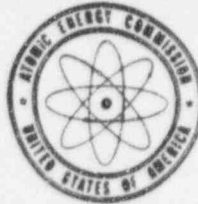


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July 6, 1973

6/20/97
date initials
SECY-R-74-5

POLICY SESSION ITEM

For: The Commissioners
Thru: *Sn* Director of Regulation *TLJ*
Subject: CONSIDERATION OF FORM FOR SHIPPING PLUTONIUM

On June 14, 1973, a meeting was held to discuss the staff differences with respect to Policy Session paper SECY-R-702* which recommends that proposed rule changes be published for comment which would require that future shipments of plutonium be made as a solid, encapsulated to meet special form requirements, in packaging meeting normal form requirements of Part 71, except for quantities less than 20 curies. Participating in the meeting were representatives of the General Manager and the Director of Regulation.

As a result of this meeting, the staffs have agreed that the basic factors pertinent to the consideration of form for shipping plutonium are:

1. The experience with shipping plutonium as an aqueous nitrate solution in packages meeting current regulatory criteria has been satisfactory to date.
2. The changing characteristics of plutonium recovered from power reactors will make the existing packaging obsolete for plutonium nitrate solutions and possibly for solid form. Economic factors will probably dictate considerably larger shipments (and larger packages) than currently used.
3. It is expected that packages can be designed to meet regulatory standards for either aqueous solutions or solid plutonium compounds. Just as in any situation involving the packaging of radioactive materials, a high level of human performance is necessary to assure against leakage caused by human error in packaging. As the number of

*Secretariat Note: SECY-R 702 - Consideration of Form for Shipping Plutonium, dated June 1, 1973, was originally scheduled for Commission consideration on June 14, 1973, but was withdrawn pending resolution of GM-DR areas of disagreement.

(NOTE: Held for OGC coordination)

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plutonium shipments increases, as it will, and packages become larger and more complex in design, the probability of such human error increases.

4. The probability of human error with the packaging for liquid, anticipated to be more complex in design, is probably greater than with the packaging for solid. Furthermore, should a human error occur in package preparation or closure, the probability of liquid escaping from the improperly prepared package is greater than for most solids and particularly for those solid plutonium materials expected to be shipped.
5. Staff studies reported in SECY-R-62 and SECY-509 conclude that the consequences of release of solid or aqueous solution do not differ appreciably. Therefore, this paper (SECY-R-702) does not deal with consequences of releases.
6. It is therefore concluded that safety would be enhanced if plutonium were shipped as a solid rather than in solution.

The arguments for requiring a solid form of plutonium for shipment are largely subjective, in that there is no hard evidence on which to base statistical probabilities or to assess quantitatively the incremental increase in safety which is expected. The discussion in the Regulatory staff paper, SECY-R-702, is not intended to be a technical argument which incontrovertibly leads to the conclusion. It is, rather, a presentation of the rationale which has led the Regulatory staff to its conclusion that a possible problem may develop and that the proposed action is a step towards increased assurance against the problem developing. This latter point would be expressed in the letter to the JCAE and in the public announcement, as shown in revised versions which are enclosed.

In response to previously expressed concern over the economic and technical feasibility of the proposed requirement, an analysis shows that it is technically feasible and that the processing costs, even in the most disadvantageous circumstances studied, should not be a deterrent to the proposed action. Actually, a possible reduction in costs is predicted.

There is an urgency to make a decision soon on this matter, since the industry is presently designing and will soon be building fuel cycle facilities for plutonium recycle. The

*Secretariat Note: SECY-R 62 - Shipment of Plutonium and SECY-509 - Plutonium Handling and Storage, were considered at Meeting 2439 on October 26, 1970.

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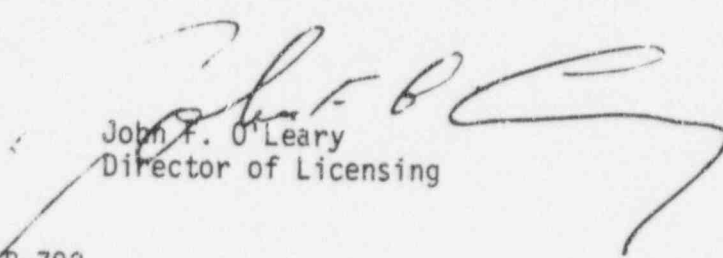
The Commissioners

- 3 -

decision on whether to restrict the form of plutonium for shipping will affect the design of these plants as well as the design of new shipping containers.

It was suggested that if the decision is made to require solid form for shipment that the proposed exemption for 20 curie quantities be eliminated. The primary concern over possible leakage of liquid is based on the increased number of large packages (probably of more complex design) to be shipped, and the possibility of human error resulting from handling the increased shipping load. The relatively small quantities expected to be shipped under the exemption is not felt to be of concern. The provision is being made principally to allow the shipment of such items as analytical samples, a necessary part of the safeguards and materials control program.

On the basis of the above, the consensus of the General Manager and Director of Regulation representatives was that the Commission should approve the publication for public comment of the proposed rulemaking in Enclosure "A" of SECY-R-702.


John F. O'Leary
Director of Licensing

Enclosures:

1. Encl "B" of SECY-R-702
(Revised version)
2. Encl "C" of SECY-R-702
(Revised version)

Seymour H. Smiley
Extension 7378

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ENCLOSURE "B"

DRAFT LETTER TO THE JOINT COMMITTEE ON ATOMIC ENERGY

1. Enclosed for the information of the Joint Committee on Atomic Energy is a copy of a notice of proposed rule making to amend 10 CFR Part 71, "Packaging of Radioactive Material for Transport and Transportation of Radioactive Materials under Certain Conditions."

2. The objective of the proposed amendments is to enhance the safety of shipping plutonium by requiring that plutonium be in solid form when shipped and that the shipping container provide at least double containment of the contents.

3. Existing regulations permit the shipment of plutonium in any chemical or physical form, including liquid plutonium nitrate. Using present regulatory criteria, hundreds of plutonium nitrate shipments have been made with no reported instances of plutonium leakage from the containment vessel. However, the present situation with respect to plutonium transportation in the private sector will change drastically over the next several years. First, increasingly larger quantities of plutonium will be recovered from power reactor fuels. Second, the specific activity of the plutonium will increase with higher reactor fuel burnup, resulting in higher gamma and neutron radiation levels, greater heat generation, and greater pressure generation potential from plutonium nitrate solutions in shipping containers. Because of these expected changes in the plutonium transport picture and the inherent susceptibility of liquids to leakage, the Commission

believes that a significant enhancement of safety would be achieved if the basic form of plutonium for shipment is changed from liquid to solid.

* While there have been no leaks with present liquid packaging, the Commission's action is believed to be a step toward increased assurance against a future problem developing. Such a change is considered feasible from an economic and technical standpoint. Further, the solid form of plutonium would be required to be shipped in a package providing at least double containment of the contents.

4. The notice of proposed rule making is being transmitted to the Office of the Federal Register and will allow 60 days for public comment after publication in the Federal Register.

5. Enclosed also is a copy of a public announcement which we plan to issue on this matter in the next few days.

* *Addition to draft
in Secy-R-702*

ENCLOSURE "C"

DRAFT PUBLIC ANNOUNCEMENT

AEC PROPOSES RULE CHANGE ON SHIPPING PLUTONIUM

The Atomic Energy Commission is considering requiring that the shipment of plutonium be in solid form in packages providing at least double containment except in single packages of 20 curies or less.

The Commission, following a review of plutonium transport practices, has concluded that while current criteria are sufficient for present shipments, both the quantity and specific activity of plutonium recovered from power reactor fuel will increase considerably in the private sector over the next several years. Because of the inherent susceptibility of liquids to leakage, the Commission believes the change to solid form would bring a significant enhancement in safety. ^{*} While there have been no leaks with present liquid packaging, the Commission's action is believed to be a step towards increased assurance against a future problem developing.

The amount of plutonium available for recovery in 1973 is estimated at 500 kilograms compared to 21,000 kilograms forecast for 1980. The specific activity of the plutonium will increase with higher reactor fuel burnup, resulting in higher gamma and neutron radiation levels, greater pressure generation potential from plutonium nitrate solutions in shipping containers.

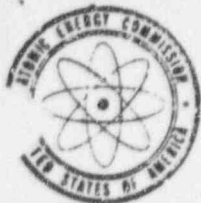
The effective date of the requirement for the shipment of plutonium in solid form would be three years from the adoption date of the

*Addition to draft in
Secy. R-702*

proposed amendment, taking into account the time when increased plutonium shipments will occur and allowing time for the process and equipment changes at reprocessing plants required to convert the plutonium to the oxide form for shipment to fuel fabricators.

Interested persons have until _____ (60 days from publication) to submit written comments or suggestions on the proposed amendment to AEC Regulations to: Secretary of the Commission, U. S. Atomic Energy Commission, Washington, D. C. 20545, Attention: Chief, Public Proceedings Staff.

Copies of comments on the proposed amendment may be examined at the Commission's Public Document Room at 1717 H Street, NW, Washington, D. C.



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

June 25, 1973

S. H. Smiley, Deputy Director
for Fuels and Materials
Directorate of Licensing

CONSIDERATION OF FORM FOR SHIPPING PLUTONIUM

The General Manager's Divisions have no objection to the subject paper as modified by the covering letter, O'Leary to the Commission.

We do suggest, however, that the thought expressed in the last sentence in the second paragraph on page 2 be incorporated into the press release and letter to the Joint Committee on Atomic Energy.

A handwritten signature in cursive script, which appears to read "Robert E. Yoder", is positioned above the typed name.

Robert E. Yoder
Assistant Director for
Facilities Safety
Division of Operational Safety

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PRINCIPAL ASSIGNMENT

NOTE TO Mr. Smiley

DATE August 20, 1973

You are assigned responsibility for completing action on the following request made at Regulatory Policy Session 74-1 on July 20, 1973:

Consideration of Form for Shipping Plutonium (SECY-R-702 and SECY-R-74-5)

The Commission approved publication of the proposed amendments in the Federal Register for a 60-day comment period. (L)

The Commission requested a summary of all comments received and further Commission consideration prior to publication of the amendments in effective form. (DR/SECY)

The Commission noted: (1) the JCAE will be informed by letter as revised in SECY-R-74-5 (L); (2) the revised press release contained in SECY-R-74-5 will be issued when the proposed amendments are filed with the Office of the Federal Register (OIS/L); and (3) an environmental statement will be prepared. (L)

If this assignment is not clear or is different from your understanding of the Commission request, please let me know.

Please return this note (and send a copy to the Office of the Secretary of the Commission) when action is completed.

Lee V. Gossick
Assistant Director of Regulation

NOTE TO LEE V. GOSSICK

Action on the above request was completed in the following manner:

cc: Mary Stromp, SECY

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