September 29, 1997 SECY-97-218

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: SPECIAL PROVISIONS FOR TRANSPORT OF LARGE QUANTITIES OF PLUTONIUM (RESPONSE TO STAFF REQUIREMENTS MEMORANDUM - SECY-96-215)

PURPOSE:

In an October 31, 1996, Staff Requirements Memorandum for SECY-96-215, Requirements for Shipping Packages Used to Transport Vitrified Wastes Containing Plutonium, the Commission directed the staff to "address whether the technical basis for 10 CFR 71.63 remains valid, or whether a revision or elimination of portions of 10 CFR 71.63 is needed to provide flexibility for current and future technologies." The purpose of this paper is to inform the Commission that the staff believes the technical bases for 10 CFR 71.63 remain valid and that the provisions provide adequate flexibility for current and future technologies. The staff believes it is desirable to retain those provisions of 10 CFR 71.63 that are not being covered by a separate rulemaking currently underway.

BACKGROUND:

The provisions of 10 CFR 71.63 place certain requirements on the transport of large quantities of plutonium. For quantities greater than 0.74 terabecquerels (20 curies), the plutonium must be in solid form, and must be shipped in a package that provides double containment. Plutonium in the form of metal, or metal alloy, or reactor fuel elements is exempted from the double-containment provision, as are other plutonium-bearing solids as determined by the Commission.

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The Commission adopted these requirements in 1974, in anticipation of a large increase in the number of plutonium shipments associated with commercial fuel reprocessing. In adopting these requirements, the Commission recognized that the release and dispersion of material in transport, as a result of human error in packaging, were less likely for material in solid form. The requirement for packages with large quantities of plutonium to have secondary containment systems was intended to take into account the fact that the solid plutonium may be in a respirable form, and to provide added assurance against leakage in the event of packaging errors, and the possible significant consequences of such an error.

The rule exempts plutonium in the form of metal, or metal alloy, or reactor fuel elements, from the double-containment requirement, since these materials are in essentially non-respirable form.

A separate rulemaking (62 FR 25146) is currently underway to extend the exemption from double-containment provisions to include vitrified high-level waste in canisters. The basis for the proposed rule is that this material is also essentially non-respirable. The public comment period has ended, and comments have been received.

DISCUSSION:

The technical bases for the special provisions for transporting large quantities of plutonium remain valid. Although the special provisions were not based on quantitative evidence or statistical analysis, experience had shown that radioactive materials in liquid form and human error had contributed to previous package leakage events. Liquids are more susceptible to leakage than material in solid form, and shipment of plutonium in liquid form introduces other technical problems, including hydrogen generation and pressure build-up. For material in dispersible form, a secondary containment vessel provides additional assurance against package failure because of human error in preparing the package for shipment, and provides an additional barrier against the potential release of plutonium in a transportation accident.

Experience indicates that it is practical to design, fabricate, and operate packages that provide double containment for shipment of large quantities of plutonium. Packages that have been designed for this purpose include:

- The 125-B package, a 100-ton lead-shielded rail cask that was used to transport the fuel debris, partial fuel rods, and partial fuel assemblies from the Three Mile Island Unit 2 reactor. The damaged irradiated reactor fuel elements were not exempted from the double-containment requirement because the form of the fuel and the cladding could no longer be relied upon to maintain the plutonium in a non-respirable form.

- The TRUPACT-II package, which will be used to transport contact-handled transuranic waste by truck from Department of Energy (DOE) facilities to the Waste Isolation Pilot Plant (WIPP). Beginning in 1998, it is estimated that 20,000 shipments will be made to WIPP over a period of 30 years, using the TRUPACT-II package. All DOE shipments to WIPP are required, by law, to be in packages certified by NRC. More than one hundred shipments have already been made between DOE facilities using the TRUPACT-II package.

- The Model 72-B package, currently being reviewed by staff, designed to transport high-radiation (remote-handled) transuranic wastes to WIPP.

- The PAT-1 and PAT-2 packages, which are used for the transport of plutonium oxide powder by air. The PAT packages were designed to withstand severe aircraft crashes, and were certified for that purpose by the Nuclear Regulatory Commission to Congress.

The successful development and use of these packages, over many years, have shown that compliance with the double-containment provisions is practical, and can be implemented for a wide range of plutonium forms for all transport modes.

The staff has considered whether a revision or elimination of portions of 10 CFR 71.63 is needed to provide flexibility for current and future technologies. Except in connection with a 1979 amendment to a previous package approval, the staff is not aware of any exemptions that have been granted with respect to the double containment provisions of 10 CFR 71.63. The exemption was to allow shipment in the Model 6400 package of objects and equipment having plutonium contamination which had been fixed in place by painting or coating. This was later extended to allow fixation by polyurethane foam. Further consideration of the provisions in 10 CFR 71.63 would require a research effort, to study the number and type of future plutonium shipments that would be anticipated because of changes to the commercial fuel cycle or to DOE's program to dispose of transuranic wastes at WIPP.

COORDINATION:

This paper has been coordinated with the Office of the General Counsel, which has no legal objection.

CONCLUSION:

The technical bases for 10 CFR 71.63 remain valid and the provisions provide adequate flexibility for current and future technologies. Except for the changes being considered in a separate rulemaking, the staff recommends that the provisions of 10 CFR 71.63 remain unchanged.

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