



# Department of Energy

Washington, DC 20585

January 27, 2000

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Secretary of the Commission  
U. S. Nuclear Regulatory Commission  
Attn: Rulemaking and Adjudication Staff  
Washington, DC 20555-0001

OFFICE  
ADJUDICATION

Reference: Docket Number PRM-73-10

**DOCKET NUMBER**  
**PETITION RULE PRM 73-10**  
**(64FR49410)**

Dear Secretary:

The Nuclear Regulatory Commission (NRC) published in the *Federal Register* on September 13, 1999, a Notice of Receipt of the State of Nevada's Petition for rulemaking concerning the regulations governing safeguards for shipments of spent nuclear fuel against sabotage and terrorism. The NRC's Notice requested comments on the Petition from interested parties and included a concise summary of the Petition, and the requested changes or additions to current regulations in 10 CFR Part 73. On November 3, 1999, the NRC extended the deadline for receipt of comments to January 28, 2000.

The U. S. Department of Energy (Department) would like to take this opportunity to make the following general comments and observations. Our specific comments on the Petition are provided in the enclosure to this letter. The State of Nevada's Petition is unusual, in that the very nature of the topic and the sensitivity of the Design Basis Threat information, the basis upon which many of the assertions in the request are made, make it difficult for members of the public to access the information necessary to assess the proposed rule changes suggested in the Petition. In fact, many NRC licensees who would be impacted do not have access to the information necessary to fully assess the proposed changes. Indeed, the Petitioner is similarly constrained. The Department's missions and responsibilities make it uniquely qualified to respond to the NRC's request for comments on the Petition. The Department maintains its own capability to conduct threat assessments and applies appropriate physical protection measures to assure public health and safety in its daily operations.

The Department does not believe that this Petition offers a compelling reason to proceed with a comprehensive assessment of the NRC's regulations or propose modifications to them. The current, performance-based regulations are more than sufficient to permit consideration of all appropriate potential threat scenarios. There is no evidence that a reassessment of or modification of the NRC's regulations would result in any measurable increase in public health or safety. The lack of any evidence on the part of the Petitioner is important and provides further support of the Department's most recent sabotage analyses that indicate that the current NRC regulations adequately protect the public health and safety and the environment (Luna et al, 1999).

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The Petition asserts in part that the current Design Basis Threat, as developed by the NRC, fails to account for recent developments. On a continuing basis, the Department participates in a review of the Design Basis Threat, in conjunction with the national intelligence community; federal, state and local law enforcement offices; the NRC; and the Department of Defense. Based upon this review, the Department can find no justification for the threat assertion made in the Petition. The Design Basis Threat premise continues to accurately describe the ability, motivation and capability of terrorist organizations, including access to weapons and the attractiveness of specific targets. In addition, the Petition's reference to terrorist events throughout the world does not reflect the actual situation in the United States or that SNF shipments are actually a terrorist target.

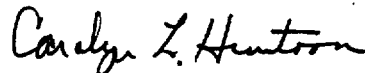
While there have been changes over the years in weapon technology and in the casks that are anticipated for use in shipping spent nuclear fuel, recent studies have shown that the fundamental response of casks to these offensive weapons has not dramatically changed. The consequences of credible scenarios continue to be bounded by the consequences evaluated in severe accident conditions.

In summary, the Department does not believe that a compelling case has been made for revising the current NRC regulations and regulatory practice along the lines suggested in the Petition. Further, the Department urges the NRC to move expeditiously in completing their disposition of the Petition. We encourage the NRC to re-affirm the adequacy of current regulations that protect public health and safety, and dispel any unwarranted doubt created by filing this Petition regarding NRC's desire or ability to ensure that public health and safety are at all times of paramount importance.

Sincerely,

A handwritten signature in black ink, appearing to read "Ivan Itkin" with a stylized flourish at the end.

Ivan Itkin, Director  
Office of Civilian Radioactive  
Waste Management

A handwritten signature in black ink, appearing to read "Carolyn L. Huntoon" in a cursive style.

Carolyn L. Huntoon  
Assistant Secretary for  
Environmental Management

Enclosure

Distribution List for Letter to, NRC, dated: January 10, 2000

cc: R. Loux, State of Nevada  
J. Hoffman, State of Nevada  
R. Price, NV Legislative Committee, NV  
J. Meder, NV Legislative Counsel Bureau, NV  
W. Barnard, NWTRB, Washington, DC  
S. Kraft, NEI  
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**Department of Energy Comments on  
Nuclear Regulatory Commission Docket No. PRM-73-10**

**Comments on the Petition's Request for Rulemaking**

- 1. The Petition asserts that primary and alternate routes should be identified prior to shipment so that highway and rail shipments through highly populated areas are minimized. To accomplish this, the Petition requests that the guidance currently contained in Nuclear Regulatory Commission's (NRC) NUREG-0561, *Physical Protection of Shipments of Irradiated Reactor Fuel: Interim Guidance*, be codified.**

The current regulations in 10 CFR Part 73 include specific requirements for physical protection of spent fuel shipments in areas of high population density. U.S. Department of Transportation (DOT) routing regulations require that routes be chosen to minimize radiological risks. The DOT regulations require the use of interstate highways, beltways, and bypasses when possible, effectively accomplishing the goal of minimizing travel through highly populated areas. Two other factors are worth noting in regard to this request. First, NRC route approval is based on safeguards and security considerations. Second, under the DOT safety-based routing rules, states may designate alternate routes through their jurisdictions.

The current regulatory approach in which the NRC uses broad-based regulations supplemented with specific guidance documents is both appropriate and effective. The NRC's guidance offers acceptable methods of satisfying regulatory requirements and is never intended to limit the way that the performance-based regulation can be met. The use of guidance documents allows licensees to explore and use approaches to compliance that are equally satisfactory in assuring public health and safety.

DOE believes that the requested routing regulation is unnecessary, would be duplicative, and would impact the effectiveness of the regulatory approach.

- 2. The Petition asserts that the current differential in safeguards and security requirements based on population should be eliminated. The Petition argues that the overall requirements for an armed escort should be increased to, at a minimum, one-armed escort each in a lead vehicle and a chase vehicle, with one escort being a state or local law enforcement officer.**

The change suggested in the Petition (regarding population differentiation) would require armed escorts for each shipment, rather than limit them to areas of high population density. The Petition provides no rationale for requiring armed escorts for shipments through less populated regions. Indeed, the Petition's earlier suggestion of avoiding populated areas to the extent practicable would seem to suggest that the Petitioner agrees that there are differences between population zones necessitating differences in implementation.

The current regulations, requiring differing escort requirements based on population density, adequately protect public health and safety and address any concerns related to sabotage. The armed escort requirements were added in the late 1970s to deter attacks in areas of high population density when it was thought that a successful attack might have substantial prompt radiological consequences and significant long-term health effects. Increasing escort requirements will place more workers in closer proximity to the spent nuclear fuel transport cask, thereby increasing occupational doses. Although the risks are small, DOE is also concerned that additional escort vehicles would only increase the potential for traffic accidents related to shipments.

The current escort requirements are considered conservative and increasing the number of escorts could increase risks without a commensurate benefit to public health and safety. Should a state believe that additional escorts are needed, it has the flexibility to provide those supplemental escorts. DOE believes that requiring an increase in the number of escorts, irrespective of any defined threats or input from federal/state/local officials at the time of the shipment, is not necessary.

**3. The Petition requests that the NRC consider requiring continuous, real-time aircraft surveillance along certain rail route segments through rough terrain and heavily populated areas.**

DOE believes that requiring air surveillance or other similar surveillance tools for all shipments through defined areas, as well as specific features of route planning and control suggested in the Petition, are unnecessary from a safeguards and security standpoint. Aircraft surveillance of spent fuel shipments that has occurred was performed by a state government and was not required for compliance with Federal regulations. A strict requirement is unnecessary given the fact that the current process provides opportunity for incorporation of security assets/activities based upon circumstances/conditions that change with time.

**Comments on the Petition's Requests for Evaluations and Revised Definitions**

**4. The Petition requests that the NRC evaluate the advantages and disadvantages of requiring a level of protection, planning, and scheduling comparable to that provided for shipments of strategic special nuclear material (SSNM).**

The Petition, while not requesting a change to existing regulations, suggests that there may be a reason for requiring spent nuclear fuel shipments to meet the same requirements as shipments of strategic special nuclear material (SSNM). SSNM is protected at a higher level, because it is useable material in making nuclear weapons. Spent nuclear fuel and high-level radioactive waste are not directly useable and are not considered targets of diversion. DOE believes that the requirements that are used to preclude diversion of SSNM are not appropriate for the shipment of spent nuclear fuel and high-level radioactive waste.

- 5. The Petition requests that the NRC reexamine the issue of terrorism and sabotage against spent nuclear fuel and high-level radioactive waste shipments to determine the adequacy of the current physical protection regulations and to assist DOE and the affected stakeholders in the preparation of a legally sufficient environmental impact statement (EIS).**

Although the Petition does not request a change in the regulations in this regard, it does suggest that current regulatory practice may be inadequate. The Petition further suggests that an alleged regulatory inadequacy may invalidate the DOE's *Draft 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 1999) (DEIS). The basis of the Petition appears to be the concern that terrorist acts have escalated in recent years in frequency and number of fatalities produced. The Petition suggests that new, high-capacity spent fuel cask designs are more vulnerable to attack with anti-armor devices.

Sabotage requires deliberate planning and actions. Sabotage is not random nor does it occur with a predictable frequency. The location, objectives, and reasons for historical attacks had nothing to do with spent fuel transportation. We can find no current intelligence information that suggests shipping casks represent significant government interests that would present themselves as targets of opportunity.

DOE's DEIS presents an updated analysis of the consequences of an act of sabotage conducted against modern truck and rail shipping casks containing spent nuclear fuel. This updated analysis was based on the source terms in Luna et al. (1999). There is no actual evidence to give credence to the Petition's assertion that newer casks would be more vulnerable to attack using the weapons referenced in the Petition. Even though some of the newer cask designs are expected to have significantly increased capacity compared to older designs, cask robustness is not reduced and the larger casks are expected to reduce the number of shipments. The new designs meet the same requirements of 10 CFR Part 71 as the older designs, and the updated analysis (Luna et al., 1999) shows that the performance of the newer cask designs is essentially the same.

More important, the release of radioactive material from a spent fuel cask to the levels predicted by test and analyses would not produce the prompt deaths and obvious destruction that seem to be a desired feature of the cited terrorist actions. The results of these sabotage tests demonstrate that the impacts of a sabotage event are bounded by those of a severe transportation accident.

- 6. The Petition suggests that the NRC should conduct a comprehensive assessment of the consequences of radiological sabotage. Consequence assessment should address the full range of potential impacts of a terrorism/sabotage event, including immediate and long-term implications for public health; environmental impacts, broadly defined; standard socioeconomic impacts, including individual and collective psychological trauma, and economic losses resulting from public perceptions of risk and stigma effects.**

Although the Petition does not request a change in the regulations in this regard, it implies an inadequacy in regulatory practice and physical protection measures that could erode public confidence and have broad-reaching impacts on the activities of DOE and others. The objective of safeguarding spent nuclear fuel shipments is to protect public health and safety from the potential consequences of sabotage, theft or diversion of the material. The impacts of radiological sabotage on immediate and long-term public health and safety have been considered extensively by NRC and DOE and will continue to be assessed rigorously.

DOE believes that consideration of perception-based impacts such as stigma induced socioeconomic impacts and psychological trauma in the evaluation of radiological sabotage would be a significant departure from the scope of 10 CFR Part 73. Consideration of such factors would be difficult to define, quantify and assess. DOE believes that the regulations in 10 CFR Part 73 should continue to focus on the quantifiable impacts that credible events could have on public health and safety.

**7. The Petition requests that the NRC re-examine the design basis threat contained in 73.1(a)(1)(I). Specifically, the Petition suggests that the NRC should clarify “hand-carried equipment.”**

Although not a request for a change in the regulatory requirements, the Petition requests a modification to a definition that could have broad-reaching impacts on the activities of DOE and others. The Petition requests adding specific items to the list of hand-carried equipment. DOE believes that the existing, inclusive regulatory language allows for consideration of a broad range of weapons and devices. This approach includes all of the specific items suggested and avoids the need to continually modify the regulation as new weapons and devices are identified.

A recent study was conducted to look at vulnerability of casks from modern hand-carried devices (Luna et al., 1999). The study was conducted to support the Yucca Mountain Draft EIS and, revisited earlier work conducted at Sandia National Laboratories (SNL) to determine the aerosol source term for modern truck and rail casks (Sandoval et al., 1983). As part of that study, two explosive devices were evaluated. One was similar to the weapon evaluated by the earlier SNL study and the second was typical of modern anti-armor weapons. The results showed that both devices could penetrate the walls of modern truck and rail casks and that both produced similar releases of respirable aerosols. Thus, there is no evident technical basis for revising 10 CFR Part 73 requirements based on the capabilities of modern anti-armor weapons.

In addition to discussion of hand-carried devices, the Petition suggests that other, more complex weapons systems, other than hand-carried devices, be included in evaluations of cask vulnerability. Some of these are described below.

The Petition suggests inclusion in the design basis threat of "military attack vehicles" that "...adversaries could conceivably obtain..." These would include tanks, attack helicopters and aircraft and other such military systems. A scenario in which such devices are obtained, moved to a point of attack, and used for an attack on a spent fuel cask is not credible. The mere existence of effective anti-armor weapons is not evidence that they are easily obtainable, easily deployed, accurately fired, and optimally effective against a spent fuel cask in transport. Even if there were some conceivable reason why a group or individual would wish to attack a spent fuel cask, it is not reasonable to assume that such an attack could be organized and fielded so as to produce a result that is in excess of that already considered in the Design Basis Threat.

A conventional explosive deployed in bulk is also suggested as a threat that justifies revision of 10 CFR Part 73. However, the construction of spent fuel casks is such that they are not easily damaged by such attacks. A large charge in close proximity to a cask may physically move it, but have minor effects on it structurally. Loss of containment of the cask contents is not expected. Additionally, it is not anticipated that damage would occur to the fuel rods within the cask that would create aerosol materials within the cask.

DOE supports the current regulation that allows consideration of a wide range of weapons that could be credibly used in sabotage attacks on spent nuclear fuel casks. However, there is no basis for considering several of the devices suggested in the Petition or for changing the Design Basis Threat.

**8. The Petition requests that the NRC re-examine the definition of "radiological sabotage." The Petition suggests that actions against SNF shipments that are intended to cause a loss of shielding or a release of radioactive materials should be included in the definition of "radiological sabotage," regardless of success or failure of the action.**

While not a request for a revision to the regulatory requirements, the Petition does request a modification of a definition that could have broad-reaching impacts on the activities of DOE and others. The Petition suggests including disruptive events in the definition of radiological sabotage, even if they are unsuccessful. The current definition of radiological sabotage, although limited to "deliberate acts ... which could directly or indirectly endanger the public health and safety by exposure to radiation," seems quite broad. The request appears to suggest expanding the scope of 10 CFR Part 73 to matters not related to radiological protection.

DOE believes that the current definition of radiological sabotage encompasses the kinds of deliberate events that would present the greatest threat of radiological consequences. Furthermore, the Petitioner does not provide a convincing argument or evidence to suggest that the definition should be changed.



- 9. The Petition suggests that there may be an advantage in terms of safeguards and security to require that all shipments be made by dedicated train. The Petition requests that the NRC evaluate the advantages and disadvantages, from the perspective of physical security, of dedicated train shipments, assuming both current and enhanced requirements or rail shipment armed escorts.**

The Petition offers no objective evidence to support the need to evaluate the advantages and disadvantages, from the perspective of safeguards and physical security, of dedicated train shipments. A requirement to use a dedicated train removes a significant degree of flexibility in deciding how to ship spent fuel. The use of dedicated trains for all shipments would have no demonstrable benefit to public health and safety and would have an impact on planning, scheduling, and cost shipments.

#### **References**

Luna, R. E., Neuhauser, K. S. and Vigil, M. G., 1999, "Projected Source Terms for Potential Sabotage Events Related to Spent Fuel Shipments", Report No. SAND99-0963, Sandia National Laboratories, Albuquerque, New Mexico.

Sandoval, R. P., J. P. Weber, H. S. Levine, A. D. Romig, J. D. Johnson, R. E. Luna, G. J. Newton, B. A. Wong, R. W. Marshall, Jr., J. L. Alvarez, F. Gelbard, 1983, "An Assessment of the Safety of Spent Fuel Transportation in Urban Environs," Report No. SAND82-2365, Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Department of Energy (DOE), 1999, "Draft 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", Report No. DOE/EIS-0250D, Office of Civilian Radioactive Waste Management, Washington, D.C.