

REVISION TO U.S. TRANSPORTATION REGULATIONS IN 10 CFR PART 71 TO BE COMPATIBLE WITH IAEA STANDARD TS-R-1

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ABSTRACT

The U. S. Nuclear Regulatory Commission (NRC) is currently conducting a major revision to its regulations on the transportation of radioactive material which are found in Title 10 of the Code of Federal Regulations, Part 71 (10 CFR Part 71). The NRC and the U.S. Department of Transportation (DOT) jointly share responsibility for overseeing the transportation of radioactive material. Consequently, the NRC and DOT are both revising their regulations to be compatible with the latest edition (1996) to the International Atomic Energy Agency's (IAEA's) standard TS-R-1 for the transportation of radioactive material. Because the NRC and DOT share responsibility for regulatory oversight in this area, challenges arise in determining which provisions of TS-R-1 should result in conforming changes to the NRC's and DOT's respective regulations, while simultaneously ensuring that the NRC's and DOT's regulations remain consistent. The NRC is proposing to adopt many of TS-R-1's provisions, however, in some instances the NRC is choosing not to adopt certain TS-R-1 provisions. In addition, the NRC is also revising several other requirements in 10 CFR Part 71 which are applicable to the domestic transportation of radioactive material in the areas of special package approvals, quality assurance, fissile material general licenses and exemptions, dual-purpose packages (i.e., packages intended for both the storage and transportation of spent fuel), transportation of plutonium, and event reporting.

BACKGROUND

In June 2000, the Commission directed the NRC staff in a Staff Requirements Memorandum (SRM)⁽¹⁾ to (1) use an enhanced public-participation process (website and facilitated public meetings) to solicit public input on the Part 71 rulemaking, and (2) publish the staff's Part 71 "Issues Paper " in the Federal Register⁽²⁾ for public comment. The Issues Paper presented the NRC's plan to revise Part 71 and provided a summary of the changes being considered. The NRC published the Issues Paper to begin an enhanced public-participation process designed to solicit public input on the Part 71 rulemaking. This process included establishing an interactive website and holding three facilitated public meetings in 2000.

The SRM also directed the staff to proceed, after completion of the public meetings, with the development of a proposed rule for submittal to the Commission by March 1, 2001. Oral and written comments received from the public meetings, by mail, and through the NRC website, in response to the issues paper, were considered in the drafting of the proposed changes.

PAST NRC - IAEA COMPATIBILITY REVISIONS

Recognizing that its international regulations for the safe transportation of radioactive material should be revised from time to time to reflect knowledge gained in scientific and technical advances and accumulated experience, IAEA invited Member States to submit comments and suggest changes to the regulations in 1969. As a result of this initiative, the IAEA issued revised regulations in 1973 (Regulations for the Safe Transport of Radioactive Material, 1973 Edition, Safety Series No. 6). The IAEA also decided to periodically review its transportation regulations, at intervals of about 10 years, to ensure that the regulations are kept current. In 1979, a review of IAEA's transportation regulations was initiated that resulted in the publication of revised regulations in 1985 (Regulations for the Safe Transport of Radioactive Material, 1985 Edition, Safety Series No. 6).

The NRC also periodically revises its regulations for the safe transportation of radioactive material to make them compatible with those of the IAEA. In August 1983, the NRC published in the Federal Register⁽³⁾ a final revision to Part 71, "Packaging and Transportation of Radioactive Material." That revision, in combination with a parallel revision of the hazardous materials transportation regulations of the U.S. Department of Transportation (DOT), brought U.S. domestic transport regulations into general accord with the 1973 edition of IAEA transport regulations. The last revision to Part 71 was published on September 28, 1995⁽⁴⁾, to make Part 71 compatible with the 1985 IAEA Safety Series No. 6. The DOT published its corresponding revision to Title 49 on the same date⁽⁵⁾.

The last revision to the IAEA Safety Series No. 6 was named Safety Standards Series ST-1, published in December 1996, and was revised with minor editorial changes in June 2000, and was redesignated as TS-R-1. This current rulemaking effort by the NRC is to evaluate TS-R-1 for potential adoption in Part 71 regulations.

Historically, the NRC has coordinated its Part 71 revisions with DOT, because DOT is the U.S. Competent Authority for transportation of hazardous materials. "Radioactive Materials" are a subset of "Hazardous Materials" in Title 49 regulations under DOT authority. Currently, DOT and NRC co-regulate transport of nuclear material in the United States. NRC is continuing with its coordinating effort with the DOT in this rulemaking process.

SCOPE OF 10 CFR PART 71 RULEMAKING

As directed by the Commission, the NRC staff compared TS-R-1 to the previous version of Safety Series No. 6 to identify changes made in TS-R-1, and then identified affected sections of Part 71. Based on this comparison, the NRC staff identified eleven areas in Part 71 that needed to be addressed in this rulemaking process as a result of the IAEA regulations. The staff grouped the Part 71 IAEA compatibility changes into the following issues: (1) Changing Part 71 to the International System of units (SI) (also known as the metric system) exclusively; (2) Radionuclide specific exemption values; (3) Revision of A_1 and A_2 values; (4) Uranium hexafluoride (UF_6) package requirements; (5) Introduction of criticality safety index requirements; (6) Type C packages and low dispersible material; (7) Deep immersion test; (8) Grandfathering previously approved packages; (9) Adding and modifying Part 71 definitions; (10) Crush test for fissile material package design; and (11) Fissile material package design for transport by aircraft.

Eight additional NRC-initiated issues (numbers 12 through 19) were identified by Commission direction, and through staff consideration, for incorporation in the Part 71 rulemaking process. These NRC-initiated changes are: (12) Special package approvals; (13) Expansion of Part 71 quality assurance (QA) requirements to holders of, and applicants for, a Certificate of Compliance (CoC); (14) Adoption of the requirements of American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel (B&PV) Code for fabrication of spent fuel transportation packages; (15) Adoption of change authority; (16) Revisions to the fissile-exempt and general license provisions to address the unintended economic impact of the emergency rule⁽⁶⁾; (17) Double containment for plutonium; (18) Surface contamination limits as applied to spent fuel and high-level waste packages; and (19) Part 71 event reporting requirements. NRC published the first 18 issues in an Issues Paper in the Federal Register in July, 2000⁽⁷⁾.

The Part 71 rulemaking is being coordinated with DOT to ensure that consistent regulatory standards are maintained between NRC and DOT radioactive material transportation regulations, and to ensure coordinated publication of the final rules by both agencies. In December 1999, the DOT published in the Federal Register⁽⁸⁾ an advance notice of proposed rulemaking regarding adoption of ST-1 in its regulations.

In April, 2001, NRC staff briefed the Commission on the proposed Part 71 rule. This briefing was open to the public and included comments from industry and special interest groups. Overall, the Commission agreed with the proposed language and thus issued a Staff Requirements Memo in July⁽⁹⁾ to incorporate minor changes and proceed with the rulemaking.

The following list indicates the IAEA-related Issues and the NRC proposed position:

- Issue 1: Changing Part 71 to the International System of Units (SI) Only - The NRC proposes to not adopt this provision. NRC will continue to use a dual-unit system (metric and customary) in Part 71.
- Issue 2: Radionuclide Exemption Values - The NRC proposes to adopt the radionuclide exemption values to assure continued consistency between domestic and international regulations for the definition of radioactive material. The individual radionuclide exemption values will replace the single 70 Bq/g value currently associated with transportation of radioactive material.
- Issue 3: Revision of A_1 and A_2 - The NRC proposes to adopt the new A_1 and A_2 values from TS-R-1. This would be consistent with TS-R-1 and based on IAEA's Q-System⁽¹⁰⁾. Some exceptions for domestic transport of molybdenum-99 and californium-252 are also proposed.
- Issue 4: Uranium Hexafluoride Package Requirements - The NRC proposes a specific exception for UF_6 that would supercede the general exception that allows one

to consider special features in criticality evaluations. The net effect is that the status quo will not change and water moderation will not be required for UF₆ packages that demonstrate special features (e.g., no contact between the valve body with the cylinder body under accident tests, and quality controls in place to demonstrate closure of the package prior to shipment).

- Issue 5: Introduction of the Criticality Safety Index Requirements - The NRC proposes to adopt the Criticality Safety Index (CSI) for certain fissile material packages into Part 71. The current radiation Transport Index (TI) would remain unchanged. However, the current definition of Transport Index would be split to address the radiation control (TI) and the transport index for criticality control (CSI).
- Issue 6: Type C Packages and Low Dispersible Material - The NRC proposes to not adopt the Type C Package and Low Dispersible Material provisions in Part 71. The NRC is not aware of a need for Type C packages for domestic commerce, thus no provision is needed in Part 71.
- Issue 7: Deep Immersion Test - The NRC proposes to adopt the deep immersion test requirement in Part 71 for packages with contents greater than 10⁵ A₂. Thus, the existing provision for irradiated fuel at greater than 37 PBq (10⁶ Ci) would be removed and replaced with the 10⁵ A₂ for all radioactive material.
- Issue 8: Grandfathering Previously Approved Packages - NRC proposes to adopt the provision to discontinue use of those packages approved to the Safety Series 6 (1967) standards. NRC proposes to adopt this provision 3 years after issuance of the final rule. Thus, those packages designated as B() would be phased out over time.
- Issue 9: Changes to Various Definitions - NRC proposes to adopt the definition of Criticality Safety Index (CSI) from TS-R-1. Additionally, new definitions would also be added that are specific to the other Issues in the proposed rule.
- Issue 10: Crush Test for Fissile Material Package Design - The NRC proposes to adopt the crush test for fissile material packages, and eliminate the 1,000 A₂ provision for fissile materials.
- Issue 11: Fissile Material Package Design for Transport by Aircraft - The NRC proposes to adopt the provisions for transporting fissile material by air by incorporating the criticality evaluation for fissile material into Part 71.

The following list indicates the NRC-initiated Issues and the NRC proposed position:

- Issue 12: Special Package Authorizations - The NRC proposes a special package authorization that would apply on a case-by-case basis with limited circumstances, to large component shipments. This would help eliminate the use of packaging exceptions for recurring licensing actions.
- Issue 13: Expansion of Part 71 Quality Assurance Requirements to Certificate of Compliance Holders (CoC) - The NRC proposes to expand the QA provisions of Part 71, Subpart H, to include certificate holders and applicants for a Certificate of Compliance. By including certificate holders and applicants for a CoC in Part 71, the NRC's ability to enforce nonconformance will be enhanced.
- Issue 14: Adoption of American Society of Mechanical Engineers (ASME) Code - The NRC staff recommends not adopting the ASME Code, Section III, Division 3 requirements into Part 71. The NRC understands that the ASME Code is under review and revision, and has therefore chosen to not adopt it into Part 71 at this time.
- Issue 15: Change Authority for Dual-Purpose Package Certificate Holders - The NRC proposes to add dual purpose packages to Part 71. These Type B(DP)packages would be certified for storage of spent nuclear fuel under part 72 and for transportation of spent fuel under Part 71.
- Issue 16: Fissile Material Exemptions and General License Provisions - The NRC proposes revisions to the fissile material exemptions and the general license provisions of Part 71. The proposed changes incorporate analyses performed by Oak Ridge National Laboratory^(11, 12).
- Issue 17: Double Containment of Plutonium - NRC proposes to remove the double containment requirement for plutonium, NRC believes the Type B packaging requirements are adequate to ensure public health, safety and the environment is maintained. The requirement for the material to be in solid form for plutonium with activities greater than 0.74 TBq (20 Ci) will be retained.
- Issue 18: Contamination Limits as Applied to Spent Fuel and High-Level Waste (HLW) Packages - The NRC proposes no change on this subject at this time. The IAEA is sponsoring Coordinated Research Projects (CRP) on this issue with input from the United States.

Issue 19: Modifications of Event Reporting Requirements - The NRC proposes a reduction in the regulatory burden for licensees by lengthening the event reporting submission period from 30 to 60 days.

Currently, NRC is coordinating with DOT on the details of the date for jointly publishing the proposed rules. Once published, there will be a 90 day comment period and three public meetings conducted at various locations in the U. S. with participation by both federal agencies. NRC is anticipating the proposed rule to be published in the Fall of 2001.

NRC encourages stakeholders to participate in the public meetings and make comments during the comment period. Specifically, NRC is interested in cost benefits and exposure information based on the proposed changes. It is through stakeholder input that the NRC will better understand the impact these various issues will have.

SUMMARY

The NRC is proposing to revise its regulations in 10 CFR Part 71 to be compatible with the IAEA's standards found in TS-R-1. Additionally, the NRC has identified several NRC-related transportation areas that are also part of the proposed revisions. The NRC and DOT share responsibility for regulating the packaging and transportation of radioactive material. Therefore, the NRC and DOT will work together to ensure compliance between each agency's respective requirements. The NRC will seek stakeholder input during the comment period and during the public meetings associated with the proposed rule.

REFERENCES

- (1) U.S. NRC Staff Requirements Memorandum 00-0117; June 28, 2000
- (2) Federal Register (65 FR 44360; July 17, 2000)
- (3) Federal Register (60 FR 35600; August 5, 1983)
- (4) Federal Register (60 FR 50248; September 28, 1995)
- (5) Federal Register (60 FR 50291; September 28, 1995)
- (6) U.S. NRC Staff Requirements Memorandum SRM-SECY-99-200; September 17, 1999
- (7) Federal Register (65 Federal Register 44360; July 17, 2000)
- (8) Federal Register (64 Federal Register 72633; December 28, 1999)
- (9) U.S. NRC Staff Requirements Memorandum SRM-SECY-01-35; July 10, 2001

(10) Advisory Material for the Regulations for the Safe Transport of Radioactive Material (1996 Edition) IAEA Safety Standards Series No. ST-2 Appendix I; February 19, 1999 Draft

(11) NUREG/CR-5342, "Assessment and Records for Fissile-Material Packaging Exemptions and General Licenses with 10 CFR 71"; July 1998

(12) Federal Register (63 Federal Register 44477; August 19, 1998)