

State of Nevada



Nuclear Waste Project Office

Capitol Complex
Carson City, NV 89710

702/687-3744

Fax 702/687-5277

Facsimile Transmission

To: Mr. Edward Shum, NRC

From: Bob Lowy

Date: 6/19/98 Time: 4:15 pm Total Pages: 13

Comments: Nevada comments on NRC's
NOI for the Private Fuel Storage
EIS.

ROB MILLER
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director



OFFICE OF THE GOVERNOR
AGENCY FOR NUCLEAR PROJECTS

1802 N. Carson Street, Suite 252
Carson City, Nevada 89701

Telephone: (702) 687-3744 • Fax: (702) 687-5277

E-mail: nwpo@govmail.state.nv.us

June 19, 1998

Dr. Edward Y. Shum
Environmental Project Manager
Spent Fuel Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
Nuclear Regulation Commission
Washington, D.C. 20555

RE: Scope of the Private Fuel Storage, L.L.C. (PFS)
Environmental Impact Statement, Docket No. 72-22

Dear Dr. Shum:

The comments which follow are provided by the Nevada Agency for Nuclear Projects on behalf of the State of Nevada in response to the U.S. Nuclear Regulatory Commission's (NRC) Notice of Intent (NOI) To Prepare an Environmental Impact Statement (EIS) and Conduct Scoping Process for the Private Fuel Storage, L.L.C., (PFS) Independent Spent Fuel Storage Installation (ISFSI), Skull Valley Indian Reservation, Tooele County, Utah (Federal Register, Volume 63, No. 84, May 1, 1998, pp. 24197 - 24198).

PFS is seeking NRC approval to construct and operate a 40,000 MTU capacity spent fuel storage facility at a location approximately 75 miles from the Nevada-Utah border. The State of Nevada, Nevada local governments, and Nevada Indian Tribes would be directly affected by thousands of spent nuclear fuel shipments to and from the proposed PFS storage facility in Utah.

It is therefore imperative that NRC's EIS fully address the risks and impacts of spent fuel transportation to and from the proposed PFS storage facility. The attached comments are intended to

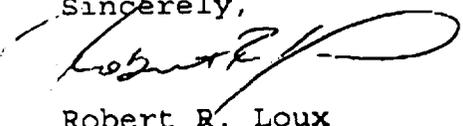
9806290196 980619
PDR ADOCK 07200022
C PDR

Handwritten signature/initials

assist NRC with the development of an EIS Implementation Plan that will result in a final National Environmental Policy Act (NEPA) decision document that adequately assesses transportation impacts associated with the PFS facility, and assures compliance with both the letter and spirit of NEPA.

Thank you for the opportunity to participate in the EIS scoping process.

Sincerely,



Robert R. Loux
Executive Director

RRL/js

cc WIEB HLW Committee

**SCOPE OF THE PRIVATE FUEL STORAGE ENVIRONMENTAL IMPACT STATEMENT
WITH RESPECT TO TRANSPORTATION IMPACTS AND RISKS**

**COMMENTS
SUBMITTED TO
THE U.S. NUCLEAR REGULATORY COMMISSION
BY
THE STATE OF NEVADA
AGENCY FOR NUCLEAR PROJECTS
JUNE 19, 1998**

The comments which follow are provided by the Nevada Agency for Nuclear Projects on behalf of the State of Nevada in response to the U.S. Nuclear Regulatory Commission's (NRC) Notice of Intent (NOI) To Prepare an Environmental Impact Statement (EIS) and Conduct Scoping Process for the Private Fuel Storage, L.L.C., (PFS) Independent Spent Fuel Storage Installation (ISFSI), Skull Valley Indian Reservation, Tooele County, Utah (Federal Register, Volume 63, No. 84, May 1, 1998, pp. 24197 - 24198).

PFS is seeking NRC approval to construct and operate a 40,000 MTU capacity spent fuel storage facility at a location approximately 75 miles from the Nevada-Utah border. The State of Nevada, Nevada local governments, and Nevada Indian Tribes would be directly affected by thousands of spent nuclear fuel shipments to and from the proposed PFS storage facility in Utah.

It is therefore imperative that NRC's EIS fully address the risks and impacts of spent fuel transportation to and from the proposed PFS storage facility. The attached comments are intended to assist NRC with the development of an EIS Implementation Plan that will result in a final National Environmental Policy Act (NEPA) decision document that adequately assesses transportation impacts associated with the PFS facility, and assures compliance with both the letter and spirit of NEPA.

The PFS EIS must contain a comprehensive and detailed analysis of spent fuel transportation activities and their impacts. Such analysis must be route specific, not a generic analysis using

hypothetical routes.¹ The transportation assessment in the EIS must also contain detailed analyses of modes of shipment to be used, including intermodal transport (i.e., barge, rail, legal weight truck, and heavy haul truck). The EIS must be reactor/generator-specific in its analyses, since the capabilities and characteristics of each reactor generator/storage site are known and can be examined as part of the EIS transportation assessment.

The EIS must also assess the national transportation system and identify the constraints and potential problems that exist with respect to spent fuel shipments.¹ Without a complete and quantified assessment of system constraints, it is not possible to adequately undertake the evaluation of transportation impacts required for the EIS.

1.0 General Comments on PFS EIS Transportation Impact Assessment

NRC must take a comprehensive and integrated approach to determining transportation impacts and risks in the EIS. Under the action proposed by PFS, a spent fuel storage facility located at the Skull Valley Indian Reservation would receive 4,000 or more cask-shipments of spent fuel from as many as 80 sites around the country. The EIS must examine, in detail, how the transportation of spent fuel to Utah specifically will affect people and the environment nationwide. Additionally, the EIS must address the risks and impacts of spent fuel shipments from PFS to Yucca Mountain in the event that the proposed geologic repository is licensed. Moreover, the EIS must address transportation risks and impacts of shipments from PFS back to the originating sites or to some other destination in the event that the Yucca Mountain repository site is found unlicensable, or in the event that the repository fails and the emplaced waste must be retrieved and shipped to another disposal site.

¹ Examples of route-specific transportation scenarios are contained in Planning Information Corporation, "The Transportation of Spent Nuclear Fuel and High-Level Waste: A Systematic Basis for Planning and Management at National, Regional and Community Levels" Prepared for the Nevada Agency for Nuclear Projects, September, 1996.

The PFS EIS must provide specific information on the highway and rail routes likely to be used for nuclear waste shipments to Utah, and from Utah to Nevada. Individuals and communities along transportation corridors are entitled to such information early in the scoping process so that they can identify and evaluate potential impacts and meaningfully participate in the EIS process before any final decisions have been made. NRC could have facilitated public participation by publishing route maps as part of the Federal Register notice or by distributing maps of the most likely shipping routes at the scoping meeting in Salt Lake City. At the very least, national route maps should be included in the Draft EIS, particularly in the executive summary of the Draft EIS.

The PFS EIS must identify the Indian reservations potentially affected by spent fuel shipments to Utah, and from Utah to Nevada. Analyses prepared for the State of Nevada have identified as many as 50 Indian reservations which could potentially be affected by shipments to Nevada. A comparable number of reservations could be affected by shipments from reactors to the PFS facility in Utah. Many of the potentially affected Indian reservations have not previously been involved with nuclear waste transportation planning. NRC must therefore develop a plan for Indian tribe participation in the review of the Draft EIS. NRC should be prepared to provide technical and financial assistance upon request by the potentially affected tribes.

2.0 Types, Quantities, and Key Characteristics of Spent Fuel to be Shipped to the Private Fuel Storage Facility

The PFS EIS must provide detailed information on the types, quantities, and key characteristics of the civilian spent nuclear fuels to be shipped to the PFS facility, and from PFS to the repository.

The PFS EIS must accurately portray the great variety of civilian spent nuclear fuels that may be shipped to the PFS facility from Pressurized Water Reactors (PWRs), Boiling Water Reactors (BWRs), and the Ft. St. Vrain high temperature gas-cooled reactor (HTG). The commercial fuel assemblies destined for PFS, and ultimately for the repository, include a wide range of designs and sizes, initial enrichments, burnup histories,

cooling times, physical conditions, and radiological characteristics. Radiological characteristics are a primary determinant of risks involved in transporting a particular type, design, or batch of spent fuel, or even a single sample. In past repository program documents, for example, DOE has used as the reference fuel type a 10-year old, moderately high burnup PWR assembly with a surface dose rate sufficient to give a lethal radiation dose (500 REMS) to an unshielded individual one meter away in 2.5 to 3.0 minutes. The PFS facility could potentially receive even more highly radioactive 5-year old, high-burnup spent fuel.

NRC should include a detailed description of the most representative PWR, BWR, and HTG fuel assemblies, in the body of the PFS EIS. Each reference spent fuel type should be illustrated with photographs and schematic drawings. Illustrations should also be used to explain variations such as failed fuel and consolidated fuel. Summary technical data should be provided for each reference fuel type, including: physical dimensions, weight, initial enrichment, burnup, cooling time, and key radiological characteristics; total radioactivity, radionuclide composition, surface dose rate, thermal output, and changes over time in each of these characteristics. The radionuclide consequences of exposure and contamination associated with each reference fuel type should be presented in terms understandable to the general public, and these consequences should be presented in the Executive Summary as well as in the body of the Draft PFS EIS.

3.0 Maximum Credible Number of Spent Fuel Shipments

The PFS EIS must address the maximum number of spent fuel shipments to and from the PFS facility. PFS has stated that rail shipment of large multipurpose canisters will be the preferred mode of transporting spent fuel from reactors to Utah, and from Utah to Yucca Mountain. Approximately 4,000 cask-shipments would be received, and another 4,000 casks shipped out, under the PFS base case scenario. A much larger number of shipments could occur if the PFS facility receives or ships spent fuel in legal-weight truck casks, or in smaller capacity rail casks. In the Draft EIS, therefore, NRC must evaluate the maximum credible number of shipments under other scenarios (e.g., 60% rail, 40% truck),

unless NRC intends to condition the PFS license to require that all shipments in and out use large rail casks. Further, unless PFS commits to use dedicated trains, or unless NRC requires use of dedicated trains, each rail cask-shipment must be considered a separate shipment hauled in a mixed-freight train.

4.0 Modal Mix Issues

The PFS EIS must include a discussion of the general and site-specific issues which will determine the selection of cask types and sizes, shipment modes, and service options. At a minimum, this discussion must address: (1) shipping cask availability and capacity assumptions; (2) storage facility interface capability assumptions; (3) near-site transportation infrastructures and routing assumptions; and, (4) potential intermodal transfers using heavy haul trucks (HHTs) and barges, including potential HHT transport of rail casks to the proposed storage site. Of particular importance, the PFS EIS must address the comparative advantages and disadvantages of using large rail casks (loaded weight 125 tons or greater) as opposed to smaller rail casks (75 to 80 tons loaded weight) and/or legal-weight truck casks (loaded weight 20 to 26 tons). The PFS EIS must also address the comparative advantages and disadvantages of shipping spent fuel casks in dedicated trains and mixed freight trains and the potential use of truck convoys.

5.0 Route Selection Issues

The PFS EIS must include a discussion of route selection issues. The discussion should provide an overview of federal routing regulations, state/tribe/local government routing authorities, and industry practices.

It is difficult to see how the PFS EIS can adequately assess the impacts of spent fuel transportation system-wide without containing route specific analyses. At a minimum, the EIS must contain at least a "strawman" route selection exercise using available information and models and based on federal routing regulations as they exist today. Such an exercise could be used to assess the adequacy of route selection requirements and

procedures for these shipments and form the basis for suggesting changes in regulations as possible mitigation measures. The Western Interstate Energy Board has done extensive work on route selection, and that information is readily available to PFS and NRC.

6.0 Rail Routes

The PFS EIS must identify the most likely rail routes to be used for spent fuel shipments from reactors to the PFS facility, and from PFS to Yucca Mountain. The Draft EIS must also include a discussion of factors which could affect current rail industry routing practices and/or change the assumptions upon which the most likely rail routes are based. The following factors must be considered: (1) new federal routing regulations; (2) rail industry mergers and acquisitions; (3) rail line abandonments; (4) use of large rail casks; (5) use of dedicated trains; and (6) availability of rail access to Skull Valley and/or Yucca Mountain.

7.0 Highway Routes

The PFS EIS must identify the most likely highway routes for spent fuel shipments from reactors to the PFS facility, and address the potential impacts of alternative route designations in Utah, Nevada, Colorado, and other states.

8.0 Transportation Risk Assessment Issues

The PFS EIS must include a detailed discussion of NRC's approach to transportation risk assessment, risk management, and risk communication. This discussion must include an objective evaluation of various risk assessment methodologies (and data requirements) that include, but is not necessarily limited to, worst case scenario analysis, probabilistic risk assessment (PRA), and comprehensive risk assessment (CRA). One crucial element of CRA is the use of the EIS as a risk management tool.

The PFS EIS must examine the full range of credible transportation risks and impacts, especially low probability/high consequence events such as very severe accidents and successful terrorist attacks which might result in loss of radiation

shielding and/or release of radioactive materials to the environment. The NRC's Modal Study (NUREG/CR-4829) is not adequate for this purpose. State of Nevada staff and consultants have identified a number of accident scenarios which could potentially result in significant loss of shielding and/or containment, including a high-speed rail collision followed by a long-duration fire; a truck cask collision involving another truck loaded with commercial or military explosives; a truck or rail cask involved in a massive infrastructure failure or natural disaster; and a rail or truck cask involved in an accident with aircraft carrying military explosives.

The PFS EIS must evaluate the potential consequences of a successful terrorist attack using armor-piercing weapons against the shipping cask, as well as indirect attacks on shipping casks, for example, sabotage of bridges and other transportation infrastructure. The NRC's 1984 assessment of terrorism risks, summarized in the proposed rule modifying protection requirements for spent fuel shipments (Federal Register, Vol. 49, NO. 112, June 8, 1984, pp. 23867 - 23872) is not adequate for this purpose. State of Nevada staff and consultants have identified a number of terrorism/sabotage scenarios involving high-energy explosive devices which could potentially result in significant loss of shielding and/or containment. The NRC must reexamine the entire issue of terrorism/sabotage against spent fuel shipments, and specifically evaluate the potential consequences of attacks involving state-of-the-art military demolition charges, commercial conical shaped charges, commercial cutting charges, massive truck bombs, man-portable mortars, rifle-fired grenades, recoilless guns, and anti-tank missiles.

The State of Nevada recommends that NRC adopt the following approach for evaluating transportation accidents and incidents in the PFS EIS.

High Probability/Low Consequence Events

- a. Radiological impacts of uninterrupted, routine shipments
- b. Regulatory incidents (eg., "weeping")

- c. Equipment failures
- d. Bad weather disruptions
- e. Minor accidents
- f. Traffic "gridlock" incidents (worker exposure, public exposure, and perceived risk)

Low Probability/High Consequence Events

- a. Extremely severe accidents
- b. Catastrophic infrastructure failures
- c. Natural disasters
- d. Successful terrorist attacks or sabotage incidents
- e. Unanticipated human errors (individual, collective, and organizational)

9.0 Transportation Accident Liability Issues

The PFS EIS must explain how the Price-Anderson Act liability system will apply to shipments from reactors to the PFS facility, and from PFS to the repository .

10.0 Transportation Impacts on Highly-Populated Areas Along Transportation Corridors

The PFS proposal would result in this nation's first large-scale, multi-decade, nationwide shipping campaign to one single destination. Therefore, the PFS EIS must address the special risks and impacts associated with large-scale shipments through highly populated areas. Rail shipments will be a major source of concern, since most of the high-quality track nationally connects and traverses major urban areas, and many rail yards and carrier interchanges are located in urban areas (for example, Cleveland, Chicago, Atlanta, Nashville, St. Louis, Kansas City, Salt Lake City, Los Angeles, and San Bernadino). Truck shipments on

interstate routes chosen per U.S. Department of Transportation regulation HM 164 to bypass major downtown areas will still traverse highly populated suburban areas (Chicago, Des Moines, Omaha, St. Louis, Kansas City, Denver, Los Angeles, and Salt Lake City are prime examples). In other instances, such as I-15 through Las Vegas, alternative interstate routes are not available. The potential risks and impacts of severe accidents and terrorist incidents are exacerbated by proximity to concentrations of people and property.

Moreover, congested urban and suburban interstates create numerous situations where truck shipments could result in actual or perceived risks to the public even when a spent fuel shipment itself is not the cause of, or directly involved in, an accident. A shipment of spent fuel caught up in a gridlock incident for three or four hours, for example, could expose occupants of nearby vehicles to radiation doses in the range of 30 - 40 millirems. Under the Linear No Threshold theory, exposures at this level could cause adverse health effects in some members of the public. Even if no adverse physiological health effects result, such incidents create obvious potential for harmful psychological impacts to the persons involved, and media coverage of such "signal" events could heighten the public perception of risk generally.

11.0 Transportation Impacts on Difficult-to-Evacuate Locations

The PFS EIS must address potential impacts of spent fuel transportation on difficult-to-evacuate locations, such as schools, hospitals, hotels, prisons, shopping malls, sports stadiums, public parks, and recreational areas along shipping routes. A particular concern is the difficulty of evacuating large numbers of non-resident visitors in the event of a severe transportation accident near a major tourist area such as downtown Salt Lake City or the Las Vegas Strip.

12.0 Transportation Impacts on Economic Activities Sensitive to Public Perception of Risk

The PFS EIS must address the potential adverse impacts of large numbers of spent fuel shipments on tourism-based economies located near transportation corridors. State-of-the-art risk studies sponsored by the State of Nevada and by DOE have

documented the public perception of risks associated with nuclear waste transportation. These studies have also documented potential adverse impacts on tourist visits to areas affected by nuclear waste shipments. The PFS EIS should consider potential adverse impacts on year-round tourism (for example, in downtown Salt Lake City and Las Vegas), seasonal tourism (for example, ski resorts in Utah and Colorado), and special-event tourism (for example, the Salt Lake City Winter Olympics). The PFS EIS must also consider the effects of risk perception on property values along shipping routes, and risk-related impacts on business location and expansion decisions.

13.0 Transportation Impacts on Native American Lands, Religious Sites, Cultural Resources, and Off-Reservation Interests

The PFS EIS must identify the Indian reservations and off-reservation Indian interests potentially affected by transportation from reactors to the PFS facility, and from PFS to Yucca Mountain. Nationwide, as many as forty to fifty reservations could be affected. Impacts to be addressed include implications for land claims (for example, claims by the Western Shoshone National Council under the Ruby Valley Treaty of 1863); location of burial sites, ceremonial sites, and other site-specific cultural resources within rail corridors; "standard" (non-radiological) socioeconomic impact assessment of rail construction and operation; and the potential for "special" (nuclear-related) social, cultural, and economic impacts on Native American communities along shipping routes.

14.0 Transportation Impacts on Environmentally Sensitive Areas

The PFS EIS must identify and evaluate environmentally sensitive areas along potential spent fuel shipping routes. Given the nature of the materials to be transported, the magnitude of the shipping campaign that will be required, the wide geographical area involved, and the 30-50 year time frame for storage facility and repository shipments, it is important that weight be given, in the EIS assessment, to environmentally sensitive areas in identifying impacts, informing routing decisions, and developing mitigation plans.

BOB MILLER
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director



Faxed 6/19/98

OFFICE OF THE GOVERNOR
AGENCY FOR NUCLEAR PROJECTS

1802 N. Carson Street, Suite 252

Carson City, Nevada 89701

Telephone: (702) 687-3744 • Fax: (702) 687-5277

E-mail: nwpo@govmail.state.nv.us

June 19, 1998

Dr. Edward Y. Shum
Environmental Project Manager
Spent Fuel Licensing Section
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
Nuclear Regulation Commission
Washington, D.C. 20555

RE: Scope of the Private Fuel Storage, L.L.C. (PFS)
Environmental Impact Statement, Docket No. 72-22

Dear Dr. Shum:

The comments which follow are provided by the Nevada Agency for Nuclear Projects on behalf of the State of Nevada in response to the U.S. Nuclear Regulatory Commission's (NRC) Notice of Intent (NOI) To Prepare an Environmental Impact Statement (EIS) and Conduct Scoping Process for the Private Fuel Storage, L.L.C., (PFS) Independent Spent Fuel Storage Installation (ISFSI), Skull Valley Indian Reservation, Tooele County, Utah (Federal Register, Volume 63, No. 84, May 1, 1998, pp. 24197 - 24198).

PFS is seeking NRC approval to construct and operate a 40,000 MTU capacity spent fuel storage facility at a location approximately 75 miles from the Nevada-Utah border. The State of Nevada, Nevada local governments, and Nevada Indian Tribes would be directly affected by thousands of spent nuclear fuel shipments to and from the proposed PFS storage facility in Utah.

It is therefore imperative that NRC's EIS fully address the risks and impacts of spent fuel transportation to and from the proposed PFS storage facility. The attached comments are intended to

assist NRC with the development of an EIS Implementation Plan that will result in a final National Environmental Policy Act (NEPA) decision document that adequately assesses transportation impacts associated with the PFS facility, and assures compliance with both the letter and spirit of NEPA.

Thank you for the opportunity to participate in the EIS scoping process.

Sincerely,



Robert R. Loux
Executive Director

RRL/js

cc WIEB HLW Committee

**SCOPE OF THE PRIVATE FUEL STORAGE ENVIRONMENTAL IMPACT STATEMENT
WITH RESPECT TO TRANSPORTATION IMPACTS AND RISKS**

**COMMENTS
SUBMITTED TO
THE U.S. NUCLEAR REGULATORY COMMISSION
BY
THE STATE OF NEVADA
AGENCY FOR NUCLEAR PROJECTS
JUNE 19, 1998**

The comments which follow are provided by the Nevada Agency for Nuclear Projects on behalf of the State of Nevada in response to the U.S. Nuclear Regulatory Commission's (NRC) Notice of Intent (NOI) To Prepare an Environmental Impact Statement (EIS) and Conduct Scoping Process for the Private Fuel Storage, L.L.C., (PFS) Independent Spent Fuel Storage Installation (ISFSI), Skull Valley Indian Reservation, Tooele County, Utah (Federal Register, Volume 63, No. 84, May 1, 1998, pp. 24197 - 24198).

PFS is seeking NRC approval to construct and operate a 40,000 MTU capacity spent fuel storage facility at a location approximately 75 miles from the Nevada-Utah border. The State of Nevada, Nevada local governments, and Nevada Indian Tribes would be directly affected by thousands of spent nuclear fuel shipments to and from the proposed PFS storage facility in Utah.

It is therefore imperative that NRC's EIS fully address the risks and impacts of spent fuel transportation to and from the proposed PFS storage facility. The attached comments are intended to assist NRC with the development of an EIS Implementation Plan that will result in a final National Environmental Policy Act (NEPA) decision document that adequately assesses transportation impacts associated with the PFS facility, and assures compliance with both the letter and spirit of NEPA.

The PFS EIS must contain a comprehensive and detailed analysis of spent fuel transportation activities and their impacts. Such analysis must be route specific, not a generic analysis using

hypothetical routes.¹ The transportation assessment in the EIS must also contain detailed analyses of modes of shipment to be used, including intermodal transport (i.e., barge, rail, legal weight truck, and heavy haul truck). The EIS must be reactor/generator-specific in its analyses, since the capabilities and characteristics of each reactor generator/storage site are known and can be examined as part of the EIS transportation assessment.

The EIS must also assess the national transportation system and identify the constraints and potential problems that exist with respect to spent fuel shipments.¹ Without a complete and quantified assessment of system constraints, it is not possible to adequately undertake the evaluation of transportation impacts required for the EIS.

1.0 General Comments on PFS EIS Transportation Impact Assessment

NRC must take a comprehensive and integrated approach to determining transportation impacts and risks in the EIS. Under the action proposed by PFS, a spent fuel storage facility located at the Skull Valley Indian Reservation would receive 4,000 or more cask-shipments of spent fuel from as many as 80 sites around the country. The EIS must examine, in detail, how the transportation of spent fuel to Utah specifically will affect people and the environment nationwide. Additionally, the EIS must address the risks and impacts of spent fuel shipments from PFS to Yucca Mountain in the event that the proposed geologic repository is licensed. Moreover, the EIS must address transportation risks and impacts of shipments from PFS back to the originating sites or to some other destination in the event that the Yucca Mountain repository site is found unlicensable, or in the event that the repository fails and the emplaced waste must be retrieved and shipped to another disposal site.

¹ Examples of route-specific transportation scenarios are contained in Planning Information Corporation, "The Transportation of Spent Nuclear Fuel and High-Level Waste: A Systematic Basis for Planning and Management at National, Regional and Community Levels" Prepared for the Nevada Agency for Nuclear Projects, September, 1996.

The PFS EIS must provide specific information on the highway and rail routes likely to be used for nuclear waste shipments to Utah, and from Utah to Nevada. Individuals and communities along transportation corridors are entitled to such information early in the scoping process so that they can identify and evaluate potential impacts and meaningfully participate in the EIS process before any final decisions have been made. NRC could have facilitated public participation by publishing route maps as part of the Federal Register notice or by distributing maps of the most likely shipping routes at the scoping meeting in Salt Lake City. At the very least, national route maps should be included in the Draft EIS, particularly in the executive summary of the Draft EIS.

The PFS EIS must identify the Indian reservations potentially affected by spent fuel shipments to Utah, and from Utah to Nevada. Analyses prepared for the State of Nevada have identified as many as 50 Indian reservations which could potentially be affected by shipments to Nevada. A comparable number of reservations could be affected by shipments from reactors to the PFS facility in Utah. Many of the potentially affected Indian reservations have not previously been involved with nuclear waste transportation planning. NRC must therefore develop a plan for Indian tribe participation in the review of the Draft EIS. NRC should be prepared to provide technical and financial assistance upon request by the potentially affected tribes.

2.0 Types, Quantities, and Key Characteristics of Spent Fuel to be Shipped to the Private Fuel Storage Facility

The PFS EIS must provide detailed information on the types, quantities, and key characteristics of the civilian spent nuclear fuels to be shipped to the PFS facility, and from PFS to the repository.

The PFS EIS must accurately portray the great variety of civilian spent nuclear fuels that may be shipped to the PFS facility from Pressurized Water Reactors (PWRs), Boiling Water Reactors (BWRs), and the Ft. St. Vrain high temperature gas-cooled reactor (HTG). The commercial fuel assemblies destined for PFS, and ultimately for the repository, include a wide range of designs and sizes, initial enrichments, burnup histories,

cooling times, physical conditions, and radiological characteristics. Radiological characteristics are a primary determinant of risks involved in transporting a particular type, design, or batch of spent fuel, or even a single sample. In past repository program documents, for example, DOE has used as the reference fuel type a 10-year old, moderately high burnup PWR assembly with a surface dose rate sufficient to give a lethal radiation dose (500 REMS) to an unshielded individual one meter away in 2.5 to 3.0 minutes. The PFS facility could potentially receive even more highly radioactive 5-year old, high-burnup spent fuel.

NRC should include a detailed description of the most representative PWR, BWR, and HTG fuel assemblies, in the body of the PFS EIS. Each reference spent fuel type should be illustrated with photographs and schematic drawings. Illustrations should also be used to explain variations such as failed fuel and consolidated fuel. Summary technical data should be provided for each reference fuel type, including: physical dimensions, weight, initial enrichment, burnup, cooling time, and key radiological characteristics; total radioactivity, radionuclide composition, surface dose rate, thermal output, and changes over time in each of these characteristics. The radionuclide consequences of exposure and contamination associated with each reference fuel type should be presented in terms understandable to the general public, and these consequences should be presented in the Executive Summary as well as in the body of the Draft PFS EIS.

3.0 Maximum Credible Number of Spent Fuel Shipments

The PFS EIS must address the maximum number of spent fuel shipments to and from the PFS facility. PFS has stated that rail shipment of large multipurpose canisters will be the preferred mode of transporting spent fuel from reactors to Utah, and from Utah to Yucca Mountain. Approximately 4,000 cask-shipments would be received, and another 4,000 casks shipped out, under the PFS base case scenario. A much larger number of shipments could occur if the PFS facility receives or ships spent fuel in legal-weight truck casks, or in smaller capacity rail casks. In the Draft EIS, therefore, NRC must evaluate the maximum credible number of shipments under other scenarios (e.g., 60% rail, 40% truck),

unless NRC intends to condition the PFS license to require that all shipments in and out use large rail casks. Further, unless PFS commits to use dedicated trains, or unless NRC requires use of dedicated trains, each rail cask-shipment must be considered a separate shipment hauled in a mixed-freight train.

4.0 Modal Mix Issues

The PFS EIS must include a discussion of the general and site-specific issues which will determine the selection of cask types and sizes, shipment modes, and service options. At a minimum, this discussion must address: (1) shipping cask availability and capacity assumptions; (2) storage facility interface capability assumptions; (3) near-site transportation infrastructures and routing assumptions; and, (4) potential intermodal transfers using heavy haul trucks (HHTs) and barges, including potential HHT transport of rail casks to the proposed storage site. Of particular importance, the PFS EIS must address the comparative advantages and disadvantages of using large rail casks (loaded weight 125 tons or greater) as opposed to smaller rail casks (75 to 80 tons loaded weight) and/or legal-weight truck casks (loaded weight 20 to 26 tons). The PFS EIS must also address the comparative advantages and disadvantages of shipping spent fuel casks in dedicated trains and mixed freight trains and the potential use of truck convoys.

5.0 Route Selection Issues

The PFS EIS must include a discussion of route selection issues. The discussion should provide an overview of federal routing regulations, state/tribe/local government routing authorities, and industry practices.

It is difficult to see how the PFS EIS can adequately assess the impacts of spent fuel transportation system-wide without containing route specific analyses. At a minimum, the EIS must contain at least a "strawman" route selection exercise using available information and models and based on federal routing regulations as they exist today. Such an exercise could be used to assess the adequacy of route selection requirements and

procedures for these shipments and form the basis for suggesting changes in regulations as possible mitigation measures. The Western Interstate Energy Board has done extensive work on route selection, and that information is readily available to PFS and NRC.

6.0 Rail Routes

The PFS EIS must identify the most likely rail routes to be used for spent fuel shipments from reactors to the PFS facility, and from PFS to Yucca Mountain. The Draft EIS must also include a discussion of factors which could affect current rail industry routing practices and/or change the assumptions upon which the most likely rail routes are based. The following factors must be considered: (1) new federal routing regulations; (2) rail industry mergers and acquisitions; (3) rail line abandonments; (4) use of large rail casks; (5) use of dedicated trains; and (6) availability of rail access to Skull Valley and/or Yucca Mountain.

7.0 Highway Routes

The PFS EIS must identify the most likely highway routes for spent fuel shipments from reactors to the PFS facility, and address the potential impacts of alternative route designations in Utah, Nevada, Colorado, and other states.

8.0 Transportation Risk Assessment Issues

The PFS EIS must include a detailed discussion of NRC's approach to transportation risk assessment, risk management, and risk communication. This discussion must include an objective evaluation of various risk assessment methodologies (and data requirements) that include, but is not necessarily limited to, worst case scenario analysis, probabilistic risk assessment (PRA), and comprehensive risk assessment (CRA). One crucial element of CRA is the use of the EIS as a risk management tool.

The PFS EIS must examine the full range of credible transportation risks and impacts, especially low probability/high consequence events such as very severe accidents and successful terrorist attacks which might result in loss of radiation

shielding and/or release of radioactive materials to the environment. The NRC's Modal Study (NUREG/CR-4829) is not adequate for this purpose. State of Nevada staff and consultants have identified a number of accident scenarios which could potentially result in significant loss of shielding and/or containment, including a high-speed rail collision followed by a long-duration fire; a truck cask collision involving another truck loaded with commercial or military explosives; a truck or rail cask involved in a massive infrastructure failure or natural disaster; and a rail or truck cask involved in an accident with aircraft carrying military explosives.

The PFS EIS must evaluate the potential consequences of a successful terrorist attack using armor-piercing weapons against the shipping cask, as well as indirect attacks on shipping casks, for example, sabotage of bridges and other transportation infrastructure. The NRC's 1984 assessment of terrorism risks, summarized in the proposed rule modifying protection requirements for spent fuel shipments (Federal Register, Vol. 49, NO. 112, June 8, 1984, pp. 23867 - 23872) is not adequate for this purpose. State of Nevada staff and consultants have identified a number of terrorism/sabotage scenarios involving high-energy explosive devices which could potentially result in significant loss of shielding and/or containment. The NRC must reexamine the entire issue of terrorism/sabotage against spent fuel shipments, and specifically evaluate the potential consequences of attacks involving state-of-the-art military demolition charges, commercial conical shaped charges, commercial cutting charges, massive truck bombs, man-portable mortars, rifle-fired grenades, recoilless guns, and anti-tank missiles.

The State of Nevada recommends that NRC adopt the following approach for evaluating transportation accidents and incidents in the PFS EIS.

High Probability/Low Consequence Events

- a. Radiological impacts of uninterrupted, routine shipments
- b. Regulatory incidents (eg., "weeping")

- c. Equipment failures
- d. Bad weather disruptions
- e. Minor accidents
- f. Traffic "gridlock" incidents (worker exposure, public exposure, and perceived risk)

Low Probability/High Consequence Events

- a. Extremely severe accidents
- b. Catastrophic infrastructure failures
- c. Natural disasters
- d. Successful terrorist attacks or sabotage incidents
- e. Unanticipated human errors (individual, collective, and organizational)

9.0 Transportation Accident Liability Issues

The PFS EIS must explain how the Price-Anderson Act liability system will apply to shipments from reactors to the PFS facility, and from PFS to the repository .

10.0 Transportation Impacts on Highly-Populated Areas Along Transportation Corridors

The PFS proposal would result in this nation's first large-scale, multi-decade, nationwide shipping campaign to one single destination. Therefore, the PFS EIS must address the special risks and impacts associated with large-scale shipments through highly populated areas. Rail shipments will be a major source of concern, since most of the high-quality track nationally connects and traverses major urban areas, and many rail yards and carrier interchanges are located in urban areas (for example, Cleveland, Chicago, Atlanta, Nashville, St. Louis, Kansas City, Salt Lake City, Los Angeles, and San Bernadino). Truck shipments on

interstate routes chosen per U.S. Department of Transportation regulation HM 164 to bypass major downtown areas will still traverse highly populated suburban areas (Chicago, Des Moines, Omaha, St. Louis, Kansas City, Denver, Los Angeles, and Salt Lake City are prime examples). In other instances, such as I-15 through Las Vegas, alternative interstate routes are not available. The potential risks and impacts of severe accidents and terrorist incidents are exacerbated by proximity to concentrations of people and property.

Moreover, congested urban and suburban interstates create numerous situations where truck shipments could result in actual or perceived risks to the public even when a spent fuel shipment itself is not the cause of, or directly involved in, an accident. A shipment of spent fuel caught up in a gridlock incident for three or four hours, for example, could expose occupants of nearby vehicles to radiation doses in the range of 30 - 40 millirems. Under the Linear No Threshold theory, exposures at this level could cause adverse health effects in some members of the public. Even if no adverse physiological health effects result, such incidents create obvious potential for harmful psychological impacts to the persons involved, and media coverage of such "signal" events could heighten the public perception of risk generally.

11.0 Transportation Impacts on Difficult-to-Evacuate Locations

The PFS EIS must address potential impacts of spent fuel transportation on difficult-to-evacuate locations, such as schools, hospitals, hotels, prisons, shopping malls, sports stadiums, public parks, and recreational areas along shipping routes. A particular concern is the difficulty of evacuating large numbers of non-resident visitors in the event of a severe transportation accident near a major tourist area such as downtown Salt Lake City or the Las Vegas Strip.

12.0 Transportation Impacts on Economic Activities Sensitive to Public Perception of Risk

The PFS EIS must address the potential adverse impacts of large numbers of spent fuel shipments on tourism-based economies located near transportation corridors. State-of-the-art risk studies sponsored by the State of Nevada and by DOE have

documented the public perception of risks associated with nuclear waste transportation. These studies have also documented potential adverse impacts on tourist visits to areas affected by nuclear waste shipments. The PFS EIS should consider potential adverse impacts on year-round tourism (for example, in downtown Salt Lake City and Las Vegas), seasonal tourism (for example, ski resorts in Utah and Colorado), and special-event tourism (for example, the Salt Lake City Winter Olympics). The PFS EIS must also consider the effects of risk perception on property values along shipping routes, and risk-related impacts on business location and expansion decisions.

13.0 Transportation Impacts on Native American Lands, Religious Sites, Cultural Resources, and Off-Reservation Interests

The PFS EIS must identify the Indian reservations and off-reservation Indian interests potentially affected by transportation from reactors to the PFS facility, and from PFS to Yucca Mountain. Nationwide, as many as forty to fifty reservations could be affected. Impacts to be addressed include implications for land claims (for example, claims by the Western Shoshone National Council under the Ruby Valley Treaty of 1863); location of burial sites, ceremonial sites, and other site-specific cultural resources within rail corridors; "standard" (non-radiological) socioeconomic impact assessment of rail construction and operation; and the potential for "special" (nuclear-related) social, cultural, and economic impacts on Native American communities along shipping routes.

14.0 Transportation Impacts on Environmentally Sensitive Areas

The PFS EIS must identify and evaluate environmentally sensitive areas along potential spent fuel shipping routes. Given the nature of the materials to be transported, the magnitude of the shipping campaign that will be required, the wide geographical area involved, and the 30-50 year time frame for storage facility and repository shipments, it is important that weight be given, in the EIS assessment, to environmentally sensitive areas in identifying impacts, informing routing decisions, and developing mitigation plans.