas of concern participated in this review. In summary, California's review concluded that the proposed action described in the Draft EIS will cause significant impacts to California and that DOE's environmental assessment of the repository project was seriously incomplete and deficient both procedurally and substantively under NEPA.

Our comments here are intended to be considered together with the previous comments submitted by the State of California. These include comments on DOE's: (1) Site Characterization Plan Yucca Mountain Site (April 14, 1989); (2) Notice of Intent to prepare an environmental impact statement (EIS) for a geologic repository at Yucca Mountain (September 21, 1995); (3) Draft Yucca Mountain EIS (written comments dated February 10, 2000 and testimony provided February 22, 2000), (4) Supplement to the Draft Yucca Mountain EIS (July 5, 2001), (5) Possible Site Recommendation for Yucca Mountain (October 19, 2001), (6) Notice of intent to prepare an EIS for the alignment, construction and operation of a rail line to Yucca Mountain (May 25, 2004), (7) Amended Notice of Intent to expand the scope of the EIS for the alignment, construction and operation of a rail line to Yucca Mountain and DOE's Supplement to the Final EIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (December 12, 2006), and (8) the Notice of Intent to amend the scope of the Yucca Mountain rail alignment draft EIS and prepare a supplement to the final EIS (testimony November 27, 2006). These documents and the comments they contain are hereby incorporated by reference to the extent that they apply to the unchanged aspects of the currently proposed repository program and analyses in the DSEIS and the RA DEIS.

PROPOSED ACTION

Under the proposed action the U.S. Department of Energy (DOE) proposes to transport approximately 70,000 metric tons of spent fuel and high-level nuclear waste from waste generator and storage sites throughout the U.S. to the proposed repository at Yucca Mountain, Nevada over a 50-year time period. These wastes would include about 63,000 metric tons of commercial spent nuclear fuel and about 7,000 metric tons of DOE spent fuel and high-level radioactive waste. The waste could include surplus weapons-usable plutonium, which DOE would dispose of as part of the high-level radioactive waste inventory. Under the proposed action, spent nuclear fuel and high-level radioactive waste being stored or projected to be generated at 72 commercial and four

DOE sites in 39 states would be shipped to the repository by rail (train) and by truck through 44 states.

Most commercial spent fuel would be packaged at the reactor sites in the proposed new TAD canisters and transported on trains dedicated to these shipments. The TAD canisters have yet to be designed beyond a conceptual level and have yet to be certified by the U.S. Nuclear Regulatory Commission for surface storage, transportation and disposal underground at the repository. DOE cannot use rail transport exclusively, however, because some commercial nuclear power plants lack the ability to load large-capacity rail shipping casks or they are not located adjacent to rail lines. Those sites, for example, Humboldt Bay and Diablo Canyon in California, would use overweight trucks to ship spent nuclear fuel to the repository, or could use heavy-haul trucks or barges to ship spent fuel to the nearest rail line.

At the repository, spent fuel and high-level radioactive waste, sealed in waste packages, would be emplaced underground about 1,000 feet below the surface and about 1,000 feet above the groundwater table. The geologic features of the site and engineered barriers would be designed to help ensure the long-term isolation of the materials from the environment. Under the proposed action DOE would construct and operate a railroad to connect the Yucca Mountain Repository to an existing rail line. DOE's preferred rail corridor is the Caliente rail corridor, which would begin in the southern corner of Nevada near Caliente, Nevada (north of Las Vegas), and would run approximately 330 miles east and then south to Yucca Mountain.

An alternative proposed rail corridor to the Yucca site is called the Mina rail corridor. The Mina line would begin approximately 290 miles northwest of Yucca Mountain, near Wabuska, Nevada (40 miles east of Carson City) and run southeast to Yucca Mountain. Because the proposed Caliente and Mina rail lines would be accessed by entirely different existing rail lines and are separated by hundreds of miles and are at opposite ends of the Yucca Mountain site, which rail alignment that DOE chooses will have a significant impact on the number of shipments through different parts of California (northern versus southern California). The Mina rail route would have greater impacts to northern California with potential high-level waste shipments from Hanford, Washington being transported through Sacramento over Donner Pass to Reno, Nevada. The Caliente route would have greater impacts to southern California, particularly Barstow, San Bernardino County, and the Cajon Pass.

Under the proposed action for disposing of 70,000 metric tons of waste, 9,495 rail casks (about 2,800 trains) and 2,650 truck casks of spent fuel and high-level radioactive waste will be transported to the repository. Under DOE's expanded capacity scenario for the repository (130,000 metric tons), approximately 24,112 rail casks and 5,025 truck casks will be transported to the repository (DSEIS, p. 8-32). The estimated number of shipments for California, under the proposal to dispose of 70,000 metric tons of waste, is 755 rail casks and 857 truck casks using the Caliente Rail Alignment and 1,963 rail casks (20 % of total shipments) and 857 truck casks using the alternate Mina Rail Alignment (DEIS, p. G-64).

Our comments and recommendations on the three new Draft EIS documents are provided below:

NATIONAL ENVIRONMENTAL PROTECTION ACT (NEPA) DEFICIENCIES AND PROCEDURAL CONCERNS

1. **DOE should issue a revised DSEIS for public review and comment before issuing a Final SEIS,**

Major deficiencies that have been identified in DOE's NEPA process for the proposed repository have included DOE's failure to: (1) provide an adequate scoping process, (2) provide a complete and accurate project description, (3) fully disclose the potential transportation impacts and groundwater impacts in California, (4) fully evaluate reasonable alternatives, (5) provide adequate notice of public hearings to affected California communities, (6) perform a comprehensive assessment of potential impacts to the affected environment, and (7) adequately evaluate the potential environmental consequences of the alternatives of the proposed action. Deficiencies and gaps in DOE's evaluation of the environmental impacts from the repository project persist in the three new EIS documents. In fact, these documents and their proposed TAD canister system and description of the alternate rail corridors to Yucca Mountain have only increased the uncertainties and concerns regarding the potential impacts to California from the proposed repository.

In light of these major deficiencies, DOE should first issue a revised DSEIS and RA DEIS for public review before developing and issuing final EIS documents. The purpose of NEPA is to ensure that decision makers and the public are fully informed and have full access to information regarding the potential environmental impacts from proposed actions. Clearly, when the deficiencies of the environmental impact analyses are so severe, the NEPA documents cannot be finalized until these inadequacies are corrected and the public is provided an opportunity to review and comment on the complete analysis.

2. **The DSEIS fails to adequately evaluate the potential impacts to California and provide adequate public notice and opportunity for comment to affected communities in California.**

DOE has failed to meet the requirements under NEPA to fully assess and disclose all potential impacts of the project and provide adequate notice to the communities that would be affected. The DSEIS provides superficial and incomplete discussion of the potential transportation and groundwater impacts in California from the proposed repository as well as the waste generator site impacts in California from using the proposed TAD canister system. It, therefore, fails to fully analyze and consider the project's impacts in our state.

A major flaw in DOE's analysis is that it has yet to identify the rail, truck and/or barge routes for the expected shipments of spent nuclear fuel to the repository. Identifying likely routes is essential to a complete analysis. California has four operating commercial nuclear power reactors (Diablo Canyon Units 1 and 2, San Onofre Generating Station Units 2 and 3), four shut-down commercial nuclear power reactors (Rancho Seco, Humboldt Bay, San Onofre Unit 1, and GE Vallecitos BWR), as well as four operating and four shut-down nuclear test or research reactors. Routes should be identified and route-specific potential impacts evaluated not only for waste shipments originating from these California sites but also from out-of-state.

Potential impacts from large quantity shipments of spent nuclear fuel are significant considering that each TAD rail cask would contain over 650,000 curies of Cesium-137 with a contact surface dose rate of 35,000 rem per hour. Nevada transportation experts concluded that a 1% release of Cesium-137 could result in cleanup costs of $100 million to more than $1 billion. During routine operations, radiation exposure doses to the public and workers, for example workers at reactor sites who repackage and load TAD containers, would be elevated. Also, the TAD canister system would result in increased risk of an accident at reactor sites from handling and repackaging spent fuel these sites. Similarly, state and local accident prevention, security, and emergency response preparedness activities and their associated costs would be significant.

In addition to spent fuel shipments from California reactors, a significant portion of the high-level waste and spent fuel shipments from reactors and DOE facilities located outside California could be routed through California through major urban areas and major rail hubs, e.g., Barstow, to Yucca Mountain. In addition, Nevada experts estimate that under the expanded repository capacity scenario described in the DEIS, there could be about 1,929 rail cask shipments in 647 trains entering Nevada from California. They estimate this could result in 5-13 trains per year for 50 years (Halstead, Dec. 3, 2007, DSEIS comments in Las Vegas).

Repository shipments using the Mina rail route or Caliente rail route could impact major cities in California including Sacramento, San Diego, Los Angeles, San Bernardino, San Luis Obispo, Fresno, Bakersfield and Barstow. An estimated 7.5 million people live within a mile of the likely rail routes in California and over 1,400 schools and 130 hospitals are located within a mile of these routes.

And yet, DOE has failed to adequately notify these potentially affected major metropolitan areas and communities along shipment corridors as well as near reactor-sites in California regarding plans to repackage and transport spent fuel and high-level radioactive waste through their communities. The communities likely to be affected by these shipments have received inadequate or no notice of DOE's analyses of the project and, therefore, have missed opportunities for public input. These communities, therefore, have no way of knowing that they will be impacted by decisions being made regarding the Yucca Mountain project and do not have access to the information needed for their participation in the NEPA process.

In spite of the major potential impacts in California from the proposed repository and requests from California for additional hearings in the state, DOE held only three public meetings/hearings in California on the various EIS documents for Yucca Mountain. A hearing was held on November 4, 1999, in Lone Pine in response to a request by Inyo County and on February 22, 2000, a hearing was held in San Bernardino in response to a request by Senator Boxer. The third public meeting was held in Lone Pine on November 29, 2007, and it addressed the three Draft EISs recently released. It was the only public meeting scheduled in California for the purpose of reviewing these Draft EISs, although the State of California requested hearings at additional locations in the state. It is unclear why so few hearings/meetings were held in California in view of the major potential impacts to the state, and why, of the three hearings/meeting held in California, two were held in Lone Pine. Lone Pine is a small community on U.S. Highway 395 and is located in the Sierra Nevada foothills about 200 miles north of San Bernardino and Los Angeles. No additional public hearings have been held in California, although requested.

Similarly, rather than encouraging information sharing and providing an open forum for public comment during the scoping meetings in 2006, DOE had the citizens individually speak to a court reporter. This approach did not provide a forum for meaningful sharing of information consistent with the spirit of the NEPA process. Finally, considering the size, scope and importance of the three EISs released in October 2007, there was insufficient time to review and provide comments. Review was particularly difficult considering the unclear relationship with the 2002 Final EIS for the Yucca Mountain project. In addition, there is inadequate time for DOE to consider public comments on these documents, given DOE's self-imposed deadline to submit a License Application to the NRC and issue Final EISs by June 2008.

3. The DSEIS and RA EIS fail to identify and evaluate transportation alternatives to the Proposed Action.

The proposed action described in the DSEIS and RA EIS is to transport 90 percent of commercial spent fuel that are packaged at the waste generator sites in TAD canisters (DSEIS, page 2-7) at 68 commercial site origins and ship these packages cross-country by rail in dedicated trains to the repository. The remainder of the commercial spent fuel (goal of 10 percent) would arrive at the repository as uncanistered spent nuclear fuel or in dual-purpose canisters. DOE spent nuclear fuel, high-level radioactive waste, and naval spent fuel would be received in disposable canisters. DOE would place both types of canisters (DOE disposable and TAD) into waste packages before emplacement in the repository. However, these broad assumptions of 90 percent transport by rail in TAD canisters are not supported by analyses. Moreover, sufficiently detailed implementation plans for the transportation program are not provided. For example, there is no rail line currently extending to the Yucca Mountain site and DOE would have to build a railroad linking the site to an existing rail line. The feasibility and costs of constructing a connecting rail corridor are highly uncertain. About 25 reactor sites lack rail access. TADs as currently envisioned are large (hold up to 10 metric tons), heavy (weigh up to 180 tons) and long (18-20 feet long) and many reactor sites lack the necessary infrastructure to handle and repackage spent fuel in TAD canisters.

The TAD canister concept is a proposal to repackage spent fuel at reactor sites and ship by rail. Yet this proposal is highly speculative. The DSEIS does not address the considerable uncertainties regarding this proposal. NEPA requires an adequate analysis of alternatives to the proposed action. In light of the major uncertainties and insufficient information provided on the TAD canister concept (discussed later in our comments) and the fact that developing rail access to Yucca Mountain is highly uncertain, the DSEIS should examine credible alternatives to the Proposed Action to transport 90% of the commercial spent fuel in TADS on dedicated trains. This analysis should include the comparative impacts and risks associated with using alternative canister systems (e.g., existing dual purpose canisters) for transport to the repository in comparison with the proposed TAD system.

DOE analyzes the construction of a rail line to the repository in the RA DEIS. DOE should also analyze the No-Action Alternative that DOE would not construct and operate a railroad. No analysis is provided in the EISs of the implications for the national transportation system of no rail access to Yucca Mountain (RA DEIS, p. 2-11). The revised DSEIS should analyze feasible No Action Alternatives including the "fall-back plan" for cross-country shipments if the rail line to the repository is not constructed and

other transportation modes, for example, shipment by legal-weight trucks, are predominantly used.

The DSEIS relies upon the No Action Alternatives described in the Final EIS (2002) which are: (1) spent fuel remains at reactors with institutional controls (care and maintenance of the spent fuel) for the first 100 years and no institutional controls at the end of the 100-year period, and (2) spent fuel remains at reactors for 10,000 years with no institutional controls. These two no-action alternatives are highly unlikely and unlawful for protecting public safety and the environment, which means that these two No-Action Alternatives are unrealistic. These two No Action Alternatives do not address transportation alternatives to the Proposed Action of transporting 90% of commercial spent fuel by rail using TAD canisters. The possibility that during the first few years of repository operation, DOE will need to rely extensively on trucks for transport to the repository should be fully described and examined and the potential impacts evaluated including quantifying the number of truck shipments, identifying truck shipment routes, and describing how the NWPA 180 (c) emergency response assistance will be provided to states, tribes and local governments along the routes in a timely manner and how the state and local needs for emergency response training and equipment will be assessed.

INADEQUATE ANALYIS OF POTENTIAL TRANSPORTATION IMPACTS

4. **DOE has not identified the preferred routes for repository shipments and has failed to adequately evaluate the major potential transportation impacts in California from these shipments.**

Under the Proposed Action, approximately 9,500 rail casks and 2,700 truck casks would be transported in California to Yucca Mountain over a period of about 50 years (DSEIS, p. 8-32) Under the "representative routes" evaluated in the DSEIS, 755 rail cask shipments (about 8 percent of the total) would enter Nevada from California and travel through downtown Las Vegas to the Caliente rail line; and 857 truck cask shipments (about 32 percent of the total) would enter Nevada from California on Interstate-15, then travel through western Las Vegas, on Interstate-215 to US Highway 95 (See p. 2-43, 2-44, and G-64). Under the expanded repository capacity scenario (143,000 metric tons and 2,303 canisters of Greater-than-Class C waste) about 24,112 rail cask shipments and 5,025 truck cask shipments would be transported through California (See p. 8-30).

If the Mina rail corridor is constructed and used, an estimated 1,963 rail casks (21% of the total) and 857 truck shipments (32% of the total) would be transported through California. These would likely include shipments of spent fuel through Sacramento, including shipments possibly from Oregon and Washington, over the Union Pacific Rail Line over the Sierra Nevada mountains through Donner Pass to Reno, Nevada. Nevada's spent fuel transportation experts have estimated a potential for even larger numbers of rail cask shipments through California to Yucca Mountain for both the Caliente and the Mina rail routing options (greater than 4,400 rail casks or more than 45% of the total shipments).

The DSEIS fails to fully evaluate the potential transportation impacts in California from the proposed shipments. Instead of providing more clarity and description of the routes and transportation modes to be used, the DSEIS and RA DEIS raise additional transportation uncertainties. Since 1989 the State of California has urged DOE to

identify the national highway, railway and barge shipping routes for transporting the thousands of tons of high-level waste from reactor locations throughout the country to the proposed repository. However, the transportation analyses provided in Volume I, Chapter 2 and in Appendix G of the DSEIS do not identify the routes to be used. The failure to identify these transportation routes effectively keeps federal, state and local jurisdictions from identifying potentially hazardous conditions along these routes and evaluating the potential for exacerbating the consequences from an extreme accident or terrorist attack.

Although the DSEIS identifies "representative" rail and truck routes, the cross-country rail routes shown in Figure S-9 ((p. S-19) are not consistent with the routes that the major railroads have identified for these shipments. For example, the rail routes in Figure S-9 show rail routes through Nebraska. However, the Union Pacific has indicated it would route cross-country rail repository shipments across Kansas, rather than Nebraska, because of more rail traffic through Nebraska compared with Kansas. The railroad believes that DOE shipments could interfere with the flow of traffic on the more congested rail line. Similarly, the Burlington Northern Santa Fe (BNSF) railroad indicated that it would not route DOE shipments on certain heavily traveled lines during high priority United Parcel Service Christmas traffic. Rail routes shown in the DSEIS do not include routes already identified by Union Pacific and BNSF as "preferred routes" to Caliente. The revised DSEIS should show the likely preferred truck and rail roads.

The DSEIS ignores the potential for rail shipments on the BNSF railroad to San Bernardino. Major transportation impacts from repository shipments are projected for Barstow and San Bernardino County as well as large numbers of potential shipments over the Cajon Pass and Donner Pass. Nevada's spent fuel transportation experts have estimated a potential for approximately 300 rail casks on about 300 barges for shipments from Diablo Canyon to Port Hueneme. DOE's Final EIS issued in 2002 for the repository, however, estimated the potential for 121-132 barge shipments from Diablo Canyon to Port Hueneme.

Nevada's transportation experts estimate the potential for large numbers of legal-weight truck shipments through California if no rail access to Yucca Mountain is developed (over 24,000 shipments or more than 45% of the total number of shipments). A 1996 report by the Planning Information Corporation (PIC) out of Denver, Colorado showed a southern consolidated routing scenario for East-West shipments to Yucca Mountain via California using the Interstate-40 highway and BNSF Railroad. Using this southern consolidated routing scenario, the PIC report estimated that more than 45% of the repository shipments could be transported through California. The DSEIS ignores the potential for more rail cask shipments through California on the Caliente or Mina rail options (more than 4,400 rail casks or more than 45% of the total).

The PIC 1996 report concluded that as many as 79,300 truck shipments would be required to move spent fuel and highly radioactive wastes from reactor sites around the country to a waste facility in Nevada. The report examined "current capabilities" with regard to reactor sites, equipment (for example, the containers or casks that would be used to transport deadly spent fuel and high-level waste), and the existing transportation system. PIC used this information to project transport modes, shipment numbers, and potential routes. Unlike DOE's more optimistic scenarios which assume that spent fuel and HLW can readily be shipped in large rail casks, thereby limiting the number of shipments and the numbers of communities affected, the PIC report examined the

capabilities that actually exist with regard to: (a) the availability of rail and highway shipping casks; (b) the ability to handle different size containers at reactor locations; (c) rail access to originating sites for spent fuel shipments; (d) which reactors would ship waste in the first three years and what their capabilities are for handling casks, (e) rail access, and other variables; and (f) mode (rail vs. truck) and routing realities as they exist today. This report concluded that a southern consolidated routing scenario using the Interstate-40 and BNSF corridors for East-West shipments to Yucca Mountain via California, would result in more than 45% of the repository shipments potentially being transported through California.

The potential implications and costs to California state and local jurisdictions as a result of the proposed action are significant, considering the large number of potential shipments by truck, rail and/or barge over the state's transportation corridors. The EISs fail to adequately assess the risk and impacts to state and local jurisdictions from these shipments. California's emergency response training and equipment needs to prepare for these proposed shipments, including accident prevention measures necessary to ensure their uneventful, safe transport (for example, shipment inspections and escorts) will be significant. This is particularly true for major urban areas such as Sacramento, Fresno, Bakersfield, and Los Angeles, and major rail hubs in California, such as Barstow and San Bernardino.

Under DOE's proposed policy (180c policy) for funding states to assess emergency response preparation needs along routes, states would be provided a one-time planning grant of $200,000. This amount likely would not be sufficient to assess emergency response preparation needs along the lengthy potential rail, truck and barge shipment routes in California, particularly through heavily populated large metropolitan areas such as Los Angeles County. Significant training and coordination will be required for the large number of emergency care facilities, emergency centers, fire stations, and police stations located near possible routes in California. For example, within 10 miles of potential rail routes in California are an estimated 33 emergency care facilities, 19 emergency centers, 282 fire stations, 424 police stations and 5740 schools. (Bob Halstead, Nov. 9, 2007; FEMA MH-HAZUS Data base);

The DSEIS should identify the generator sites from which the waste would be shipped along either corridor. The DSEIS should state whether the Donner Pass route or the Feather River Canyon route would be used/preferred for connecting with the Mina Route and whether one route would be a backup for the other route. The DSEIS should describe how the operating parameters imposed on the railroads to ensure shipment safety would be monitored and enforced.

The impacts on tribal lands in California could also be significant. Eight tribes in California would be potentially impacted by rail shipments (Halstead, Nov. 9;) Routine radiation exposure to populations within 1600 meters of the rail route would impact approximately 3.4 million people (Source: Halstead, Nov. 9; census 2005 Block group update). Radiation doses to workers and the public from routine operations, particularly in congested areas where shipments may be delayed, should be evaluated. The DSEIS should also consider the impacts and costs to the state from civil unrest, for example, demonstrations or protests against shipments, or acts of terrorism directed against these shipments. Potential adverse economic impacts from proposed shipments, for example, adverse impacts on tourism in national parks including the Death Valley National Park, should be considered as well.

5. **DOE has failed to describe potential major route-specific impacts in California and identify mitigation for these impacts.**

There is a risk of a major, possibly long-term, disruption of transportation systems and hubs in California, for example, rail ways, rail hubs, and major interstate highways, should a major accident occur along any of California's major transportation corridors. The potential impact on California's rail and highway materials transport system from a major accident should be evaluated in the DSEIS. Rail capacity is already heavily impacted by goods being transported through California's major ports (Oakland, Los Angeles, Long Beach) from overseas. Capacity improvements that the Union Pacific and BNSF are making are intended to serve intermodal and international commerce, especially in California. The DSEIS should evaluate the impact of Yucca shipments, including the use of dedicated trains, on rail service and truck transport of goods in California, in particular, the impact on rail or highway freight transport capacity. Are there assurances that commercial use of rail lines would not be adversely impacted by waste shipments? Would waste trains have priority over commercial shipments? Would waste shipments occur at times and intervals that could disrupt regular commercial traffic patterns? If waste trains travel at reduced speeds, how would this affect commercial railroad traffic, including shipping rates, as well as passenger trains?

The risk assessment of potential transportation impacts should consider route-specific conditions along any likely shipment corridors in California. These route-specific conditions include: (1) increasing rail freight traffic in California due to the increasing flow of goods and imports from Asian countries through the Ports of Oakland, Long Beach and Los Angeles, (2) California's heavily populated and congested major urban areas including Los Angeles, Sacramento, the Central Valley (Los Angeles is the second largest metropolitan region in the country), (3) the steep terrain and heavily weather-impacted rail and truck routes over the Donner Summit to Reno, Nevada, as well as corridors through southeastern California that could be heavily impacted by these shipments, e.g., Cajon Pass, San Bernardino County and Barstow, and (4) certain high risk sections of track in California with prior major derailments and hazardous materials spills. The DSEIS should identify the likely rail and truck routes needed to access the Mina and Caliente routes, as well as communities and environmental resources in California potentially impacted by these shipments, so that any route-specific concerns can be addressed.

The DSEIS should describe how DOE would handle stranded/stalled nuclear waste trains, for example, during bad weather, floods causing derailments, or periods of service interruption.

DOE defines the radiological region of influence (ROI) for incident-free transport as .5 miles on either side of the rail alignments centerline. For accidents and sabotage, the ROI area is defined as 50 miles on either side. The potentially affected environment for transportation radiological impacts, including individuals, businesses, agriculture, and the natural environment should be described and impacts assessed for the (ROI) along potential shipping routes in California, including through major urban areas in Los Angeles, Sacramento, and the Central Valley. DOE should estimate the number of people living, commuting, and working within the ROI for the proposed rail, truck and barge shipment routes in California and evaluate these impacts.

The DSEIS should evaluate route-specific analyses of the companion rail segments to the proposed Caliente and Mina rail corridors. For example, the Caliente corridor could use the Union Pacific mainline that extends from Ogden, Utah, through southern Nevada to southern California. The Mina corridor could extend to Hazen and the impact analysis should include Union Pacific mainline tracks in northern Nevada from Hazen westward to Sacramento. The DSEIS should examine the full range of impacts to all affected communities in California from waste shipments to Yucca Mountain, considering the maximum shipment scenarios and likely truck shipments of waste. The potential impacts of transporting waste on lines shared by passenger service (Amtrak) should also be analyzed.

6. **The DSEIS should consider worst case credible accident scenarios to identify the maximum consequences from a potential accident involving a spent fuel or high-level radioactive waste shipment that exceeds package performance capability.**

The consequences of a severe transportation accident could be much more severe than DOE estimates. The DSEIS does not consider "worst case" accidents in which "all factors combine in the most disadvantageous way," because DOE considers such combinations of factors "not reasonably foreseeable" (DSEIS, p. G-54). Moreover, the DOE accident analysis did not consider the impacts of human error in the design, fabrication, and loading of shipping casks nor did it consider unique local conditions along rail, barge or truck routes that could result in more severe accidents or consequences. However, DOE acknowledges that clean-up costs after a very severe transportation incident involving a repository shipment resulting in the release of radioactive material could range from $300,000 to $10 billion (DSEIS, p. G-54). Having identified the upper range of clean-up costs, the DSEIS should evaluate the impacts from a credible worst case transportation accident or terrorist attack that led to the high cost estimate.

7. **The DSEIS should examine unique local conditions or credible accident or terrorist attack scenarios that could result in conditions that exceed packaging performance standards.**

Should an accident or terrorist attack occur along certain segments of possible routes in California, a resulting fire could exceed the limits of the spent fuel package to contain the radioactive materials under accident conditions. For example, two recent major highway accidents on California highways (one in the Bay Area in northern California and a tunnel fire in Santa Clarita) are being investigated to determine whether these accidents may have resulted in conditions, in particular fire temperatures and fire durations, which approached or exceeded the limits of packaging performance requirements. The potential for highway and rail accidents resulting in severe conditions in California should be evaluated considering that nearly half of the 16 historic severe accident scenarios that were examined in the National Academy of Sciences' 2006 spent nuclear fuel transport study occurred in California[1]. These accidents included extreme truck fires in highway tunnels, train derailments, and a rail accident involving a gas pipeline rupture.

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[1] Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States. National Research Council of the National Academies, 2006.

The National Academy of Sciences' study recommended that detailed surveys of transportation routes for spent fuel be done to identify potential hazards that could lead to or exacerbate extreme accidents involving very long duration and fully engulfing fires and further recommended that steps be taken to avoid or mitigate such hazards. We fully concur. To be comprehensive, the DSEIS should identify the likely shipping corridors and include route-specific analyses that identify potential hazards along shipment routes. It is vital that the risk analyses should include the potential consequences of a severe accident or terrorist attack involving extreme, long duration fire conditions that exceed package performance limits.

DOE should conduct a systematic inventory of local conditions along the preferred routes that could exacerbate the consequences of a severe accident or attack, for example, tunnels, bridges, refineries, stadiums, congested urban areas, proximity to flammables or explosives in storage or transit. DOE also should conduct an inventory of state/local capabilities along route segments for handling potential consequences of a major accident. This inventory of route segment characteristics and response capability should be available before Section 180c planning and assessment efforts begin.

8. **DOE should evaluate the potential for human error and intentional non-compliance with federal packaging safety standards in exacerbating the consequences of a severe accident or terrorist attacks.**

DOE has concluded that regulations and regulatory practices of the NRC and the US Department of Transportation address the design, manufacture, and use of transportation packaging and that the regulations and regulatory practices are effective in preventing human error by requiring independent NRC review and approval of package design to ensure compliance and NRC's approval and audited quality assurance programs for design, manufacturing and the use of transportation packages. (DSEIS, p. G-52). DOE also said that timely and effective actions to identify and initiate corrective actions for undetected design or manufacturing defects provide assurances that undetected deficiencies would not lead to a meaningful reduction in package performance under normal or accident conditions of transportation. However, human error, for example, an undetected major flaw in the design and certification of transportation packaging (casks) for radioactive material shipments, hidden or undetected defects in the manufacture of these packages, and error in the preparation of these packages for shipment could severely compromise packaging performance during an accident or during routine transport.

DOE should consider the potential consequences of a package not meeting federal packaging safety requirements, for example, due to a manufacturer's intentionally falsifying records in meeting these requirements. In December 2007, the Nuclear Regulatory Commission proposed a civil penalty against Alpha Omega Services, Inc., of Bellflower, California and barred the company president from NRC-licensed activity for deliberately falsifying an inspection report on a Type B package used for transporting radioactive materials. The company was charged with stating in a report of an inspection that the transportation package met NRC requirements even though the company knew the package had been modified and no longer met the specification in its certificate of compliance from the NRC. As a result of the falsified information, the NRC licensee made at least three exports of radioactive material outside of the US in violation of NRC and U.S. Department of Transportation regulations. Although the NRC was not aware of actual safety consequences, NRC considered the potential safety consequences to be

significant considering the "potential adverse impact of shipping radioactive materials in the modified and unapproved package design that no longer met transportation package approval standards for both normal and hypothetical accident conditions."

9. **No mitigation is being identified in these EIS documents for potential national transportation impacts outside of the State of Nevada.**

The DSEIS states that, "Shipments of spent nuclear fuel and high-level radioactive waste would represent a very small fraction of total national highway and railroad annual traffic (less than 0.1 percent." (DSEIS Summary, page S-42). From the perspective of all highways and railroads in all affected states, the impact in terms of the number of repository shipments relative to other shipments would be small. However, to adequately determine transportation impacts to a particular state, city, or county, route-specific analyses must be provided, impacts evaluated, and mitigation measures described for major potential impacts.

10. **Under the Proposed Action, those commercial nuclear plant sites lacking the capacity to use rail transport would use overweight trucks to ship material to the repository or could use heavy-haul trucks or barges to ship spent fuel to the nearest rail line.**

The DSEIS states, for the first time, that truck shipments could be made using "overweight" truck shipments without addressing specifically what that entails or any of the implications or impacts of such shipments. The DSEIS should fully evaluate these impacts. Overweight trucks would be subject to permitting requirements in each state through which they traveled. Strict weight restrictions on some bridges, tunnels, or roadways could prohibit their use for overweight trucks, which could result in shipments being rerouted from the interstate highway system to less acceptable roads to avoid those areas. For example, given the increased bridge structural scrutiny and concerns raised following the Minnesota bridge collapse, some states with restrictions on Interstate bridges might force overweight shipments to be routed on less acceptable routes from a safety perspective. Therefore, the reliance on overweight shipments could have significant and unintended consequences. The DSEIS should evaluate the implications of using overweight trucks to transport spent fuel to the repository and fully analyze the potential for rerouting overweight shipments over less acceptable truck routes. It is likely that overweight truck permit requirements could prevent or seriously impede cross-country shipments.

11. **The DSEIS should provide the upward bounds or maximum capacity for spent fuel and high-level waste disposal at the repository and the implications for shipments in California.**

It has been estimated that 140,000 metric tons of spent fuel and defense waste would be generated if all US reactors are given 20-year license extensions. (Approximately half of the US reactors have received license extensions.) The DSEIS should define the maximum number of waste shipments that could potentially be transported to the repository, including assuming that all US reactors receive 20-year license extensions and assuming the potential for new reactor construction in the US. The Proposed Action is for a 70,000 metric tons capacity repository. The DSEIS considers Modules 1 and 2 at 130,000 metric tons of commercial spent nuclear fuel in the expanded capacity case.

However, no discussion is provided on a proposed underground layout for how the expanded capacity could be accommodated.

The period of analysis for shipment impacts should also consider a larger repository capacity scenario. The DSEIS should provide the maximum capacity for spent fuel and high-level waste at the repository given the large amount of spent fuel and defense waste generated for the current fleet of reactors and DOE facilities as well as estimated new reactors planned for construction in the US. New reactor license applications have been submitted to the US Nuclear Regulatory Commission with strong industry and federal support and incentives encouraging additional new nuclear power reactors. The SEIS should discuss the maximum and likely number of rail and truck shipments to the repository should the Nuclear Waste Policy Act be amended to expand the repository capacity beyond its current statutory limit of 70,000 metric ton. If DOE plans to include an expanded repository capacity as a reasonably foreseeable future action, it should provide the technical basis and safety evaluation, including cumulative impacts, supporting a decision for additional repository capacity.

12. The use of TAD canister systems will increase risks at waste generator sites. The DSEIS should evaluate these at-reactor risks as well as address major uncertainties and concerns about DOE's proposed TAD System.

The DSEIS proposes the use of a new canister system called the "Transportation, Aging, and Disposal" (TAD) canister to minimize handling of spent fuel at the repository by having waste loaded at the reactor sites in welded TAD canisters. Under DOE's Proposed Action, up to 90% of spent fuel would be loaded into TAD canisters at reactors and welded shut. The remaining approximately 10 percent of spent fuel would be shipped directly to the repository by over-weight trucks. TAD canisters would be inserted into large transportation casks at the reactor sites and shipped by rail to Yucca Mountain for storage and "aging" before disposal underground. These TADs would be large (hold up to 10 MTU) and heavy (weigh up to 180 tons with impact limiters and skids). At reactors (about 25) which lack rail access at the reactors, TADs would be moved by barge or heavy haul truck to rail (for example, Diablo Canyon in northern California). The design for the TAD canister is not complete and it is unclear how the TAD system will interface with the multi-purpose canister system used for spent fuel storage at many reactors. Southern California Edison Co. indicated that the TAD system, which is proposed for only 21 assemblies, increases the need for spent fuel storage space at the compact site at the San Onofre Nuclear Generating Station. The DSEIS should evaluate the impact at reactors from the use of the TAD system.

Use of the TAD canister system would significantly increase workers' radiological exposure and the risks associated with handling bare spent fuel assemblies, as well as loading and welding canisters at reactor sites (routine exposures and accidents). The Draft SEIS should explain how the TAD canisters would be certified and inspected during loading, welding shut, transport and disposal to ensure compliance with NRC regulations.

There are potential problems regarding acceptance of the TAD canisters at the repository and the potential return of rejected TADS to originating sites. For a complete analysis, the DSEIS should thoroughly assess the TAD system regarding its risks and impacts to workers at the reactors and repository, the surrounding communities, the environment, and the populations in transit (along highways and/or railways at or near

reactor sites). In addition, the DSEIS should analyze how the TAD system will interface with the dry cask storage system at reactor sites. All four California commercial reactor sites (Diablo Canyon, San Onofre, Rancho Seco, and Humboldt Bay) may have specific problems with the proposed TAD system, since all of these plants are either planning to transfer or have transferred all or a portion of their spent fuel into dry cask storage.

The DSEIS also should assess how the TAD system would work at decommissioned reactors where the spent fuel handling equipment and facilities have been removed and no longer remain onsite. All of the spent fuel at Rancho Seco, which is in the final stages of decommissioning, has been transferred into dry storage using multi-purpose canisters. The DSEIS should evaluate how the TAD system would work at decommissioned reactors, where spent fuel handling equipment and facilities have been dismantled and removed from the site. The DSEIS fails to identify the party or parties responsible for building the facilities needed to house the spent handling operations and it fails to fully evaluate the costs, liability, and impacts associated with transferring spent fuel into TADs at reactor sites. The DSEIS should clarify and analyze these aspects of the TAD system and the financial arrangements for paying for developing the TAD repackaging system at reactor sites. The DSEIS should also evaluate the alternatives if the TAD system does not prove to be suitable, for example, due to its costs, risks, and impacts.

No final TAD designs are available, only the "Proof of Concept". NRC must approve TAD transport and storage components separately (10 CFR Part 71 & 72). Therefore the Proposed Action cannot be evaluated based upon the incomplete information presented. The DSEIS should provide supplemental information on TADs (performance specifications; use of welded closures; future of alternate storage systems currently in use at reactors; need for cask handling infrastructure at reactor sites; need for coordination with utilities; timetable for development and certification; quality control over repackaging and cask loading; need for full-scale testing; costs and benefits of using TADs; how TADs fit into the overall plans for transportation, storage, schedule, and protection against terrorist attacks; and the difference between TADs and the multi-purpose canister concept);

Further, the TAD canister system requires rail transportation, although Yucca Mountain lacks rail access. The proposed Caliente railroad that DOE plans to build to the repository would cost an estimated $ 2.5 to 3 billion and has strong opposition in Nevada that is likely to delay rail access. Further, one-third of the spent fuel shipping sites lack rail access. These challenges result in major uncertainties regarding the feasibility of the proposed TAD canister system.

13. The DSEIS fails to adequately evaluate the potential impacts from a terrorist attack on spent fuel shipments to the proposed repository.

The consequences of a successful terrorist attack could be much more severe than DOE estimates. For example, the National Academies' 2006 spent fuel transport study noted that malevolent acts against spent nuclear fuel and high-level waste shipments are a major concern, especially following 9/11 terrorist attacks. NAS recommended an independent examination of the security of spent nuclear fuel and high-level waste transportation including the threat environment, the response of spent fuel packages to credible malevolent acts, and operational security requirements for protecting spent fuel and high-level waste while in transport.

DOE acknowledges in the DSEIS that both truck and rail casks are vulnerable to terrorist attacks or sabotage involving certain types of military and commercial explosive devices. Nevada-sponsored studies have concluded that a credible attack scenario in an urban area could release enough radioactive material to cause thousands of latent cancer fatalities and require cleanup and recovery costs exceeding $10 billion. However, DOE has chosen not to consider attack scenarios involving a combination of multiple weapons that could The DSEIS should examine, to the extent possible without exposing classified information, the bounded consequences of a terrorist attack against these shipments. The DSEIS should explain how the consequences of a severe attack or terrorist attack can be mitigated through, for example, additional security measures or emergency responder preparedness, i.e., how emergency responder professionals responding to an event or escorting the shipments can respond effectively and in a timely manner to a major terrorist event involving spent fuel and high-level waste shipments.

14. **The Revised DSEIS should fully describe DOE's implementation plan, e.g., DOE's National Transportation Plan, for transporting spent nuclear fuel and high-level radioactive waste to the repository. At a minimum, DOE's National Transportation Plan for repository shipments should incorporate recommendations by the National Academy of Sciences (2006) to enhance the safety and security of these shipments.**

The revised DSEIS should describe DOE's National Transportation Plan for transporting spent fuel and high-level radioactive waste to the repository in sufficient detail to provide assurances that these shipments **will** be transported safely and uneventfully. This transportation plan should be heavily based upon the successful transportation safety plan and program for shipments to the Waste Isolation Pilot Plant that was developed in cooperation with western states and DOE. In addition, DOE should incorporate the following National Academy of Sciences' recommendations for enhancing the safety and security of spent fuel and high-level waste shipments from their 2006 study of spent fuel and high-level radioactive waste transport:

- An independent examination of the security of spent fuel and high-level waste transportation should be conducted before large quantity repository shipments to a repository begin including an evaluation of the threat environment, response of packages to credible malevolent acts, and operational security requirements for protecting spent fuel and high-level waste in transport.
- Transportation planners and managers should conduct detailed surveys of transportation routes to identify potential hazards that could lead to or exacerbate extreme accidents involving very long duration, high temperature, fully engulfing fires; planners should take steps to avoid or mitigate such hazards before shipments begin.
- Full-scale package testing should continue to be used as part of the analytical and testing programs to validate package performance.
- DOE should continue to ensure effective involvement of states and tribes in routing and scheduling of DOE spent fuel shipments.
- DOE should fully implement its dedicated train and mostly rail decision before DOE begins transporting nuclear waste to the repository to avoid the need for a stopgap shipping program using general trains.

- DOE should identify and make public its suite of preferred highway and rail routes for transporting spent fuel and high-level waste to a repository as soon as practicable to support state and local planning, especially emergency response planning and follow the foreign research reactor spent fuel program in involving states and tribes in these route selections to obtain access to their familiarity with accident rates, traffic and road conditions and emergency preparedness.
- There are clear safety advantages from shipping older (radiologically and thermally cooler) spent fuel first. The radiological risk from spent fuel transport drops sharply depending upon the age of the spent fuel. Therefore, the risk from these shipments would drop dramatically as well if the spent fuel generators and owners could be persuaded by DOE to ship their older fuel first. DOE should negotiate with commercial spent fuel owners to ship the older fuel first except where spent fuel storage risks at specific plants dictate the need for immediate shipments;
- DOE should begin shipments through a pilot program involving relatively short, logistically simple movements of oldest fuel from closed reactors to demonstrate the ability to transport this waste in a safe and operationally effective manner.
- DOE should immediately begin to carry out its emergency responder preparedness responsibilities defined in Section 180 (c) of the NWPA. DOE should establish a cadre of professional of emergency responders to work with the Department of Homeland Security to provide consolidated "all-hazards" training materials and programs for first responders, include trained emergency responders on the shipment escort teams, use emergency responder preparedness programs for community outreach along planned routes.
- DOE should work with the Department of Homeland Security, Department of Transportation, and NRC to develop, apply, and disclose consistent, reasonable and understandable criteria for protecting sensitive information about spent fuel and high-level waste shipments. They should commit to the open sharing of information that does not require protection and should facilitate timely access to such information.
- DOE and Congress should examine options for changing the organizational structure of DOE's spent fuel transportation program to give the transportation program greater planning authority, greater flexibility to support future transportation programs and make the multiyear commitments needed to plan for, procure and construct the necessary transportation infrastructure.

In addition, the DSEIS should commit to developing a schedule, identifying routes and shipment modes and order for shipments from specific sites and how states and local jurisdictions will be notified sufficiently in advance of shipments and provided assistance to allow states, tribes and local jurisdictions to plan, train and prepare for these shipments. If DOE follows the shipment order queue as currently envisioned, there will be a hodgepodge of repository shipments from various sites with spent fuel owners and generators having the option of trading places in the shipment queue with other shipping generators/sites. Routes could open for a few years for a few shipments and then possibly close again for a few more years, with the result that state and local planning and emergency response preparation for these shipments would occur in fits and starts with potential lapses in funding and resources available for retraining and maintaining emergency response equipment appropriate for responding to accidents involving these shipments.

DOE should work with the utilities and affected states and tribes to develop a national transportation plan for repository shipments that includes a reasonable shipment schedule and site shipping priorities taking into consideration state and local needs for an overall predictable schedule and sufficient advance notification of shipments to allow adequate state and local jurisdictions to prepare adequately for these shipments.

15. **If DOE plans to use State Route 127 as an access route for repository shipments by truck, the Draft SEiS should carefully assess the risks and potential impacts from using this route for shipments as well as its potential use for heavy trucks needed for repository construction and operation activities and rail line construction.**

California officials have expressed concern that DOE will route spent fuel and high-level waste shipments on California roads not designated for heavy truck traffic, such as State Route 127 in southern California for spent fuel shipments from eastern states to the proposed repository. SR 127 is the major access route to the Death Valley National Park and is not approved for highway-route-controlled quantity shipments, such as spent nuclear fuel. Concerns about the use of SR 127 for Yucca Mountain shipments include its road conditions, periodic flash floods, seasonal peaks in tourists (Death Valley National Park has approximately 800,000 to 1.25 million visitors each year), the scarcity and remoteness of emergency responders in the region, and the impacts on the road from increased heavy truck traffic.

However, there are limited southern access routes to Yucca Mountain. Concern in California increased with DOE's decision to reroute through California via SR-127 a major portion of DOE's nuclear waste shipments to and from the Nevada Test Site (NTS) through California via SR 127. Beginning in January 2000, DOE began using SR-127 for a major portion of thousands of low-level radioactive waste shipments to NTS. Later DOE transported transuranic waste shipments on SR 127 from NTS to WIPP, although there were shorter, more direct routes in Nevada. U.S. Senators Dianne Feinstein and Barbara Boxer, the California Congressional chairs Sam Farr and Jerry Lewis, as well as Inyo and San Bernardino Counties, and the Cities of Needles and Barstow, strongly objected to rerouting these shipments from eastern states through California over greater distances.

SR 127 was analyzed in the Draft EIS (2002) as part of an alternate route for repository shipments. U.S. Department of Transportation regulations restrict DOE shipments to interstate highways, bypasses or beltways or routes designated by a state or tribe. SR127 was proposed by the State of Nevada as an alternate route and was included for analysis in the Draft EIS (2002) as part of a sensitivity analysis of potential routes. The sensitivity analysis concluded in the EIS that routes using SR-127 (Cases 2 and 3) as comparing favorably to the base case. It appears that California's concerns about the use of SR 127 were not adequately incorporated in the EIS evaluation. If DOE contemplates using SR 127 as an access route for spent fuel shipments by truck to the repository, the revised DSEIS should carefully assess the potential risks and impacts, including the impacts from heavy truck use along this route during repository construction as well as the construction of the rail alignment to the Yucca site.

16. **DOE should provide details for how it plans to achieve its objective of transporting 90% of the shipments by rail in TADS and explain to what extent truck shipments may be used, as opposed to rail, during the initial**

years of shipment pending construction, completion and operation of a rail line to Yucca Mountain.

The DSEIS should describe how DOE will make-up its dedicated trains at reactor shipment origin sites or nearby rail yards and how it will address infrastructure limitations at reactor sites (e.g., sites which lack spent fuel repackaging facilities and equipment or rail access, etc.) The possibility of shipment mostly by truck should be fully evaluated as an alternative in the DSEIS including truck shipments to Yucca Mountain from all waste generator sites over the life of the project in the event that a rail line is not constructed to Yucca Mountain. DOE should describe the likely ratio of rail use to heavy-haul truck use, describe the procedures and locations for the intermodal transfer of waste, needed safety measures and routes, and assess the impacts. DOE should also describe the possibility of a northern and southern approach to Yucca Mountain that would accommodate seasonal weather or road/rail conditions. DOE should present a range of TAD implementation scenarios and not rely solely on a "90% use of TADs", since there are uncertainties associated with use of TAD at each reactor site (for example, some sites lack cask handling capabilities; more than 10% of the spent fuel may already be packaged and sealed in dual-purpose canisters.)

The DSEIS should describe the safety record of rail transport of hazardous and radioactive materials in the US.

INADEQUATE ANALYSIS OF POTENTIAL GROUNDWATER IMPACTS IN CALIFORNIA

17. DOE has failed to analyze adequately the potential ground water and other environmental impacts in California.

In 2000, thirteen California agencies, in a comprehensive review of the Draft EIS for the repository, found serious deficiencies in DOE's evaluation of groundwater and transportation impacts in California. California agencies identified potential groundwater impacts in the Death Valley region, impacts on wildlife, habitat and public parks, as well as transportation impacts in California from the repository. DOE is fully obligated under NEPA to provide a complete evaluation and disclosure of these impacts and provide adequate notice to the communities potentially affected by the proposed project.

Groundwater flowing beneath Yucca Mountain discharges in springs to the south, including Furnace Creek Springs in Death Valley, California. This is a potential pathway for radioactive contaminants that may leak from the waste packages in the repository to reach these springs in Death Valley. The DSEIS should better characterize regional hydrogeology in the Amargosa and Death Valley areas to evaluate groundwater flow and evaluate the potential impact from radionuclide contaminant migration toward aquifers in California. Further, the Draft SEIS should propose mitigation measures, for example, a monitoring program to detect potential radionuclide migration from the repository into California aquifers.

The DSEIS summarizes Inyo County's groundwater studies program and that a primary focus of the County "has been the investigation of the source of water that discharges from the various springs on the east side of Death Valley and whether there is a hydraulic connection between those springs and the groundwater moving beneath Yucca Mountain." The County has concluded that they have strong scientific evidence through geochemical

analysis that the Lower Carbonate Aquifer (LCA), which underlies the repository, has several discharge points on the western side of the Funeral Mountains in the Furnace Creek area of Death Valley National Park. The DSEIS and Inyo County's research suggest that groundwater discharged in the Death Valley National Park is mixed with other groundwater sources from the Ash Meadows area and the Amargosa Desert.

DOE assumes that because the volcanic aquifers do not discharge into the Death Valley National Park, that no impacts to the Park are anticipated. Inyo County disagrees and believes that the Park will be potentially affected by contaminated discharge from the LCA, and **not** the volcanic aquifers. DOE concedes that Inyo County, but not the Park, will be impacted from contaminants in the volcanic aquifers. Radionuclides in the volcanic aquifers will surface at Franklin Lake Playa and Alkali Flat, near Death Valley Junction, California. However, the DOE predicts this will happen after any applicable compliance period.

Inyo County observed that "the most glaring omission in the DSEIS is that it contains no meaningful assessment of potential impacts to the LCA." The DSEIS makes no predictions, based upon water infiltration and waste package corrosion rates, or groundwater migration times, of the severity or timeframe for impacts to the LCA, or its discharges points in the Park. Accordingly, the DSEIS contain no impact assessment for plant life, wildlife, wildlife habitat or drinking water supplies in the Park that could potentially be impacted by migrating radiouclides from the repository.

Although the 2002 Final Environmental Impact Statement for a Geologic Repository at Yucca Mountain, Nevada (2002 FEIS) frequently references ongoing groundwater impact studies, the Draft Repository SEIS contains little new information on studies conducted by the DOE, the State of Nevada, or Nye and Inyo Counties. DOE notes that Death Valley proper is the regional hydrological sink for surface and groundwater. However, the Yucca Mountain regional hydrographic map on page 3-33 (Figure 3.9) in the "Affected Environment" section fails to include California in terms of hydrographic areas, even though maps on pages 3-28 (figure 3-7) and 3-30 (Figure 3-8) clearly show California and Death Valley as part of the Death Valley regional groundwater flow system, receiving flow from both the volcanic aquifers and the LCA.

We believe that Inyo County has a legitimate objective to ensure protection for current and future water supplies and its living environment. Issues they have raised concerning potential groundwater impacts in Inyo County should be evaluated, for example, does groundwater pumping in the region for repository construction, operation and closure affect potential groundwater migration from the repository site? Additional information is needed on the impacts of groundwater pumping as well as the potential aquifer contamination and the migration of contaminated groundwater from the Yucca site to eastern Death Valley. In addition, monitoring wells (and high capacity extraction wells) should be strategically located around the repository to detect any early "leaks" into any of the groundwater aquifers. A series of monitoring wells (with high capacity extraction capabilities) should be placed into the aquifers along the California border to track and extract any contamination plumes should radionuclide migration and groundwater contamination occur.

Inyo County has concluded that an upper gradient exists in the LCA, which causes LCA water to move upward into the volcanic aquifers because of a steep down gradient found in the vicinity of Yucca Mountain. They note that the upper gradient is considered to be ephemeral and very fragile and that the upper gradient could be degraded by regional groundwater pumping, both from the LCA and volcanic aquifers. DOE maintains that the

future effects of groundwater pumping are highly speculative, and need not be considered in any NEPA analysis. Therefore, they do not propose any analysis of the impacts from groundwater pumping in the region, nor any regulatory measures to maintain the upper gradient. Inyo County strongly disagrees with this assertion and recommends that DOE should consider present pumping rates and its impact on the upper gradient and radionuclide migration. We agree with Inyo County's conclusion that any NEPA analysis of repository performance and radionuclide migration that does not take into account the effects of groundwater pumping is incomplete and completely inadequate. Therefore, we recommend that DOE evaluate the effects of groundwater pumping on repository performance and potential radionuclide migration.

Groundwater is proposed to be used for repository construction and operation. DOE would pump groundwater from wells in the Jackass Flats hydrographic area in Nevada. Groundwater from that area flows into Amargosa Desert aquifers. The Draft SEIS notes that because these aquifers are used for the regional water demand, the potential effects of DOE groundwater use on this down gradient use is of particular concern (Draft SEIS, p. S-24).

18. **DOE should provide a clean-up or remediation plan for potential radionuclides surfacing at Alkali Flat/Franklin Lake Playa**

Inyo County noted that the 2002 FEIS states that water from beneath Yucca Mountain surfaces at Alkali Flat and Franklin Lake Playa, and that 69,000 people could be exposed to contaminated groundwater. The County believes it is the DOE's responsibility to implement a mitigation/remediation plan, and an evacuation plan should the repository suffer a catastrophic failure. We agree.

CONCERNS ABOUT THE SUITABILITY OF THE YUCCA MOUNTAIN SITE AND PROPOSED PROJECT FOR PERMANENT WASTE ISOLATION

19. **The Revised DSEIS should address the high level of uncertainty regarding the performance of the engineered and geologic barriers in isolating the nuclear waste from the environment.**

Site selection and the geologic barriers at the site are the most important characteristics in determining the performance of a repository in permanently isolating the waste from the environment. The International Atomic Energy Association (IAEA) in 2003 established siting criteria for high-level nuclear waste repositories which include long-term tectonic stability, low-groundwater content and flow, stable geochemistry at depth, including a reducing environment and equilibrium between rock and water, and that the site is excavatable. The Yucca Mountain site violates two of the four IAEA siting criteria. The site is tectonically active (has earthquakes and volcanoes) and has an oxidizing geochemical environment, therefore, requiring more "engineering fixes" to isolate the wastes from the environment. For example, a volcano at the southern tip of Yucca Mountain is 80,000 years old and considered still active. Five Quaternary basaltic volcanoes are located within 20 km of Yucca Mountain. Also the site provides an "oxidizing environment" rather than a reducing geochemical environment, for the waste packages. Oxidizing environments would corrode the metal casks holding the waste. The US is the only country using an oxidizing environment for high-level waste storage, which introduces large uncertainties in the performance of the repository.

The Yucca Mountain site is a complex site geologically with considerable uncertainty regarding its ability to permanently isolate the waste from the environment. Scientists including Dr. Allison Macfarlane, a Massachusetts Institute of Technology researcher, question whether Yucca Mountain is a suitable site for geologic disposal, especially when you extend the time out to1 million years. In addition, the rock at the site has proven to be more porous than previously thought, raising major concerns about contamination of groundwater. In recent years, scientists discovered that radioactive contaminants from nuclear weapons tests in the 1950s at the Nevada Test Site had migrated downward with rain water to more than 600 feet below ground at rates far faster than predicted by DOE. This raises concern about the risk of corrosion of the waste containers in which the waste would be stored, as well as the potential for much more rapid spread of contaminated groundwater.

Because of flaws in the geology of the site, DOE has turned to what are called "engineering fixes" to try to contain the waste. The DSEIS should address concerns over earthquakes and groundwater movement on repository performance as well as the high level of uncertainty regarding the performance of the proposed engineered and geologic barriers in permanently isolating the nuclear waste.

20. **DOE's plan to install drip shields raises uncertainties that should be addressed in the DSEIS.**

DOE proposes to install titanium drip shields during a ten-year period after the NRC has approved a license amendment to close the repository (approximately 90 years from the time of first waste emplacement) or as many as 290 years. It is difficult to predict the condition of the subsurface conditions 100 to 300 years from now, since once waste packages are emplaced in the repository, access to portions of the repository may be limited. Given uncertainties, DOE's plan to install drip shields and their reliance on this plan in their repository performance assessment is not supportable. DOE should evaluate the advantages of installing drip shields as waste is emplaced, rather than postponing it decades to hundreds of years later when access to the waste containers and supplies of titanium may be limited.

21. The Final U.S. EPA Radiation Protection Standard has not been adopted.

The US Environmental Protection Agency's (EPA) role is to determine how the Yucca Mountain high-level waste facility must perform to protect public health and safety. However, EPA has yet to issue a final radiation protection standard for the repository. Congress directed EPA to develop public health and safety standards that would be incorporated into the NRC's licensing requirements for the Yucca Mountain facility. The EPA issued a Draft Radiation Protection Standard (2005) for the repository but it has not yet issued a final standard. Under the proposed new standard, estimated repository performance for the first 10,000 years is a dose limit of 15 millirem per year. From 10,000 to one million years, EPA proposed a dose limit of 350 millirem per year. One million years is consistent with the time period cited by the National Academy of Sciences as providing a reasonable basis for projecting the performance of the disposal system. EPAs proposal would require that DOE demonstrate that Yucca Mountain can safely contain the wastes, even considering the effects of earthquakes, volcanic activity, climate change, and container corrosion over one million years.

DOE does not believe it needs EPAs final radiation protection standard to develop or submit its license application for the proposed repository. However, we believe that DOE cannot demonstrate in the NEPA process whether it can meet a radiation protection standard to protect public health and the environment if that standard has not yet been issued in its final form. Therefore, the DSEIS should use the Final EPA Radiation Protection Standard, rather than the Draft Standard, to evaluate the performance of the repository.

POTENTIAL SOCIO-ECONOMIC AND WILDLIFE IMPACTS IN CALIFORNIA

22. DOE's analysis of the potential socio-economic impacts from the proposed repository is inadequate.

The potential economic losses from severe accidents and/or successful terrorist attacks or sabotage against a repository shipment should be evaluated including cleanup and recovery costs resulting from a release of radioactive materials.

DOE considers Inyo County outside of the "region of influence" for socio-economic impact analysis under NEPA. We strongly disagree with this conclusion, as the repository is approximately 15 miles from the California-Nevada border and Inyo County line and the boundary for Death Valley National Park. The Park has approximately 800,000 to 1.25 million visitors each year, many of whom are foreign tourists. Inyo County relies heavily on tourism revenues from the Park, as well as other regional attractions. Inyo County is concerned about reduced tourism revenues, as well as decreases in real and business properties resulting from repository operations and the transportation of nuclear waste through the County. Therefore, Inyo County and California should be considered within the "region of influence" for socio-economic impact analysis because of the proximity to the repository site. Without meaningful analysis in the DSEIS of potential socio-economic impacts to Inyo County, DOE's NEPA analyses for the project are incomplete. The DSEIS should evaluate the socio-economic impacts to Inyo County from the proposed repository.

Finally, the DSEIS should describe and fully analyze the potential impacts from the proposed repository, including transportation and groundwater impacts as well as impacts on wildlife, natural habitat and public use parks in California.

Conclusion

The State of California in cooperation with applicable local jurisdictions reviewed U.S. DOE's Draft Repository Supplemental Environmental Impact Statement and the Draft Nevada Rail Corridor/Alignment Environmental Impact Statements. We concluded that the environmental review of the proposed project is significantly lacking in its project description, analysis of alternatives, and meeting the procedural and fundamental requirements of NEPA.

DOE has not conducted a thorough analysis of potentially significant impacts to California in several areas. We respectfully urge DOE to: (1) augment its NEPA analyses in the areas we have identified, (2) recirculate for public review another revised DSEIS and RA DEIS, and (3) expand the public notice and public meeting opportunity for comment to include the major affected California communities that face potentially significant impacts from the proposed project at Yucca Mountain. The revised EISs

should address the deficiencies identified in the NEPA documents for the proposed Yucca Mountain project including the potential transportation and groundwater impacts, as well as impacts on wildlife, natural habitat and public use parks in California.