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Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Rulemaking and Adjudications Staff

The Department of Energy is pleased to provide comments in response to the Nuclear Regulatory Commission's (NRC) Federal Register notice of July 17, 2000, "Major Revision to 10 CFR Part 71: Compatibility With ST-1--The IAEA Transportation Safety Standards and Other Transportation Safety Issues, Issues Paper, and Notice of Public Meetings."

The Department's comments are based on preliminary evaluations of the potential safety and cost impacts which could arise if certain changes to Part 71 were adopted. While it is not possible to evaluate such changes fully without having actual proposed regulatory text, the Department appreciates the NRC's willingness to provide early opportunity for input. The comments provided herein represent the Department's assessment of these issues at this time; however, these views may be modified in response to the content of the subsequent Notice of Proposed Rulemaking.

Sincerely,

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U.S. Department of Energy
Response to NRC Request for
Comment on the Major Revision to 10 CFR PART71 Rulemaking

Issue 1: Changing Part 71 to SI Units Only

While the required training for transport workers can be modified to include SI units at a rather low cost, the conversion of existing packaging documentation to SI units appears to have minimal value and high cost. The U.S. has not integrated the SI/metric system for everyday use. The DOE recommends that the NRC continue its present approach of using SI units with English units in parentheses.

Issue 2: Radionuclide Exemption Values

ST-1 includes radionuclide-specific exemption values (Section IV, Table I Basic Radionuclide Values). Current U.S. regulations in 49 CFR 173.403 and 10 CFR 71.10 define radioactive material as any material having a specific activity greater than 70 Bq/g.

The areas in which DOE may be adversely affected include sample shipments, mixed waste, remelted metals, and environmental restoration activities. Based on preliminary information, a switch from the present fixed exemption concentration (70 Bq/g) approach to radionuclide-specific exemption values (even with the addition of the exempt activity consignment approach), would incur increased characterization costs, increased paperwork, and increased packaging processing time. To accurately assess the cost implications for the proposed regulatory changes, an accurate estimate of the shipment volumes is needed. Since these estimates were unavailable at this time, a detailed cost/benefit analysis is not possible, but the costs are expected to be very significant.

There is a potential for regulating certain products that are exempt under 49 CFR regulations. Notably among these materials are mining, oil, and gas products, and certain manufactured products. Specific examples of such products that contain various radionuclides, such as Ra-228, Th-228, Am-241, etc., are rare earth minerals, oils and gas extraction by-products, thoriated electrodes, thoriated luminous items, and smoke detectors.

While exemptions from the requirements of packaging, shipping documents, marking, labeling, and placarding could be sought by the shipper for specific products in accordance with provisions in 10 CFR 107.105, the exemption process may be lengthy, extensive, and burdensome on the affected industries. More importantly, the increased levels of complexity to comply with the proposed changes to the U.S. transport regulations due to the implementation of ST-1 by the DOT may impact operations of the affected industries.

Shipping personnel will need training and will need to develop methodologies for making the determinations. The determination will not be simple, as there are two parts. One part is based on the activity concentration of the material and the second part is based on the total activity in a consignment. It is important to note this is a consignment limit and not a package limit. As both parts vary for each isotope, it will require a sum of the fractions determination for both parts for

the isotopes present in a mixture. To be considered nonradioactive for shipment, one of the parts must be less than or equal to the established limits. These additional complications will add considerable costs to the classification of very low level material for transportation purposes.

If DOT and NRC believe that radionuclide-specific exemption values must be adopted for harmony with the international transportation regulations, DOE proposes that a domestic exception be made for low level materials. The exception could continue to exclude materials with activity concentrations below 70 Bq/g from compliance with the regulations, provided that they are only transported domestically.

DOE is willing to assist DOT and NRC in developing appropriate parameters and performing the necessary calculations to determine numerical values for these radionuclides.

Issue 3: Revision of A_1 and A_2 Values

The DOE endorses adoption of the new A_1 and A_2 values with the exception of the following; 1) the ST-1 A_1 limit for Cf-252, 2) the need to include Uranium enriched above 20%, and 3) entries for Ar-42, Au-196, Es-253 to 255, Ir-193m, Nb-96, Po-208 and 209, Re-183 and Te-118 in the U.S. tables.

DOE is willing to assist DOT and NRC in developing appropriate Q-system parameters and performing the necessary calculations to determine numerical values for these radionuclides.

Issue 4: Uranium Hexafluoride Package Requirements

The DOE sees little value in these changes. They are a result of two separate initiatives at the international level. The first was to substitute an ISO standard for the long-standing, and internationally accepted ANSI standard that applies to UF₆ cylinders. The second was to require thermal testing of natural and depleted UF₆ cylinders (i.e., bare cylinders) to minimize the non-radiological impacts of an accident. While this may be a desirable goal, it need not necessarily be an integral part of regulations that are intended to minimize radiological hazards.

DOE also does not support the ST-1 prohibition of pressure relief devices on Uranium Hexafluoride packages.

Issue 5: Introduction of Criticality Safety Index (CSI) Requirements

This change in the regulations provides clear separation of the reasons to limit the number of packages in a shipment. Under the new system the Transport Index will give only an indication of the direct radiation hazard and the CSI provides control of the criticality potential. With appropriate training, workers and managers in transport should be able to use the new system to control exposure risks more closely. DOE does note that there is an impact on training costs.

Issue 6: Type C Packages and Low Dispersible Material (LDM)

The Department supports harmonization with the IAEA air transport regulations and

incorporation of Type C requirements for dispersible materials. The Type C requirements recognize that other materials may pose significant hazards in a severe air accident. The provisions for Type C packagings should be included in the 10CFR71 revision even though they will not come into force for Plutonium given the highly restrictive provisions of 10CFR71.64 and 10CFR71.74 already in the regulations.

The LDM concept in ST-1 also should be incorporated in the U.S. regulations; however, it must be recognized that the process for establishing that a material is LDM is likely to be subject to additional regulation development in succeeding editions of ST-1.

The Department suggests reevaluation of the existing regulations for plutonium in light of the level of protection afforded by the IAEA ST-1 Type C regulations. Incorporation of the Type C package air transport requirements into the U.S. regulations will result in harmonization with IAEA regulations and will also enable NRC to certify air transport packages that could be used outside U.S. airspace. In any event, it would be helpful to clarify the relationship between Type C package requirements and any domestic requirements which are different.

Issue 7: Deep Immersion Test

The revision to 10CFR71 to the ST-1 language is a case of making the exception level more conservative (in many cases) and the criteria for meeting the requirement less specific. Except for issues of grandfathering older casks, DOE sees little impact on its operations from adoption of this language, but it would suggest that NRC's current criteria for success in meeting the requirement be used as a specific definition for the ST-1 language of "no rupture."

Issue 8: Grandfathering Previously approved Packages

Grandfathering is currently contained in 10 CFR 71. It provides rules and guidelines to assure that previously constructed packagings remain usable as long as they are safe. The Department is in the process of procuring packagings based on design approvals under the current DOT/NRC regulations.

Also, the Department has a considerable inventory of previously approved packagings and an inventory of radioactive material stored in previously authorized transport packagings, for which future use may require transport after harmonization with ST-1 dates, and thus require re-packaging if a "grandfather" relief is not provided. The Department also proposes that NRC incorporate the following: "Packages that have been prepared for transport prior to (five-year effective date) may be offered for transport provided that the labeling, marking, and placarding provisions of the regulations in effect at time of shipment are complied with.

Issue 9: Changes to Various Definitions

These definitions should be adopted to the extent that the terms they define are to be used in the updated version of 10CFR71.

Issue 10: Crush Test for Fissile Material Package Design

DOE endorses removal of the 1000 A₂ threshold for fissile packages on the grounds that A₂ levels are intended as an index of radiological hazard rather than criticality potential and it is inconsistent with ST-1.

A second issue is that the current version of 10CFR71 does not follow ST-1 or SS-6 with respect to imposing either the drop test or crush test (not both); 10CFR71 requires both. This requirement should be removed in 10CFR71 since the crush test would be expected to be more severe for light weight low density package designs.

Issue 11: Fissile Material Package Design for Transport by Aircraft

The recognition that aircraft crash situations have the potential for higher levels of damage in all types of packages resulted in the additional ST-1 requirements for fissile packages in the air mode. The new requirements are generally in parallel with those in place for surface mode accidents and should be adopted in 10CFR71.

Issue 12: Special Package Approvals

The Special Arrangement provisions of ST-1 should be included in 10CFR71 as the model under which shipments such as recent transport of the Trojan reactor vessel could be accommodated. These approval procedures should not be referred to as special packaging approvals because the action taken is actually a transport system approval in which the package as well as operational measures are taken into consideration in approving the shipment campaign. The concept of transport system approval is consistent with the NRC approach to risk-informed decision making.

Issue 13: Expansion of Part 71 QA Requirements to Holders and Applicants for a Certificate of Compliance

The DOE has no comment on this issue.

Issue 14: Adoption of ASME Code

DOE believes that the NRC should use caution in incorporating into its regulations specific references to an ASME Code. Under current licensing practices, not all packages are required to meet Section III, e.g., radiography devices. Such a change could have a catastrophic effect on parts of DOE and U.S. industry. As a result, references to codes, code cases, and standards, unless absolutely essential for ensuring safety, should continue to be the subject of Regulatory Guides. References in Regulatory Guides have the added benefit of being easily changed without regulatory action.

Issue 15: Adoption of Changes, Test, and Experiments Authority

At this time, the DOE does not support Certificate Holder initiated non-safety related changes to approved packagings.

Issue 16: Fissile Material Exemptions and General License Provisions

The DOE is continuing to evaluate the safety and potential impacts of the recommendations contained in NUREG/CR-5342, "Assessment and Recommendations for Fissile-Material Packaging Exemptions and General Licenses within 10 CFR Part 71" for safety and cost impacts.

Issue 17: Double Containment of Plutonium (PRM-71-12)

The ST-1 Package Containment System design requirements are the same for all radionuclides while 49 CFR 173.413 and 10 CFR part 71.63 impose special requirements for plutonium shipments to be met by the designer of the package in seeking approval of the package from the U.S. competent authority. IAEA and national regulations of other member countries generally do not make a special case for plutonium.

Based on the "Q-System for the Calculation of A_1 and A_2 values," which is embraced by IAEA and NRC regulations, a Type B package is sufficient for all radionuclides whose quantity exceeds A_2 . The additional regulatory requirement of a separate inner container for packages containing plutonium is not congruent with the requirements for all other radionuclides.

Moreover, if the special requirements are eliminated, personnel exposures from routine handling may decrease through reduced process time, and costs may be reduced substantially through more efficient handling and packaging. International harmonization of regulations is another benefit of the proposed change.

The Department will be glad to share any additional detailed analyses developed on this topic.

Issue 18: Contamination Limits as Applied to Spent Fuel and High Level Waste (HLW) Packages

External contamination on packages of radioactive material in transport is a significant problem and is a potential source of actual or perceived hazard that can cause damage to the nuclear industry. DOE recommends staying with the contamination limits in ST-1 unless a sound technical basis is developed to support any revisions to these requirements. Given the recent issues in Europe, the logic of an increased limit with an offsetting (and significant) decrease in worker dose cannot be justified without sound technical review.