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September 30, 2000

Ms. Annette L. Vietti-Cook
Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

ATTENTION: Rulemakings and Adjudications Staff

REFERENCE: Request for Comments on "Major Revision to 10 CFR Part 71: Compatibility With ST-1 – The IAEA Transportation Safety Standards – and Other Transportation Safety Issues", 65 Fed. Reg. 44360 (July 17, 2000)

Dear Ms. Vietti-Cook:

The Nuclear Energy Institute (NEI)¹ is submitting the following comments on the Major Revision to 10 CFR Part 71: Compatibility With ST-1 – The IAEA Transportation Safety Standards – and Other Transportation Safety Issues as published in the July 17, 2000 *Federal Register*. NEI supports the U.S. Nuclear Regulatory Commission's efforts to revise 10 CFR Part 71 to be compatible with IAEA ST-1 and to also address some non ST-1 issues in Part 71 during this revision.

Nuclear material is involved in international commerce. It is important that all countries adopt uniform regulations to assure the safe use and transportation of radioactive materials. The IAEA serves a vital role in developing recommendations for regulations that govern the international transportation of radioactive materials. Without this approach each country would be developing its own regulations and

¹ NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

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compatibility would be difficult, if not impossible, to achieve. The IAEA ST-1 recommendations provide a uniform level of safety throughout the world. Therefore, the NRC along with the U.S. Department of Transportation should make every effort to harmonize 10CFR71 regulations with ST-1 as is reasonably achievable.

NEI is also supportive of the NRC's efforts to make Part 71 safety - focused and performance - based. The suggested changes in the Federal Register notice will move the regulations in that direction. As has been experienced in Part 50 and the new Part 70, the use of safety - focused regulations allows the licensee as well as the NRC to place its respective resources where they will have greatest impact on safety.

You will find attached responses to the eighteen issues identified in the Federal Register notice. Responses to specific issues also include information on related topics.

We would be pleased to discuss these comments and to respond to any questions the NRC may have.

Sincerely,



Felix M. Killar, Jr.

Attachment

Part71NRC093000

**NEI'S RESPONSES
TO THE 18 ISSUES IDENTIFIED
IN THE JULY 17, 2000 FEDERAL REGISTER NOTICE**

Issue 1. Changing Part 71 to SI units only

- **What changes would licensees and Certificate of Compliance holders have to make to relevant documents if NRC revised 10 CFR Part 71 to require SI units only?**

Response: NEI does not support a domestic change to require only System International (SI) units. For international shipments SI units are appropriate; however, for domestic shipments we recommend the NRC retain the dual unit use. Even though the United States has adopted a policy to adopt the SI units, the transition has not occurred, and, as discussed below, customary units continue to be used throughout the US. Therefore, requiring use of SI units only for domestic shipments, when the balance of the nation's activities are conducted in customary units would cause confusion as well as possible safety issues if misunderstandings, or miscalculations were to occur.

No changes to shipping documents would be required if the NRC adopted the SI only units. Customary units on the shipping papers would only have to be omitted.

- **What risks and safety impacts might occur in shipments because of possible confusion or erroneous conversion between the currently utilized English units and SI units?**

Response: For the most part shippers already use both the customary and SI units on

shipping documentation. From a risk and safety stand point there should be limited risk in using only SI units for international shipments. However, as discussed above, for domestic shipments the dual units should be retained. Use of only SI units on domestic packages could result in unnecessary exposures by the recipient of a shipment who doesn't realize the units are SI or, due to inexperience, does a erroneously conversion of them to customary units. Unintended exposure could also occur in the event of a transportation accident, if the emergency response personnel directly compare the on-site meter readings (customary units) to the shipping documentation in SI units without realizing the need to perform a conversion. There is also the concern that confusion of a carrier could needlessly delay the timely distribution and/or delivery of radioactive materials. This is especially a concern with short half-life materials such as radiopharmaceuticals.

- **What sort of transition period would be needed to allow for the conversion to exclusive use of SI units?**

Response: One year should be adequate to update computer systems and operating procedures to adopt SI units for international shipments. Time is also needed for the training of employees in the carrier and distribution network. This might take more than one year.

- **What other conforming changes would have to be made to Title 10?**

Response: Title 10 uses customary units throughout. They are used in Part 61 for burial of radioactive materials, and in Part 20 for contamination and radiation survey

records of the transport vehicles and packages. In addition to the NRC, the EPA, and FDA use customary units in their regulations. Until the country as a whole adopts the SI units, the NRC should allow the continued use of dual units.

Issue 2. Radionuclide Exemption Values

- **In some cases, would shippers have to expend resources to: 1) identify the radionuclides in a material; 2) measure the activity concentration of each radionuclide; and, 3) apply the method for mixtures of radionuclides when determining the basic radionuclide values for exempt material?**

Response: Shippers are already doing this. The calculations and computer codes will need to be updated to reflect the changes in A_1/A_2 values. Packages that were previously exempt may not be with the new values, while others that were not exempt may now be. Therefore, some time, such as one year, must be allotted for making the updates.

- **Should the exemption values apply to domestic as well as export shipments?**

Response: The exemption values should be internationally uniform. Just as the NRC/DOT would not like to explain why an exempt package in the U.S. is not exempt in France, neither would it like an exempt package from England to be received in the U.S. and not be exempt according to U.S. regulations.

- **If the exemption values only applied to export shipments, would the**

resulting standard be practical to implement?

Response: As discussed above, the exemption values should be global.

- **If DOT specifies the exemption values in its regulations (49 CFR 173), should the NRC incorporate those same exemption values in Part 71, or simply make reference to the exemption values in the DOT regulations?**

Response: To prevent conflict between the DOT and NRC regulations, the NRC should reference the DOT regulations and not adopt unique exemptions. NRC should go beyond the exemptions and reference all equivalent DOT requirements and streamline Part 71 by eliminating duplicate requirements.

- **There may be unintended consequences to adoption of specific exemption values as the current exemption value is used for non-transportation related activities. To what extent and in what manner would a change to specific exemption values affect entities whose non-transportation activities are linked to the current exemption value?**

Response: From time to time exemptions are issued that may or may not encompass the transportation regulations. Therefore, exemptions that exist outside of the transportation regulations should only be considered for the transportation aspect with just cause. Similarly, if exemptions are granted for transportation, they can only be used for other purposes if justified in that application.

Issue 3. Revision of A₁ and A₂

- **Is there a practical alternative to adoption of the A₁ and A₂ values?**

Response: For transportation applications the A₁/A₂ values should continue to be used.

It is not practical to change systems unless that system is uniformly recognized around the world. There is no such alternate system today.

- **Are there specific values that should be modified for domestic use only? What would be the justification for doing so?**

Response: While specific values of the A₁/A₂ table should not differ from those in ST-1, the current footnote "c" in 49 CFR 173.435 for molybdenum-99 should be retained.

Molybdenum-99 generators have been shipped safely for many years without risk or exposure to the public. Therefore the US exemption should be retained.

- **To what extent should the US partial adoption of ICRP 61 be considered for revising the A₁ and A₂ values?**

Response: Because the universal adoption of ICRP 61 is reflected in the ST-1 A₁/A₂ values, partial adoption of ICRP 61 by the USA should not be a factor in the transportation regulations.

Issue 4. Uranium Hexafluoride Package Requirements

- **NRC practice has been to certify fissile UF₆ packages (including the cylinder which is the containment vessel and a protective overpack) that are shown to be leaktight when subject to the hypothetical accident tests and to specify that the cylinder meets ANSI N14.1 (ANSI**

N14.1 has the domestic pressure test requirement in 630(a), not the regulations). For this reason, it is believed that NRC-certified UF₆ packages already comply with the above package performance requirements (para 630 and 677(b)). However, these changes appear to have significant ramifications for non-fissile UF₆ packaging that are under the purview of DOT.

Response: The industry agrees with the NRC's assessment that NRC – certified packages comply with the package performance requirements. We are working with the DOT to address the non-fissile UF₆ packages.

- **NRC practice has been to reference the ANSI N14.1 standard in the certification, but not to reference the standard in the rule. Although the ISO-7195-2000 standard (in draft) has been drafted taking into account ANSI N14.1, a detailed confirmation of the compatibility of the two standards has not been performed. NRC has representation on the ANSI N14.1 revision panel.**

Response: Industry believes that ANSI 14.1 and ISO 7195 are, in principle, consistent. We are currently working with the standard setting bodies to have this consistency acknowledged.

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

- **Under the new approach, it is believed that some shipments of fissile material packages might be made more efficiently (equivalent safety**

but more packages allowed in a single shipment), due to avoiding the situation where separation distance requirements (radiological safety) restrict package accumulation (criticality safety), or vice versa.

Response: Industry supports the use of the new "CSI" label in conjunction with the "TI" label. Separate labels are more meaningful and provide additional safety in transport. Their use may make some shipments more efficient by allowing an increase in the number of packages per conveyance or the number of packages per cargo hold.

- **Are any issues envisioned in the use of two TI values for shipments?**

Response: The only issue may be if the two values are confused. The distinctive "CSI" is far removed from "TI" and should not be confused. This assumes people and/or organizations refer to them properly and don't add confusion by referring to them as the two "TI" values.

Issue 6. Type C Packages and Low Dispersible Material

- **What would be the impact on air transport of currently certified Type B packages if the activity content is limited to the activity content thresholds specified above?**

Response: The industry has reviewed this issue and believes that the impact would be minimal. However, the Type C package and the term LDM were created to specifically address plutonium air shipments. The LDM limits the air shipment of plutonium in the form of a liquid or oxide. The NRC should remove the plutonium - specific

requirements for air and replace them with these new requirements.

- **What tests and analyses would be a practical method for demonstrating compliance with the type C package standards?**

Response: Industry is currently assessing practical acceptance criteria for type C package testing. Given that the need for the Type C package is still a number of years in the future, efforts to develop the testing method or acceptance criteria can be pursued at a later time. Industry will work with the NRC to define an appropriate schedule for addressing the issue.

Issue 7. Deep Immersion Test

- **How should the differences in the acceptance standards be addressed?**

Response: Due to the international nature of transportation, the NRC regulations should be consistent with ST-1.

- **What would be the impact on availability of packages and shipping costs if all packages with an activity greater than $10^5 A_2$ are required to pass the immersion test requirements?**

Response: Industry has not assessed this impact as very few packages exceed $10^5 A_2$.

- **Would US origin package designs have to be specially reviewed and certified before shippers could export them in accordance with international regulations if ST-1 requirements were not adopted?**

Response: The future use of U.S. certified package designs for import/export use

beginning in mid-2001 is entirely dependent upon approval of such designs to ST-1 performance standards. Failure to grant U.S. Competent Authority Certifications for such designs (assuming they meet necessary criteria) would seriously hinder the U.S. industry which relies heavily on international shipments; such failure would also place U.S. package designers and manufacturers at a strong competitive disadvantage.

Issue 8. Grandfathering Previously Approved Packages

- **Should the “grandfathering “ of previously approved packages be limited to those approved under the last two major revisions of the regulations? If not, on what basis should the “grandfathering “ of previously approved packages be allowed?**

Response: While grandfathering may not be allowed for international shipments under ST-1, it should be allowed for domestic shipments. A shipping package does not become unsafe just because it is a year or a day older. The NRC has the ability to recall certifications if there is a question about the safety of a package. Older packages should continue in service provided they are properly maintained and no safety deficiencies are identified.

- **How long should “grandfathered” packages be allowed to be fabricated or used?**

Response: Existing packagings should be grandfathered unless safety deficiencies are identified. Fabrication of new packagings to existing design approvals could only occur subject to case-by-case consideration.

- **What type and magnitude of package design changes should be allowed for “grandfathered” packages, before re-certification to the current set of regulations is required?**

Response: ST-1 phases out the manufacturing of any packages by Dec. 31 2006 that are not certified to the 1996 version of ST-1. This provides a window for the design, testing and certification of new packages, the re-evaluation of existing packages to the 1996 specification, or requests for special certification.

- **IAEA has initiated a process to review and update ST-1 on a two-year frequency and does this new process raise any issues on the grandfathering limitations to the last two major revisions?**

Response: The two-year review cycle concerns industry. This limited time period could result in regulatory changes that affect a package that is in the middle to the end of its design and licensing process. Therefore, package designs should be issued for a fixed period, such as 20 years, to assure that they don't become obsolete before they are even manufactured. The package applicant could indicate for how long it believes the certificate should be issued.

We are also concerned with such a short time period for changes. If IAEA had adopted this process following the adoption of ST-1, the U.S. would be behind on two sets of revisions before it incorporates ST-1 in its regulation. However, there may be merit in the program if it is conducted similar to the way the U.S. regulators update and revise

their regulations with minor continuous change and only major revisions periodically.

This should continue to be the practice for adoption of future changes to ST-1.

Issue 9. Changes to Various Definitions

- **Do the definitions conflict with existing programs, or introduce other issues or concerns?**

Response: ST-1 defines the specific types of packaging allowed for Class 7, and unless DOT revises its regulations, there will be a conflict domestically. Industry does not recommend this change.

- **Are there other definitions of terms that are recommended for incorporation in Part 71?**

Response: The NRC needs to consider definitions for “uniformly distributed”, “distributed throughout” and “homogeneous”. The NRC uses all three terms, but the differences among such terms are not clear.

Issue 10. Crush Test for Fissile Material Package Design

- **How should the differences in the test sequencing and required tests be addressed? Would the test sequencing requirements be applied to Type B packages as well?**

Response: The NRC should adopt the testing sequence of ST-1 and the requirements for Type B packages to assure international uniformity. The NRC with DOT should work with IAEA to determine an international standard testing sequence. This would eliminate the requirement to test the package twice based on the sequence of the tests.

- **What would be the impact on availability of packages and shipping costs due to elimination of the 1000 A₂ activity limit for fissile material packages having a mass not greater than 500 kg and an overall density not greater than 1000 kg/m³ based on external dimensions?**

Response: The impact is currently unknown.

- **If Part 71 is changed to only eliminate the 1000 A₂ activity limit for fissile material packages, but all other tests and the testing sequence remains unchanged, what implications would this have for US origin packages for export?**

Response: In order for shipping companies to accept packages and for foreign countries to authorize use of such packages within their jurisdiction, U.S. origin designs will need to meet international standards as established in ST-1.

Issue 11. Fissile Material Package Design for Transport by Aircraft

- **Certain factors need to be considered in determining the practical impacts of domestic adoption of ST-1 paragraph 680. First, all uranium can be shipped in non-Type C package (IF, AF) due to its A₁ and A₂ values. The paragraph 680(a) requirements appear to be readily satisfied by low-enriched uranium, because low enriched uranium (less than approximately 5% enrichment) would typically require moderation (e.g., by water) to achieve nuclear criticality, but the test specifies no water ingress. Secondly, there are statutory**

restrictions on air transport of plutonium in the U.S. Finally, packaging for air transportation may follow International Civil Aviation Organization Technical Instructions that are also being revised for compatibility with ST-1.

Response: ST-1 writers recognized that the air shipment requirements might have unintentionally limited low-enriched uranium shipments to land and sea. There is work ongoing to establish a table that takes into consideration mass, enrichment, and moderation to define an acceptable limit for shipment by air.

Issue 12: Special Package Approvals

- **Should Part 71 be revised to address reactor vessels specifically or to address large objects in general?**

Response: The NRC should consider revisions to Part 71 to address large objects in general. This would address reactor vessels as well as other large objects that would fall within NRC jurisdiction.

- **Should NRC consider adopting an analogue of IAEA's special arrangement provision modified to address packaging?**

Response: The IAEA's special arrangement provision applies to shipments between countries in nonconforming packages. Therefore, it would not lend itself to domestic shipments. However, there is merit in the NRC taking into consideration the conditions under which nonconforming packages can be shipped.

- **What (additional) determinations should be included in an**

application for a special package approval?

Response: The review should be based on the hazard.

- **Should the risk-informed basis used specifically for the Trojan approval be adopted for other special package approvals?**

Response: The review performed for the Trojan shipment provides a point of reference.

Since this has been accepted, it could be referenced as the basis for other similar shipments.

Issue 13. Expansion of Part 71 Quality Assurance Requirements to Holders of, and Applicants for, a Certificate of Compliance

- **Should consistency be maintained between the QA provisions of Parts 71 and 72, in light of the existence of dual purpose cask designs?**

Response: Yes, the NRC should have consistent QA requirements between both sections, specifically as they apply to dual-purpose packages. Subpart H to Part 71 has been in existence for many years and should be applied to the comparatively new Part 72.

Issue 14. Adoption of ASME Code

- **Can other regulatory vehicles for NRC endorsement of Code be used or should this only be done by rulemaking?**

Response: Adoption of voluntary consensus standards should not be part of the regulation. First, because the standards are updated from time to time it would take a formal regulatory process to change the regulation to adopt the standard changes.

Current regulations that have adopted standards inherently develop conflicts as one part of the regulations endorses one version of the standard while another part endorses another version. Finally, because industry standards are voluntary and consensual in nature, not all members of the industry may wish to adopt the entire standard. This results in an exception provision in the license. We recommend that the NRC place industry standards in the regulatory guides, which would allow for simpler updating, and recognize that other methods of demonstrating compliance are available.

- **Are there other voluntary consensus standards that should be considered in addition to, or in lieu of, ASME code?**

Response: No

Issue 15. Adoption of Changes, Tests, and Experiments Authority

- **Should this change authority apply to spent fuel packages involved in domestic commerce only?**

Response: The change authority should be extended to all packages.

- **Should this change authority be expanded to include all types of transportation packages, licensees, or users?**

Response: The change authority should be extended to all packages, licensees, or users.

However, each change must be submitted to the NRC/DOT and maintained in a master file so other users or licensees are aware of the changes.

- **Should the change authority apply to all domestic transportation**

packages?

Response: ST-1 does not have a specific change authority or a specific provision preventing changes that do not materially change the package or the basis to which the package was certified. The same should apply to the change authority within the new Part 71. Therefore, it should not be limited to domestic use only.

- **Should the change authority apply to dual purpose spent fuel packages?**

Response: The change authority should not be limited to only dual purpose spent fuel packages.

Issue 16. Fissile Material Exemptions and General License Provisions

- **Should all, or only some, of the 16 sub-issues (i.e., the recommendations contained in NUREG/CR-5342) be included in this rulemaking on this issue?**

Response: The following is a listing of the recommendations and industry's position.

Recommendation 1: Revise definitions and text of 10 CFR 71 for intent and internal consistency, perhaps considering relationships between 49 CFR 173 and IAEA No. ST-1.

Response: Industry supports this recommendation.

Recommendation 2: Remove ²³⁸Pu from the definition of fissile material and review the text for consistency and meaning relative to the word "fissile" and "fissile material."

Response: Industry supports this recommendation.

Recommendation 3: Review the need to demonstrate some minimal requirements (e.g., §71.43) for construction of packages containing fissile materials exceeding a certain minimal mass. Otherwise exclude fissile material from the allowable materials to be considered under §71.10(a).

Response: Industry does not support this recommendation. Fissile material under the appropriate conditions can be shipped in a Type A or Industrial package. There is no safety basis to establish minimal requirements for construction of the package simply because the material is fissile.

Recommendation 4: Modify §71.10(a) text to read ". . . not greater than 70 Bq/g (0.002 µCi/g), provided the packages contain no fissile material." and consider providing separate exemption limits for use with fissile material. The intent would be to provide a low enough exemption mass that dispersion to the public would be inconsequential OR unacceptable accumulation would be impractical. These limits could be based on the infinite media subcritical values evaluated in the appendixes. Using D2 O to provide the limiting concentration value (0.0192 g/L from Appendix E) and using the specific activity associated with U(93), the limiting radiological value to preclude any theoretical concern with criticality safety would be 43 Bq/g.

Response: Industry does not support this recommendation. The exemption requirements from ST-1 are based on potential dose to transportation workers. This is a conservative number that provides adequate protection to the public as well. The fact that the material is fissile should not impact these criteria. ST-1 includes the "Criticality Safety Index" (CSI) for the purpose of addressing criticality safety in transit. In the update to Part 71 CSI and exemption values for criticality need to be established.

Recommendation 5: There is a need for some limited specification on the packaging to be used under this general license.

Response: Industry supports this recommendation. However, the specification manifests itself through the requirements of §71.10 and the section that will address criticality safety through the use of CSI.

Recommendation 6: Clarify the aggregate TI for a shipment of packages under the general license. Require the packages to meet NCT as specified in 71.43. This might enable the mass limits to be raised since an argument could be made that criticality safety concerns would then be dictated by HAC.

Response: Industry does not support this recommendation. The use of TI and the CSI will address this concern and no unique conditions need to be identified.

Recommendation 7: As a minimum, consider revising §71.18(d)(2) to increase the allowed quantity of 233 U per package to 22 g. A simplification to the section could be obtained if this additional mass reduction for materials with higher hydrogen densities is eliminated. The consequences to safety are a reduction in the current margin, but yet a

significant mass margin (greater than 25%) even for exclusive use (TI = 100) would still be in place. Providing a minimum specification on the materials of construction for the packaging would further strengthen the justification. Another approach that would relax the mass limits would be to retain the separate limits, but raise the values as noted in Recommendation 6.

Response: Industry does not have a position on this recommendation at this time, due to little if any U-233 being shipped by the commercial sector.

Recommendation 8: Delete section §71.18(e). Consider the need to restrict such materials to the point that bulk quantities would not be present to serve as a reflector.

Response: Industry does not support this recommendation. §71.18(e) provides a reasoned basis for considering the moderators and, therefore, should be retained.

Recommendation 9: Delete §71.20(c)(2-3). Also, as indicated in Recommendation 6, there is a need to clarify the aggregate TI allowed in a shipment of these packages. Exclusion of the Be, C, and D₂O as reflector materials may be prudent (see Recommendation 8).

Response: Industry does not support this recommendation. As discussed in the response to recommendation 4 above both TI and CSI need to be taken into consideration when shipping fissile material. However, §71.18(e) and §71.20(c)(2-3) need to be harmonized. In one case Be, C and D₂O are allowed up to 0.1% of the fissile material while in the other Be and D₂O are specifically excluded while C can be up to 7.7 times the sum of the U-235 plus plutonium.

Recommendation 10: Revise the regulations to remove the need for distinguishing between uniform and nonuniform. Depending on the perceived impact on transport, the alternative would be to develop and add a definition to §71.4 for "Nonuniform distribution" that can be clearly interpreted by the licensees.

Response: Industry supports this recommendation.

Recommendation 11: Determine and specify, in a revised section, the controlled shipment conditions under which the 2500-g 239 Pu permissible mass limit stated in §71.22(d)(2) is acceptable and/or develop acceptable permissible mass limits. See recommendation 6.

Response: Industry does not support this recommendation. The combination of the TI and CSI will determine the package necessary in order to ship Pu-Be source in a package that contains up to 2500-g Pu-239. Controlled shipping conditions are not needed.

Recommendation 12: Eliminate §71.22 and combine within §71.18 by indicating maximum TI for exclusive-use shipments.

Response: Industry supports this recommendation but it should also include §71.20, §71.24, and the CSI with TI in this reformulation.

Recommendation 13: Delete §71.22(e). Consider need to restrict potential for material to serve as reflector.

Response: Industry does not support this recommendation. §71.22(e) provides a reasoned basis for considering the moderators and/or reflectors and should, therefore, be retained.

Recommendation 14: Delete §71.24(c)(3-4).

Response: Industry does not support this recommendation. As discussed in response to recommendation 4 above both TI and CSI need to be taken into consideration when shipping fissile material. However, §71.18(e), §71.20(c)(2-3) and §71.24(c)(3-4) need to be harmonized. In one case Be, C and D₂O are allowed up to 0.1% of the fissile material while in the other Be and D₂O are specifically excluded while C can be up to 7.7 times the sum of the U-235 plus plutonium.

Recommendation 15: Revise consistent with Recommendation 10 action. Eliminate §71.24 and combine within §71.20 by indicating maximum TI for exclusive use shipments.

Response: Industry supports this recommendation but it should include §71.18, §71.22, and the CSI with TI in this reformulation.

Recommendation 16: Based on a resolution to ensure the conveyance is properly limited, the criteria for restricting the special moderators identified in §71.53 should be eliminated or revised. Also, see Recommendation 5. A requirement for package standards that satisfy §71.43 should be added as appropriate.

Response: Industry supports the use of TI and the CSI to limit the conveyance. In determining the CSI for a package special moderators and/or reflectors would be considered.

Recommendation 17: As a **minimum** the table title needs to be changed to be consistent with its intent of limiting the consignment mass. However, it is probably more appropriate to limit the quantity of fissile material exempted from the requirements of §71.53(a) by restricting the permissible mass per **conveyance** to the values shown in the

reference table. These masses are consistent with an exclusive-use shipment allowed under §71.18. The only means for ensuring conveyance mass limits is to implement use of a TI based on the mass quantity of fissile material in the package or consignment. The TI would be defined such that the sum of the TIs for the packages and/or consignments on the conveyance would be limited to 100. (See discussion below relative to assessment of need for exclusive use shipment.). A simple alternative to implementing a TI for exempt quantities is to merely add a sentence to the introduction of §71.53(a) that states, "These exemptions apply only for a single consignment per conveyance."

It is further recommended that the impact of implementing a TI on a fissile exempt package be carefully considered relative to the impact on shippers of limited quantities of radioactive material under §173.421. Currently, this DOT regulation allows a package to be **exempt from packaging, marking, and labeling specifications** provided certain constraints are met and the fissile quantity is limited to 15 g of 235 U. The need to label such a package with a TI could have a major, and potentially unnecessary, impact on the isotope industry. Lowering the 235 U limit or providing a criteria for allowable grams of 235 U per gram of other material (see Sect. 5) are possible solutions that should be considered.

The best possibility for eliminating the need for conveyance control and current moderator restrictions would be to implement criteria related to the ratio of the mass of fissile material to the mass of nonfissile material. If this approach is applied, the nonfissile material included in the determination should be insoluble-in-water and noncombustible. Also, the mass of Be, D2 O, or C in the package should be excluded from determination of the ratio.

Response: Industry supports the use of TI and the CSI to limit the conveyance. In determining the CSI for a package special moderators and/or reflectors would be considered. The industry recognizes that a fissile material package that is exempt from the fissile marking may require a CSI of 0 to assure safe handling during transport.

Recommendation 18: Develop a definition of homogeneity that can be clearly understood for use with material having enrichments less than 1 wt % 235 U. Analyses such as those performed for Ref. 12 should be considered. Clarify the term "lattice arrangement" or eliminate its use. If definitions and clarifications cannot be provided, then a restriction on Be, D2 O, and C should be maintained for this provision.

Response: Industry supports this recommendation. However, the definition should not be limited to materials having enrichments less than 1 wt% U-235.

- **Should additional issues or alternative approaches on the fissile exemptions or general license provisions be included in this rulemaking?**

Response: NUREG/CR-5342 provides a firm basis for an exemption when fissile material is uniformly distributed and there is not more than 5 grams of fissile material in any 10 liter volume. ST-1 includes a similar concentration limit.

Therefore, industry recommends that the NRC adopt this exemption. However, ST-1 also has a total limit of fissile material, which does not have basis for the limit, and the NRC should not adopt it.

- **Is there available cost data that may help to understand the cost impact of the implemented emergency rule; or help to better understand the possible cost impact of the ORNL recommendations?**

Response: There is no specific cost information available at this time. However, a simple estimate can be made. During decommissioning, principally of fuel cycle facilities, the shipments of contaminated soil or building rubble to a low-level waste disposal facility could double or triple due to the conveyance limit. This would, in turn, double or triple the cost for that portion of the decommissioning.

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

- **Should NRC change any of the special requirements for the transportation of plutonium?**

Response: The NRC should re-evaluate the shipping requirements for plutonium, including the ban on air shipments. IAEA has spent considerable time evaluating plutonium shipments due to the number of them made in Europe. ST-1 reflects the state of safety thinking for these shipments. The overly conservative approach taken by

the NRC is not justified from a risk or cost standpoint.

- **Should the double containment requirement in 71.63(b) be eliminated?**

Response: Yes

- **Should both the solid form and the double containment requirements of 71.63(a) and (b) be eliminated?**

Response: NRC regulations should be consistent with ST-1 concerning all shipments, including plutonium.

- **Is consistency with IAEA standard ST-1 important on this issue?**

Response: As discussed above, the regulations should be consistent.

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

- **Should the 4 Bq/cm² limit continue to apply to spent fuel and HLW packages or should an alternative limit be developed? Is there an alternate contamination limit or alternative approach that will result in lowered exposure to workers, yet ensure that the rail and truck workers as well as the public are adequately protected from external package contamination?**

Response: The public is adequately protected from external package contamination.

The 4 Bq/cm² criterion should be applied to all packages. This is the approach of ST-1 and the NRC should be consistent with it.

- **If alternative contamination limits are established for spent fuel and HLW packages, is there any concern with the possible resulting difference in US domestic regulations and international standards?**

Response: As discussed above, there should be a consistent standard for all packages.