UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket No. 72-22-ISFSI
PRIVATE FUEL STORAGE, LLC Independent Spent Fuel Storage Installation)	)	ASLBP No. 97-732-02-ISFSI
	)	August 9, 1999

DECLARATION OF DR. MARVIN RESNIKOFF IN SUPPORT OF THE STATE'S RESPONSE TO APPLICANT'S MOTION FOR PARTIAL SUMMARY DISPOSITION OF UTAH CONTENTION R

Under penalty of perjury, I, Dr. Marvin Resnikoff, declare as follows:

1. I am the Senior Associate of Radioactive Waste Management Associates, a private consulting firm based in New York City. I have researched radioactive waste issues for the past 25 years and have extensive experience and training in the field of nuclear waste management, storage, and disposal. A copy of my resume is attached.

2. I am the State of Utah's expert witness on various contentions in this proceeding. As a nuclear engineer, I am assisting the State in the review and analysis of the Holtec and TranStor casks that will be used at the proposed Private Fuel Storage, L.L.C.'s ("PFS's") facility.

3. I am familiar with the PFS license submittal and updates thereto and PFS's responses to the Staff's Requests for Information. I am also familiar with the submittals to the NRC for a certificate of compliance for the storage, transportation and transfer casks that are intended to be used at the PFS facility, as well as the NRC regulations relating to radiation safety and the transportation and storage of spent nuclear fuel.

4. I have reviewed the Applicant's Motion for Summary Disposition of Contention R - Emergency Planning, the attachments thereto, and the Staff's Response to the Motion.

5. The Applicant says it has analyzed credible fires that may occur inside the Canister Transfer Building from a 50 gallon spill of diesel fuel from the cask transporter and a 300 gallon spill from the heavy haul truck and fires that may occur outside the building from an unknown quantify of diesel fuel spilled from the locomotive and from wildfires. It is my opinion that the Applicant has not conducted a proper analysis of the fires it believes are credible and has also not taken into account the effects of fires from those sources it analyzed as well as from other sources.

6. The PFS Safety Analysis Report ("PFS-SAR") provides overall diagrams without any detail to ascertain that the building design will prevent the escape of diesel fuel spilled inside the Canister Building from the cask load/unload bay or from the main bay outside a transfer cell to other areas of the building. Accordingly, the Applicant must conduct an broader analysis of a 300 gallon fuel spill than simply restricting the analysis to the load/unload bays. In my opinion such an analysis must include the effects of a 300 gallon fuel fire on the transfer casks.

7. The HI-STORM Topical Safety Analysis Report ("TSAR") has only considered a fire analysis involving a 50 gallon spill. HI-STORM TSAR § 11.2.4.2.2. The short-term accident design temperatures for the HI-TRAC cask varies from 300°F for the neutron absorber material (Holtite-A) at the top of the HI-TRAC cask to 600-700°F for other materials such as the lead liner and outer water jacket. HI-STORM TSAR, Docket No. 72-1014, Table 2.2.3. The maximum temperature of the fuel cladding under steady-state conditions is 902°F while the fuel cladding for a 50 gallon fire is 942°F. Id. at 4.5-11 (Rev. 8); *see also* id. at Table 4.5.2 It is important to note, however, that the maximum fuel cladding temperature has not been calculated for a 300 gallon fire or a 6,000 gallon fire. It is my opinion that such a fire would cause gross cladding defects. The Holtec TSAR has no such analysis; neither does the Applicant's summary disposition motion.

8. Because the inertial mass of the TranStor transfer cask and the age of the fuel it is designed to carry are similar to those of the HI-TRAC transfer cask, the short-term accident design temperatures for the two casks are likely to be similar as well. However, British Nuclear Fuels Ltd., manufacturers of TranStor cask systems, does not analyze short-term accident design temperatures for a fire accident involving 50 gallons of diesel fuel. SAR for the TranStor Storage Cask System, SNC-96-72 SAR, Rev. C, November 1998, Docket No. 72-1023. The Srinivasan Declaration attached to the Applicant's motion only discusses the

TranStor storage cask and appears to rely on the Holtec 50 gallon fuel spill analysis rather than relying on any independent analysis. *See* Srinivasan Declaration ¶ 6. The Srinivasan Declaration contains no reference to the TranStor transportation cask or the transfer cask.

9. The Applicant admits that a credible event from a fire inside the Canister Transfer Building is the loss of electrical power. Johns Dec. at ¶ 10. Therefore, a fire would likely cause electrical wiring in the Canister Building building to burn and need to be replaced. The Johns Declaration goes so far as to say that loss of electrical power while canister transfer operations were in progress would not cause a release of radioactivity. Johns Dec. at ¶ 10. The PFS SAR recognizes that interruption of transfer operations due to external power outage would require crane operators to "take measures as necessary to assure adequate distance and/or additional shielding between themselves and the transfer casks to minimize doses...." PFS SAR at 8.1-5 (Rev. 0). There is no analysis, however, either in the PFS SAR or the Applicant's motion, of the effects to electrical repair workers from having to repair or replace any burned wiring inside the canister transfer bay. In my opinion utility workers would be at risk of high occupational exposures of radiation. Furthermore, the Applicant has not identified how or when it could resume canister transfer operations if fire causes burned out electrical wiring supplying the Canister Transfer Building during those operations.

10. The Applicant says it has analyzed the effects of a fire caused by fuel spilled from a locomotive located outside the Canister Transfer Building. Johns Dec. ¶ 13. This analysis is meaningless because there is no reference whatsoever to the quantity of fuel involved in the spill. Such facts as the total fuel capacity of the locomotive and the quantity of fuel spilled must be divulged by the Applicant before an analysis can begin. The Applicant's effort to compare a fire from some unknown quantity of fuel spilled from a locomotive to fire from a 50 gallon spill that may engulf a storage cask has no scientific validity.

11. The fuel capacity of a locomotive at PFS is a significant material fact in analyzing a fire involving diesel fuel from a locomotive. For example, the GE AC6000CW locomotive has a fuel capacity of 6,000 gallons of diesel fuel. *See* Exhibit 1 attached to this Declaration.

12. Casks loaded on railcars will enter and exit the Canister Transfer building on railroad tracks. There is no indication how those railcars will enter and exit the building if, as PFS claims, some undisclosed administrative procedures will

preclude a locomotive from entering the building. According to the PFS discovery documents I have reviewed, the total weight of a rail car, plus tie-down and cask will exceed 211 tons. The length of the load/unload area is 198 feet. PFS SAR Fig. 4.1-1. *See also* Johns Dec. at ¶ 9. There is nothing in the PFS submittals to NRC to suggest there is any way, other than by a locomotive, to move the casks into and out of the Canister Transfer Building. Therefore, the logical assumption is that the railcars will be moved by the locomotive. Given the significant quantity of fuel that a locomotive may carry, it is an important safety concern to analyze a fire caused by a spill of fuel from a locomotive inside the Canister Transfer Building. Certainly the Holtec TSAR has not analyzed the effects of fire on the transfer cask from a fire involving such a large quantity of diesel fuel.

13. A loaded heavy haul truck and a loaded rail car may fit into the cask load/unload area at the same time. PFS SAR Fig. 4.7-1 (sheet 1). There nothing in the PFS submittals to NRC that states that a heavy haul truck and a locomotive moving a railcar will not be inside the Canister Transfer Building at the same time. Therefore, it is credible for a fire to occur involving fuel from both the heavy haul truck and the locomotive. The Holtec SAR has not analyzed the effects from such a fire; nor has the Applicant.

Dr. Marvin Resnikoff

Dated: August 9, 1999

Dr. Marvin Resnikoff

Radioactive Waste Management Associates
526 West 26th Street, Room 517
New York, NY 10001
(212)620-0526 FAX (212)620-0518

241 W. 109th St, Apt. 2A
New York, NY 10025
(212) 663-7117

EXPERIENCE:

April 1989 - present **Senior Associate**, Radioactive Waste Management Associates, management of consulting firm focused on radioactive waste issues, evaluation of nuclear transportation and military and commercial radioactive waste disposal facilities.

1978 - 1981; 1983 - April 1989 **Research Director**, Radioactive Waste Campaign, directed research program for Campaign, including research for all fact sheets and the two books, *Living Without Landfills*, and *Deadly Defense*. The fact sheets dealt with low-level radioactive waste landfills, incineration of radioactive waste, transportation of high-level waste and decommissioning of nuclear reactors. Responsible for fund-raising, budget preparation and project management.

1981 - 1983 **Project Director**, Council on Economic Priorities, directed project which produced the report *The Next Nuclear Gamble*, on transportation and storage of high-level waste.

1974 - 1981 **Instructor**, Rachel Carson College, State University of New York at Buffalo, taught classes on energy and the environment, and conducted research into the economics of recycling of plutonium from irradiated fuel under a grant from the Environmental Protection Agency.

1975 - 1976 **Project Coordinator**, SUNY at Buffalo, New York Public Interest Research Group, assisted students on research projects, including project on waste from decommissioning nuclear reactor.

1973 **Fulbright Fellowship** at the Universidad de Chile, conducting research in elementary particle physics.

1967 - 1972 **Assistant Professor of Physics**, SUNY at Buffalo, conducted research in elementary particle physics and taught range of graduate and undergraduate physics courses.

1965 - 1967 **Research Associate**, Department of Physics, University of Maryland, conducted research into elementary particle physics.

EDUCATION

University of Michigan
Ann Arbor, Michigan

PhD in Physics, June 1965
M.S. in Physics, Jan 1962
B.A. in Physics/Math, June 1959

Resume of Marvin Resnikoff, Ph.D.

Dr. Marvin Resnikoff is Senior Associate at Radioactive Waste Management Associates and is an international consultant on radioactive waste management issues. He is Principal Manager at Associates and is Project Director for risk assessment studies on radioactive waste facilities and transportation of radioactive materials. Dr. Resnikoff has concentrated exclusively on radioactive waste issues since 1974. He has conducted studies on the remediation and closure of the leaking Maxey Flats, Kentucky radioactive landfill for Maxey Flats Concerned Citizens, Inc. under a grant from the Environmental Protection Agency, the Wayne and Maywood, New Jersey thorium Superfund sites and on proposed low-level radioactive waste facilities at Martinsville (Illinois), Boyd County (Nebraska), Wake County (North Carolina), Ward Valley (California) and Hudspeth County (Texas). He has conducted studies on transportation accident risks and probabilities for the State of Nevada and dose reconstruction studies of oil pipe cleaners in Mississippi and Louisiana, residents of Canon City, Colorado near a former uranium mill, residents of West Chicago, Illinois near a former thorium processing plant, and residents and former workers at a thorium processing facility in Maywood, New Jersey. In West Chicago he calculated exposures and risks due to thorium contamination and served as an expert witness for plaintiffs A Muzzey, S Bryan, D Schroeder and assisted counsel for plaintiffs KL West and KA West. He is presently serving as an expert witness for a separate group of plaintiffs in West Chicago, including R Dassion. He also evaluated radiation exposures and risks in worker compensation cases involving G Boeni and M Talitsch, former workers at Maywood Chemical Works thorium processing plant.

Under a contract with the State of Utah, Dr. Resnikoff is a technical consultant to DEQ on the proposed dry cask storage facility for high-level waste at Skull Valley, Utah and proposed storage/transportation casks. He is assisting the State on licensing proceedings before the Nuclear Regulatory Commission. In addition, at hearings before state commissions and in federal court, he has investigated proposed dry storage facilities at the Point Beach (WI), Prairie Island (MN) and Palisades (MI) reactors.

In Canada, he has conducted studies on behalf of the Coalition of Environmental Groups and Northwatch for hearings before the Ontario Environmental Assessment Board on issues involving radioactive waste in the nuclear fuel cycle and Elliot Lake tailings and the Interchurch Uranium Coalition in Environmental Impact Statement hearings before a Federal panel regarding the environmental impact of uranium mining in Northern Saskatchewan. He has also worked on behalf of the Morningside Heights Consortium regarding radium-contaminated soil in Malvern and on behalf of Northwatch regarding decommissioning the Elliot Lake tailings area before a FEARO panel. More recently he completed a study for Concerned Citizens of Manitoba regarding transportation of irradiated fuel to a Canadian high-level waste repository.

He was formerly Research Director of the Radioactive Waste Campaign, a public interest organization conducting research and public education on the radioactive waste issue. His duties with the Campaign included directing the research program on low-level commercial and military waste and irradiated nuclear fuel transportation, writing articles, fact sheets and reports, formulating policy and networking with numerous environmental and public interest organizations and the media. He is author of the Campaign's book on "low-level" waste, *Living Without Landfills*, and co-author of the Campaign's book, *Deadly Defense, A Citizen Guide to Military Landfills*.

Between 1981 and 1983, Dr. Resnikoff was a Project Director at the Council on Economic Priorities, a New York-based non-profit research organization, where he authored the 390-page study, *The Next Nuclear Gamble, Transportation and Storage of Nuclear Waste*. The CEP study details the hazard of transporting irradiated nuclear fuel and outlines safer options.

In February 1976, assisted by four engineering students at State University of New York at Buffalo, Dr. Resnikoff authored a paper that changed the direction of power reactor decommissioning in the United States. His paper showed that power reactors could not be entombed for long enough periods to allow the radioactivity to decay to safe enough levels for unrestricted release. The presence of long-lived radionuclides meant that large volumes of dismantled reactors would still have to go to low-level waste disposal facilities. He has assisted public interest groups NECNP and CAN on the decommissioning of the Yankee-Rowe reactor.

Dr. Resnikoff is an international expert in nuclear waste management, and has testified often before State Legislatures and the U.S. Congress. He has extensively investigated the safety of the West Valley, New York and Barnwell, South Carolina nuclear fuel reprocessing facilities. His paper on reprocessing economics (Environment, July/August, 1975) was the first to show the marginal economics of recycling plutonium. He completed a more detailed study on the same subject for the Environmental Protection Agency, "Cost/Benefits of U/Pu Recycle," in 1983. His paper on decommissioning nuclear reactors (Environment, December, 1976) was the first to show that reactors would remain radioactive for hundreds of thousands of years.

Dr. Resnikoff has prepared reports on incineration of radioactive materials, transportation of irradiated fuel and plutonium, reprocessing, and management of low-level radioactive waste. He has served as an expert witness in state and federal court cases and agency proceedings. He has served as a consultant to the State of Kansas on low-level waste management, to the Town of Wayne, New Jersey, in reviewing the cleanup of a local thorium waste dump, to WARD on disposal of radium wastes in Vernon, New Jersey, to the Southwest Research and Information Center and New Mexico Attorney General on shipments of plutonium-contaminated waste to the WIPP facility in

New Mexico and the State of Utah on nuclear fuel transport. He has served as a consultant to the New York Attorney General on air shipments of plutonium through New York's Kennedy Airport, and transport of irradiated fuel through New York City, and to the Illinois Attorney General on the expansion of the spent fuel pools at the Morris Operation and the Zion reactor, to the Idaho Attorney General on the transportation of irradiated submarine fuel to the INEL facility in Idaho and to the Alaska Attorney General on shipments of plutonium through Alaska. He was an invited speaker at the 1976 Canadian meeting of the American Nuclear Society to discuss the risk of transporting plutonium by air. As part of an international team of experts for the State of Lower Saxony, the Gorleben International Review, he reviewed the plans of the nuclear industry to locate a reprocessing and waste disposal operation at Gorleben, West Germany. He presented evidence at the Sizewell B Inquiry on behalf of the Town and Country Planning Association (England) on transporting nuclear fuel through London. In July and August 1989, he was an invited guest of Japanese public interest groups, Fishermen's Cooperatives and the Japanese Congress Against A- and H- Bombs (Gensuikin).

Between 1974 and 1981, he was a lecturer at Rachel Carson College, an undergraduate environmental studies division of the State University of New York at Buffalo, where he taught energy and environmental courses. The years 1975-1977 he also worked for the New York Public Interest Group (NYPIRG).

In 1973, Dr. Resnikoff was a Fulbright lecturer in particle physics at the Universidad de Chile in Santiago, Chile. From 1967 to 1973, he was an Assistant Professor of Physics at the State University of New York at Buffalo. He has written numerous papers in particle physics, under grants from the National Science Foundation. He is a 1965 graduate of the University of Michigan with a Doctor of Philosophy in Theoretical Physics, specializing in group theory and particle physics.

GE Transportation Systems

AC6000 Statistics

*The following facts were compiled by GETS employee **Tom Gerbracht**, CSX Contracts Manager:*

- CSX is the first railroad to place the AC6000 locomotive into revenue service.
- CSX has received three GE AC6000CW locomotives and has ordered 50 more.
- The GE AC6000CW is the most powerful, single engine diesel-electric locomotive ever built.
- The GE AC6000CW carries 6000 gallons of diesel fuel, enough to drive your car 150,000 miles if your vehicle gets 25 miles per gallon.
- The GE AC6000CW can travel at 75 mph where railroad speed limits permit.
- The GE AC6000CW can replace two older and less efficient locomotives.
- The GE AC6000CW weighs 210 tons fully fueled and sanded.
- The GE AC6000CW can translate 90 tons of its weight into pulling power.
- The GE AC6000CW carries 40 cubic feet of sand which is used to improve traction on slippery rails.
- The GE AC6000CW has a complete AC traction system.
- The GE AC6000CW has onboard microprocessor computers used to maximize performance and diagnose any problem which might occur.
- One GE AC6000CW can pull a coal train of 150 cars on level tangent track. The length of this train

is 1.7 miles long.

- The GE AC6000CW can operate on grades so steep that the front of the locomotive will be two feet higher than the back of the locomotive.
- If an AC6000CW has an equipment problem, its computers work around the problem so the locomotive can complete its mission.
- The GE AC6000CW has an electric braking system, called a dynamic brake, which can be used in place of the regular air brake to improve train handling.
- The GE AC6000CW sends its computer information via satellite to a base station to inform railroad personnel when it requires maintenance.
- The diesel engine used in the GE AC6000CW weighs over 23 tons.

Return to Main Story

GE home page GE Transportation Systems home page

GE home page | GE Transportation Systems home page