SECY99-200

August 3, 1999

FOR: The Commissioners

FROM: William D. Travers /s/
Executive Director for Operations

SUBJECT: FEDERAL REGISTER NOTICE RESPONDING TO PUBLIC COMMENTS RECEIVED ON AN EMERGENCY FINAL RULE FOR FISSILE MATERIAL EXEMPT SHIPMENTS

PURPOSE:

To request that the Commission approve for publication in the Federal Register, the attached notice of response to public comments received on an emergency final rule.

BACKGROUND:

The Nuclear Regulatory Commission (NRC) published on February 10, 1997; 62 FR 5907, an emergency final rule to amend its regulations in 10 CFR Part 71 regarding the shipment of exempt quantities of fissile material and the shipment of fissile material under a general license. The emergency final rule restricted the use of beryllium and other special moderating materials (i.e., graphite and deuterium) in the shipment of fissile materials and placed quantity limits on fissile exempt shipments. These amendments were necessary to correct a discovered defect in the regulations that would have permitted, in special circumstances, nuclear criticality to occur in shipments of fissile materials which are permitted to take place without specific Commission approval. The regulatory defect was not indicative of past unsafe fissile material shipments. Rather, it was identified by Babcock & Wilcox during preparation for shipment of an unprecedented type of fissile material that could have resulted in nuclear criticality under the Part 71 requirements in place at that time. This unique material was to be produced as a waste product from processing of strategic material resulting from operations to commercially downblend weapons-usable fissile material from the former Soviet Union.

DISCUSSION:

The Commission issued the emergency final rule without a notice of proposed rulemaking and the accompanying opportunity for public comment prior to issuance of a final Rule because the Commission found good cause to dispense with these steps as being impracticable and contrary to the public interest, as permitted under the *Administrative Procedure Act*. Notwithstanding the final status of the rule, NRC solicited public comments on the rule during a 30-day postpromulgation comment period in accordance with the provisions of 10 CFR 2.804(e).

All commenters agreed with the need to impose restrictions on the shipments of fissile material when special moderating materials were present. However, all the commenters also believed that the changes to Part 71, which imposed a 400-gram consignment limit, were too restrictive and imposed an unnecessary burden on licensees for a large number of shipments that do not contain special moderators (i.e., water is the moderator). Several commenters believed that the final rule would significantly increase the number of shipments and would cause a corresponding increase in probability of worker injuries and transportation accidents, as well as increase licensee costs and paperwork burdens to transport the same quantity of fissile material.

Following publication of the emergency rule and receipt of public comments, the staff sought to study the technical issues raised by the public comments, and to perform an independent evaluation of Part 71 regulations relating to the fissile material exemption and general license limits. The NRC awarded a contract to the Oak Ridge National Laboratory (ORNL). The ORNL study (NUREG/CR-5342, August 19, 1998) supported the staff's view that the emergency rule limits were needed for criticality safety in shipments with special moderators. The study also concluded that the limits are restrictive for other shipments. NUREG/CR-5342 recommended several changes in Part 71 fissile exempt limits and general license provisions to streamline and simplify these sections, thereby providing greater flexibility to licensees.

The NRC staff intends to implement some of the ORNL recommendations in a rulemaking as part of the planned revision of Part 71. The staff is currently collecting cost/benefit data to quantify the impact of the emergency final rule, and the future impact of adopting the NUREG recommendations in a rulemaking as part of the planned revision of Part 71. However, the staff has experienced difficulty obtaining data needed to verify the burden imposed on licensees by the emergency final rule.

The enclosed Federal Register notice (Attachment 1) contains the staff's response to the public comments on the emergency final rule, and indicates the staff's intent to conduct an additional rulemaking in the future.

In a letter dated October 2, 1998, the Nuclear Energy Institute (NEI) commented on the emergency final rule stating that it is too restrictive, and indicated that NEI planned to provide comments on the NUREG document. NEI also indicated that they were willing to work with the NRC to develop an appropriate set of regulatory conditions. The NRC staff met in a noticed public meeting with NEI on May 11, 1999, to discuss the industry comments on the emergency final rule and any comments on the NUREG. NEI offered to collect data from the industry to help support the burden estimates and indicated that it was still their intent to comment on the NUREG document. This effort was not considered a high priority for the industry at that time.

The staff is currently developing a rulemaking plan to revise Part 71 to make it compatible with the IAEA transportation standards. This rulemaking would revise some of the same sections as the rulemaking necessary to implement the NUREG recommendations. To make a more efficient and effective use of staff resources, the staff plans to combine these two rulemaking initiatives. The staff has reviewed the NUREG recommendations and determined

that none of the recommendations has an immediate health and safety concern that would require an immediate action such as a rulemaking. The combined rulemaking plan will be provided to the Commission on the schedule developed for the IAEA compatibility rulemaking.

In addition, this rulemaking plan will contain provisions that respond to the Commission's directive to the staff in its SRM M970122B on SECY-96-268 (Attachment 2). In that SRM, the Commission, while approving the issuance of the emergency final rule, directed the staff to issue additional guidance for instances where fissile materials may be mixed in the same shipping container with different moderators. The staff, in a memorandum dated September 8, 1998, indicated that this issue would be addressed in a forthcoming rulemaking (Attachment 3).

The U. S. Department of Transportation (DOT) is a co-regulator of nuclear material shipments in the United States. Therefore, this rulemaking plan is being coordinated with the DOT to ensure consistency between 10 CFR Part 71 and 40 CFR Part 173. Also, Agreement States will be involved in this rulemaking because some of the revised sections are a matter of compatibility for the Agreement States.

RECOMMENDATION:

That the Commission approve for publication, in the Federal Register, the attached notice of response to public comments.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection. The Office of the Chief Financial Officer has reviewed the Commission Paper for resource impacts and has no objections. The Office of the Chief Information Officer has reviewed the Commission Paper for information technology and information management implications and concurs in it.

William D. Travers
Executive Director for Operations

CONTACTS: Naiem S. Tanious, NMSS/IMNS (301) 415-6103
Philip G. Brochman, NMSS/SFPO (301) 415-8592

Attachments:
1. Federal Register Notice
2. SRM M970122B on SECY-96-268
3. Memorandum from L. Joseph Callan, EDO to the Commission, September 8, 1998

ATTACHMENT 1

[7590-01-P]

NUCLEAR REGULATORY COMMISSION
10 CFR Part 71
RIN: 3150-AF58

Fissile Material Shipments and Exemptions; Response to Comments

AGENCY: Nuclear Regulatory Commission.

ACTION: Direct final rule response to public comments.

SUMMARY: The Nuclear Regulatory Commission (NRC) published on February 10, 1997; 62 FR 5907, an emergency final rule which amended its regulations regarding the shipment of exempt quantities of fissile material and the shipment of fissile material under a general license. The NRC issued the emergency final rule without a notice of proposed rulemaking and the accompanying opportunity for public comment prior to the rule's finalization, because NRC found good cause to dispense with these steps as being impracticable and contrary to the public interest, as permitted under the *Administrative Procedure Act*. Notwithstanding the final status of the rule, NRC solicited public comments on the rule during a 30-day comment period following publication in accordance with the Commission's regulations. This notice contains the NRC response to public comments received on the rule.

FOR FURTHER INFORMATION CONTACT: Naiem S. Tanious, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-6103, e-mail Naiem.Tanious@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Background

On February 10, 1997; 62 FR 5907, the NRC published an emergency final rule to expeditiously correct a defect in its fissile material regulations, that was discovered 5 months earlier by Babcock & Wilcox, Naval Nuclear Fuel Division (B&W). B&W, an NRC licensee, had notified the NRC by telephone on September 11, 1996, that it had discovered that the NRC and the U.S. Department of Transportation (DOT) regulations (10 CFR 71.53 and 49 CFR 173.453, respectively) on fissile exempt shipments did not provide adequate criticality safety for certain shipments of fissile material[(1)] (enriched uranium containing beryllium oxide.) Specifically, B&W demonstrated through calculations that a shipment, containing large amounts of an exempt concentration of enriched uranium in the presence of beryllium, intended to be shipped pursuant to the then existing 10 CFR 71.53(d), could result in a nuclear criticality.[(2)] B&W indicated that a beryllium oxide-enriched uranium mixture would be produced as a waste product from its processing of strategic material resulting from operations to commercially downblend weapons-usable fissile material from the former Soviet Union. B&W promptly notified the NRC of its concern, provided its calculations to the NRC, and made commitments not to make any such shipments. The NRC staff subsequently reviewed and verified B&W's calculations and determined that expeditious revisions to NRC regulations were needed to correct the deficiency because an inadvertent nuclear criticality in the public domain could involve fatalities, health effects from the resulting radiation exposures, and extensive cleanup costs.

The NRC also brought this problem immediately to the attention of the DOT and the U.S. Department of Energy (DOE). The DOT is a coregulator of fissile material shipments, and the DOE makes many shipments of fissile exempt material each year. The NRC informed the DOT of its intent to issue an emergency final rule. The DOT decided to defer any rulemaking until DOT staff could review the public comments on the NRC's emergency final rule.

The criticality safety problem brought to NRC's attention with respect to 71.53 caused the NRC staff to review Part 71 to determine whether any other provisions of this part might be similarly deficient. The general licenses in 71.18 and 71.22 provide for criticality control by limiting the quantity of fissile material in a single package (i.e., similar to the quantity-based fissile exemptions in 71.53). Section 71.18 (General license: Fissile material, limited quantity per package) also assigns a criticality transport index[(3)] (pursuant to 71.4) to each package. These sections were found to have deficiencies comparable to those discovered in 71.53, where there were no restrictions placed on special moderating materials (i.e., materials which would increase the number of neutrons available to cause fission as compared with ordinary water. Section 71.22 (General license: Fissile material, limited quantity, controlled shipment) had the additional deficiency of not limiting the total amount of fissile material in a conveyance. During the NRC staff's review, 71.20 and 71.24, which also provide general licenses, were found to be adequate in that the moderators of concern were excluded.

Packages for shipments made in accordance with a fissile material exemption in 71.53 or the general license in 71.18 or 71.22, are not required to be certified by the NRC. The intent of 71.53, 71.18, and 71.22, is that any materials packaged and shipped in accordance with the limits in these sections (and the other applicable sections of 10 CFR Part 71 and 49 CFR Part 173) were inherently safe (incapable of an inadvertent criticality). The B&W analyses demonstrated that a deficiency existed in these requirements.

The safety problem uncovered by the B&W calculations, and verified by the NRC, involved quantities, geometries, and concentrations of fissile materials and moderators that could result in criticality when shipped in compliance with sections of the regulations for which criticality analyses are not required. Fissile exemptions in 71.53 and the general licenses in 71.18 and 71.22, were originally based on the assumption that water is the only moderator that might be present in fissile exempt shipments. In these cases, these rules provide inherent criticality safety without a need for shippers to perform separate analyses. However, some moderators (herein referred to as special moderating materials) can increase the number of neutrons available to cause fission as compared to ordinary water and result in the potential for criticality in shipments where these moderators are present, even though the shipments are in compliance with 10 CFR 71.53 and 49 CFR 173.453.

When the issue was identified to the NRC in September 1996, the presence of special moderating materials in significant quantities in NRC-regulated shipments of fissile exempt materials had not been anticipated. However, certain international initiatives, including efforts to reduce stockpiles of strategic weapons material by processing for commercial use, have resulted in the greater likelihood of inclusion of these materials in NRC regulated shipments. The materials proposed to be shipped by B&W resulted from such a source. B&W had been awarded a contract to process weapons-usable enriched uranium materials from the Republic of Kazakstan. The waste product of the processing, a uranium-beryllium filtercake, met the fissile exemption provisions in then existing 10 CFR 71.53(d) and 49 CFR 173.453(d). However, B&W used a computer model of the enriched uranium-beryllium oxide waste packages to demonstrate that, if the packages were loaded for shipment into a sea-land container at the regulatory fissile exempt concentration limit, adequate confidence in nuclear criticality safety would not have been provided. NRC had verified through independent analyses that the concerns raised by the B&W analysis were valid and apply to other geometries and moderating characteristics as well. To avoid inadvertent criticality, the NRC determined that it was necessary to restrict shipments of fissile material with three special moderating materials: beryllium, graphite, and deuterium.

However, the NRC concluded that limiting beryllium, graphite, and deuterium to trace quantities would not completely eliminate the possibility of criticality in fissile exempt or generally licensed shipments. There was also a need to limit the quantity of material in a single consignment (the B&W criticality model calculations were performed using 200-centimeter high infinite slab configuration). The problem of a lack of control on the total amount of fissile exempt material in an exempt shipment was originally identified during the revision process for the 1996 Edition of the International Atomic Energy Agency's (IAEA's) "Regulations for the Safe Transport of Radioactive Material," Safety Requirement No. ST-1. The problem was addressed in ST-1 by adopting a consignment limit on the amount of fissile exempt material that a shipper could transport as a private carrier (400g for Uranium-235, and 250g for other fissile material), or deliver to a common carrier for shipment. Before the emergency final rule, the NRC could not enforce a limit on the total quantity of fissile material in a common carrier shipment because the regulations did not require a transport index for each package or require

shipment by exclusive use. The latter would restrict the ability to use common carriers, while requiring a transport index would negate much of the advantage gained by the exemption. Consignment limits are enforceable and represent a practical operating limit that would prevent the potentially unsafe accumulation of fissile exempt materials during shipment.

The NRC addressed these regulatory defects by issuing the emergency final rule in February 1997. The final rule amended 71.18, 71.22, and 71.53 by restricting the quantity of fissile material in a shipment - if trace quantities of special moderating materials (i.e., beryllium, graphite, or deuterium) were present. The final rule also restricted the quantity of fissile material shipped under a general license or exempt shipment to a consignment limit of no greater than 400 grams.

The NRC issued the emergency final rule without a notice of proposed rulemaking and opportunity for public comment prior to finalization because the Commission found good cause for dispensing with these steps as being impracticable and contrary to the public interest under the good cause tests for omitting notice and comment of the *Administrative Procedure Act* (5 U.S.C. 553(b)(B)). Notwithstanding the final status of the rule, the Commission solicited public comments on the final rule during a 30-day comment period following publication of the rule, in accordance with the provisions of 10 CFR 2.804(e). The Commission stated that it would publish a statement in the Federal Register containing an evaluation of the significant comments received and any revisions to the rule to be made as a result of the comments. The comment period ended on March 12, 1997, and this notice responds to the comments received on the rule.

II. Discussion

In developing the emergency final rule, NRC staff noted that the regulatory and technical bases for the fissile exemption and general license provisions of Part 71 were internally inconsistent and not thoroughly documented. Based on these regulatory/technical bases questions and the public comments received on the rule, the NRC issued a contract to Oak Ridge National Laboratory (ORNL) to: (1) perform an independent evaluation of Part 71 regulations relating to the fissile material exemption and general license limits; (2) review the technical issues raised by public comments on the emergency final rule; (3) perform independent calculations of the minimum critical mass limits for different combinations of fissile material and moderating material; and (4) identify potential changes to the fissile material exemption and general license limits which may be warranted. The results of the ORNL study are contained in NUREG/CR-5342[(4)], *Assessment and Recommendations for Fissile Material Packaging Exemptions and General Licenses Within 10 CFR Part 71*, issued July 1998. Publication of NUREG/CR-5342 was noticed in the Federal Register (63 FR 44777; August 13, 1998).

ORNL researched the historical bases for the fissile material exemption and general license regulations in Part 71 and discussed the impact of the emergency final rule's restrictions on NRC licensees. ORNL also performed calculations of k_{eff} (k-effective) for various combinations of fissile material and moderating material, including beryllium, carbon, deuterium, silicon-dioxide, and water, to verify the accuracy of minimum critical mass values. These minimum critical mass values were applied to the regulatory structure contained in the current Part 71, and revised mass limits for both the general license and exemption provisions to Part 71 were determined. ORNL concluded, and NRC staff agreed, that the restrictions imposed by the emergency final rule on shipments with special moderating material were necessary to protect public health and safety; however, the restrictions are excessive for water-moderated shipments. Based on its new k_{eff} calculations, we also agree that: (1) the mass limits in the general license and exemption provisions could be safely increased and thereby provide greater flexibility to licensees shipping fissile radioactive material; and (2) additional revisions to Part 71 were appropriate to provide greater clarification and simplification of the regulations. We believe these changes will resolve the issues raised in the public comments on the emergency final rule, and provide greater usability to these Part 71 regulations.

III. Response to Comments on the Emergency Final Rule

The NRC received eight letters commenting on the emergency final rule. Four were from NRC fuel-cycle licensees; one from a remediation and decommissioning company, one from DOE, one from the Nuclear Energy Institute (NEI); and one from a member of the public (same comments as DOE's). None of the commenters objected to the rule insofar as it imposes restrictions on the shipments of fissile material when special moderating materials (i.e., beryllium, graphite, or deuterium) are present. However, all the commenters also believed that the changes to Part 71 that imposed consignment limits when special moderating materials are not used, were too restrictive and imposed an unnecessary burden on licensees. Several commenters believed that the final rule would significantly increase the number of shipments and would increase licensee costs and paperwork burdens to transport the same quantity of fissile material. Some commenters indicated that the number of shipments of fissile material involving the presence of special moderators was only a small percentage of the total number of shipments involving fissile exempt and general license material which occur each year, and that the negative aspects of the rule for all shipments were not balanced by the accompanying increase in public health and safety. Some commenters requested that the consignment limits be removed, others requested that the table after 10 CFR 71.53(a) be clarified to indicate that it applied only to shipments with special moderating material present. Overall, the commenters indicated that the final rule was excessively burdensome for a large number of shipments that do not contain special moderators and requested that further rulemaking be accomplished to address their concerns. Detailed discussion of the comments is presented below. Response to this general comment is presented first, with responses to other specific comments presented later. Copies of the comment letters are available for public inspection and copying, for a fee, at the Commission's Public Document Room, located at 2120 L Street NW. (Lower Level), Washington, DC 20003-1527.

General Comment: All eight commenters objected to the imposition of the 400-gram limit of fissile material per consignment when special moderating materials (i.e., beryllium, graphite, or deuterium) are not present. The commenters stated that the 400-gram limit was unnecessarily restrictive for the majority of shipments (i.e., water-moderated), and imposed a penalty on shippers for what had been considered perfectly safe controls under the old requirements without a justification being provided. Two commenters stated that this new limit would double or triple the number of separate shipments needed to transport the same amount of fissile material, and that this increase in the number of shipments of fissile material would cause a corresponding increase in probability of worker injuries and transportation accidents, and would increase licensee costs and paperwork burdens to ship the same amount of fissile material. Two commenters indicated that the rule will impose unnecessary accounting and recordkeeping requirements on licensees to assure compliance with the rule. These commenters also believe that shippers will now need to more accurately determine the concentration

of fissile material present in a package to assure compliance with this rule. One commenter was concerned that these negative aspects of the rule were not balanced by the accompanying increase in public health and safety. One commenter stated that instead of globally restricting shipments which do not contain special moderating materials, the NRC should have identified a category of material descriptive of the special moderator-containing material, and restricted only that category.

Response: The 400-gram limit of fissile material per consignment is essential to preclude an inadvertent criticality occurring during a transportation accident involving fissile material shipments with special moderators. However, the Commission agrees with the commenters that the 400-gram limit may have caused an unintended and unnecessary economic burden to licensees whose fissile material exempt and general licensed shipments use water as the moderator because the 400-gram consignment limit may be too restrictive, in some cases. The Commission will more thoroughly examine these issues in an upcoming rulemaking currently being developed to revise Part 71 to make it compatible with the 1996 IAEA standards. However, the Commission has not, as yet, been able to substantiate the burden claim of the commenters. The staff is currently seeking necessary information from the commenters to quantify this burden.

The Commission had imposed the 400-gram consignment limit because of the regulatory latitude given to these fissile exempt and general license shippers. Shipments of exempt quantities of fissile material under 71.53 occur without NRC prior review or imposition of any additional requirements on the quantity of fissile material which may be placed on a conveyance. Therefore, the Commission imposed a 400-gram limit on the amount of fissile material that could be shipped in a single package. This limit was intended to ensure that a nuclear criticality accident would be precluded under highly unlikely, but theoretically conceivable, circumstances by restricting the quantity of fissile material that could be inadvertently assembled to less than one-half that of a critical mass needed for criticality to occur. These circumstances could exist when exempt quantities of fissile material, from two different shippers, wind up on the same conveyance and that conveyance is subsequently involved in an accident.

Additionally, in the emergency final rule the Commission simplified the regulations to require that control be maintained over one parameter (e.g., the mass of the fissile material), rather than controlling five separate parameters (e.g., the mass of fissile material, the fissile material concentration, moderation, reflection, and geometry (i.e., the spatial arrangement of the fissile material, moderating material, and any reflecting material)). This was accomplished by limiting the quantity of fissile material to less than one-half of a critical mass, while using bounding assumptions for the other parameters. Therefore, the fissile material can be in any geometrical configuration or concentration, and water can be present in any density (i.e., moderating effectiveness and reflection) and the fissile material still remains subcritical. Further reductions in the mass limit were imposed if nuclides other than uranium^{235} (e.g., uranium^{233} or any isotope of plutonium) were present or if moderating materials with a hydrogen density greater than water (i.e., oil or plastic) were present.

Licensees desiring to ship fissile materials in quantities that do not meet the limits of the fissile material exemption, or the general license regulations, may use other provisions of Part 71 to submit an application to the NRC for approval of the design of a transportation package to ship the fissile material (e.g., Type A(F) or Type B(F) packages), or may use previously approved Type A(F) or B(F) packages. [Note, the use of a Type B(F) package would also require a licensee to have a quality assurance program in place which meets the requirements of Part 71, Subpart H.]

Taken with the 0.1 percent limit on the presence of special moderating materials (i.e., beryllium, deuterium, or graphite), the final rule sought to achieve a balanced approach with relaxation of controls over concentration, moderation, and reflection, while requiring greater control on the quantity of fissile mass, and assuming that prior NRC review and approval were not obtained.

The NRC has reviewed the factors which initiated the emergency final rulemaking, the ORNL evaluation, and public comments received on the emergency final rule, and concluded that the changes imposed by the emergency final rule were clearly warranted to protect public health and safety and the environment from an accidental criticality occurring during the transport of a special class of fissile material shipments (i.e., those with special moderators). Although the Commission believes that the commenters may have valid concerns with respect to the unintended burden imposed by the emergency final rule on a large number of shipments that do not use special moderators, the staff has not been able to substantiate the burden estimates. The Commission has decided to consider, in additional rulemaking revising the fissile exemptions and general license regulations of Part 71 to: (1) address the concerns raised by public comments; (2) provide greater clarity and simplicity to these Part 71 regulations; and (3) provide increased flexibility for licensees who use these regulations. This rulemaking is scheduled to revise Part 71 to make it consistent with the IAEA transportation standards, and would be undertaken in coordination with the DOT and the Agreement States.

SPECIFIC COMMENTS

Comment: One commenter stated that the rule will double the number of water-moderated shipments that will be needed to transport the same amount of fissile material. The commenter further stated that the increase in the number of shipments will increase the cost of shipping the material, increase the chance of injury to workers due to increased probability of loading accidents, and will increase the probability of highway accidents due to the increased number of transport vehicles on the road.

Response: The Commission agrees that there may be an increase in the number of water-moderated shipments. [See response to the general comment.] Although the staff has not been able to quantify the cost, the Commission will consider the costs for fissile material shipments in the scheduled Part 71 rulemaking as part of the regulatory analysis.

Comment: One commenter stated that the term "unpackaged material" may be inadequate or misunderstood.

Response: The Commission agrees. The term "unpackaged material" is not currently defined in Part 71. In 71.53(a)(1), the Commission considered imposing a 15-gram limit on fissile material in an individual package. For fissile material which is not contained in discrete packages (i.e., unpackaged material or bulk material), the 15-gram limit is instead applied to all of the fissile material being transported on a specific conveyance. The Commission will address this issue in a future rulemaking.

Comment: One commenter stated that changes in the emergency final rule, that are not directly associated with the special moderating materials (i.e., total mass per consignment), may be needed, but these should be issued only after they go through the normal rulemaking review process.

Response: As stated in the emergency final rule (at 62 FR 5910), "[t]he Commission is promulgating this emergency final rule because the problem of regulatory safety limits over quantities and concentrations of fissile material and moderators ... is an important safety issue meriting immediate corrective action. An accidental criticality in the public domain would very likely involve fatalities, health effects from the resulting radiation, and extensive cleanup costs." Consequently, for this reason, and as described in the general comment above, the changes made to Part 71 in the emergency final rule were necessary and met the good cause test of the Administrative Procedure Act (5 U.S.C. 553(b)(B)), to dispense with notice and prepromulgation public comment as being impracticable and contrary to the public interest.

Comment: One commenter stated that because this special moderators issue was known for more than 2 years, they failed to understand why an emergency action was needed at this time.

Response: The Commission disagrees. The NRC was unaware of the regulatory defect that existed in Part 71 until it was notified by B&W in September 1996. Once the NRC became aware of the potential to affect public health and safety and the environment, the Commission deemed that prompt action was necessary to ensure that public health and safety and the environment remained protected; and hence the emergency final rule was issued.

Comment: One commenter stated that the emergency final rule addressed only a small number of specialized shipments, the size of a large freight container, and that the final rule appeared to be too conservative for smaller packages.

Response: The Commission agrees in part. The emergency final rule was too restrictive for small packages with water as the moderator. The Commission will address this issue in a future rulemaking. Also, see response to general comment.

Comment: One commenter stated that the rulemaking failed to address the value and impact of the rule change and that the rule does not consider the type and number of shipments that have been or will be impacted.

Response: The Commission agrees in part. A separate regulatory analysis was not prepared for the final rule because of its emergency nature. However, the Commission considered the values and impacts of the final rule in the discussion entitled "Alternatives Considered" on page 5909 of the Federal Register notice (62 FR 5907). The value of this rule was in preventing the possibility of an accidental criticality from occurring in the public domain during the transport of fissile material. As stated earlier, an accidental criticality could result in fatalities or other adverse health effects and would require extensive cleanup efforts. The Commission did consider that a limited number of licensees possess quantities of fissile material which could be affected by this change in regulations. However, the emergency nature of this rulemaking did not allow time for the NRC to complete as thorough a review of the type and number of impacted shipments as would occur during normal rulemaking. The NRC will address this issue in a future rulemaking. The NRC staff is currently attempting to collect cost/benefit data for this rulemaking. However, the staff has had difficulty in collecting this data from affected licensees and shippers, and is working with NEI to obtain the necessary information.

Comment: One commenter stated that the rationale for limiting the mass of special moderating material to only 0.1 percent of the fissile mass is not clear.

Response: The Commission's basis for using the 0.1 percent limit was that it was consistent with the limit contained in the 1996 IAEA standard ST-1. The NRC believed that given the emergency nature of the rulemaking and absent sufficient time to develop a national standard, the use of an international consensus technical standard was a reasonable alternative. The NRC did depart from the standard established in ST-1 by including graphite in the list of special moderating material. The Commission will continue to impose limits on the allowable fissile mass if special moderators are present; however, the Commission will solicit comment on the continued use of a consensus technical standard in a future rulemaking. This effort will be a major rulemaking which will revise Part 71 to make it compatible with the IAEA ST-1, to revise fissile material exempt and general license provisions, and to revise other Non-IAEA provisions. The National Technology Transfer Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless the use of these standards is inconsistent with applicable law or otherwise impractical.

Comment: One commenter stated that it is not clear from the wording of the rule whether the 0.1 percent limit applies to all of the deuterium present in a shipment or only to the quantity that exceeds the amount of naturally occurring deuterium.

Response: The Commission intended that the 0.1 percent limit apply to all of the deuterium present in a shipment because the ability of deuterium to moderate neutrons is not dependent upon whether the deuterium is natural or created via a man-made process.

Comment: One commenter stated that it is not so much the average hydrogen density that is important as it is the moderating effect of the material. The commenter suggested replacing "average hydrogen density greater than that of water," with "moderating effect greater than that of water."

Response: The Commission agrees that moderating effectiveness is the parameter of concern. However, in the past, the concept of average hydrogen density has been substituted for moderator effectiveness, because the principal focus was on moderation by ordinary water. The NRC believes this terminology, which had been widely used, is still appropriate and did not change this approach in the emergency final rule. The NRC will address this terminology issue in a future rulemaking.

Comment: One commenter stated that the use of absolute moderator limitations was too restrictive. The commenter believes that waste shipments from remediation and decommissioning of nuclear facilities often contain incidental quantities of special moderating materials (e.g., process materials, motors, charcoal filters, batteries, and pencils). The commenter suggested that the rule be revised to specify a quantitative limit only for those

deformable materials that can form a homogenous or latticed mixture of fissile and moderating material. Further, intact components, blocks, or articles would be considered exempt from consideration as special moderating materials. The commenter also recommended that the NRC encourage the DOT to make equivalent or similar changes to 49 CFR Part 173.

Response: The Commission agrees that the original problem with beryllium and enriched uranium involved homogenous mixtures of these substances and that discrete articles, blocks, or components would be less effective as moderating agents. The Commission will address this issue of homogenous versus heterogeneous mixture in a future rulemaking.

IV. Conclusion

The NRC staff is in the process of developing a rulemaking plan to revise Part 71 to make it compatible with the 1996 IAEA transportation standard ST-1, as well as to include other non-IAEA amendments. The staff intends to include in this rulemaking plan, proposed revisions to the fissile material exemption and general license limits, based on the ORNL recommendations. The staff is currently collecting cost/benefit data to quantify the impact of the emergency final rule, and the future impact of adopting NUREG/CR-5342 recommendations in a rulemaking.

As stated previously, the DOT deferred any rulemaking on 49 CFR 173.453 until DOT staff could review the public comments received on the NRC's emergency final rule and review the NRC's study on the fissile exemptions contained in NUREG/CR-5342. The NRC staff is currently coordinating with the DOT the resolution of these issues and the development of the rulemaking plan for the Part 71 revisions. In addition, NRC will coordinate the rulemaking plan with the Agreement States for issues that are a matter of compatibility.

Dated at Rockville, Maryland, this day of , 1999.

For the Nuclear Regulatory Commission.

_____
Annette L. Vietti-Cook,
Secretary for the Commission.

ATTACHMENT 3

[**THIS MEMO HAS BEEN SCANNED AND THE FORMAT MAY NOT LOOK LIKE THE ORIGINAL**.]

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 8, 1998

MEMORANDUM TO:	Chairman Jackson Commissioner Diaz Commissioner McGaffigan
FROM:	L. Joseph Callan Executive Director for 0perations
SUBJECT:	RESPONSE TO STAFF REQUIREMENTS MEMORANDUM M970122B ON SECY-96-268, REGARDING LIMITS ON FISSILE EXEMPT MATERIALS IN THE PRESENCE OF MIXED MODERATORS

In Staff Requirements Memorandum (SRM) M970122B on SECY-96-268, "Final Rule to Amend 10 CFR Part 71 for Fissile Material Shipments and Exemptions," dated January 27, 1997, the Commission directed the staff to consider issuing additional clarifying guidance for two tables in regulations 71.22 and 71.53, for instances where fissile materials may be mixed in the same shipping container with moderating materials that have different moderator effectiveness (e.g., water and polyethylene). These tables provide permissible mass limits for shipments of fissile material under either general license (71.22) or exemption (71.53) provisions of Part 71. These tables vary a permissible mass limit as a function of the average hydrogen density (i.e., the moderator effectiveness) for any moderating material that may be mixed with the fissile material. Consequently, the fissile-material mass limit is reduced when a shipment contains a moderating material whose moderator effectiveness is greater than that of water (i.e., the material's average hydrogen density is greater than that of water).

The staff responded to the SRM in a memorandum from the Executive Director for Operations to the Commission, dated May 19, 1997, and agreed that additional clarifying guidance was warranted, although not immediately necessary. Staff recommended that such guidance be delayed until: 1) public comments on the emergency final rule (62 FR 5907; February 10, 1997) were resolved; and 2) the staff had received and analyzed a study by Oak Ridge National Laboratory (ORNL) on the regulatory and technical bases associated with the fissile material exemption and general license provisions of Part 71 (NUREG/CR-5342). Availability of this study was noticed in the Federal Register (63 FR 44477; August 19, 1998). The ORNL study also included an evaluation of the question raised by the SRM.

Staff has completed evaluation of the public comments on the final rule and review of the ORNL study and has concluded that rulemaking should be

undertaken to simplify and consolidate the fissile material exemption limits and general license provisions of Part 71. In addition, these provisions of Part 71 would be revised to reflect a more consistent and risk-informed basis. Staff would address the issue of mixed moderators as part of this larger rulemaking by adding additional language to the allowable mass limit tables, currently in 71.22 and 71.53, that would clarify how the limits are to be applied when mixtures of hydrogenous moderators are present. Staff is currently developing a rulemaking plan that addresses these issues for submission to the Commission by April 1999. This rulemaking plan will be accompanied by a supporting regulatory analysis and environmental assessment which are being developed by an NRC contractor. Therefore, the actions outlined above will be taken to close the issue raised by the SRM.

CONTACTS: Philip G. Brochman, NMSS/SFPO
(301) 415-8592
Naiem S. Tanious, NMSS/IMNS
(301) 415-6103

cc: SECY
OGC
OCA
OPA
CFO
CIO

---

1. Fissile is defined in 10 CFR Part 71 and 49 CFR Part 173 as: plutonium-238, plutonium-239, plutonium-241, uranium-233, uranium-235, or any combination of these radionuclides. Packages used for shipment of materials containing these radionuclides must meet specific standards and operating limits designed to preclude nuclear criticality during transport, unless excepted by specific regulations (e.g., 10 CFR 71.53 or 49 CFR 173.453).

2. For transportation purposes, nuclear criticality means a condition in which an uncontrolled, self-sustaining and neutron-multiplying fission chain reaction occurs. Nuclear criticality is generally a concern when sufficient concentrations and masses of fissile material and neutron moderating material exist together in a favorable configuration. The neutron moderating material cannot achieve criticality by itself in any concentration or configuration. It can enhance the ability of fissile material to achieve criticality by slowing down neutrons or reflecting neutrons.

3. Transport index is defined in 10 CFR Part 71 as: the dimensionless number (rounded to the next tenth) placed on the label of a package, to designate the degree of control to be exercised by the carrier during transportation. For a fissile material package, the transport index is considered to be the larger of two numbers: the first is for external radiation control and is calculated based on the maximum radiation level at one meter from the external surface of the package, and the second is for criticality control purposes and is calculated based on the allowable number of packages stacked together during transportation.

4. Copies of NUREGS may be purchased from the Reproduction and Distribution Section, Office of the Chief Information Officer, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Copies are also available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. A copy is also available for inspection and/or copying for a fee at the NRC Public Document Room, 2120 L street, NW. (Lower Level), Washington, DC.