U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Public Meeting: Issues Paper on Revisions to Transportation Safety Requirements and Harmonization with IAEA Transportation Requirements

December 5, 2016

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12/5/16 Afternoon Agenda

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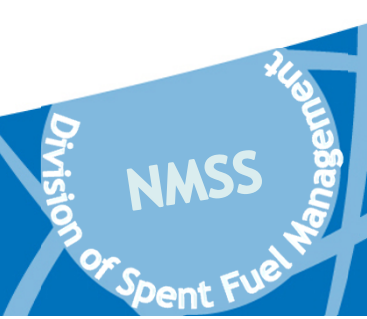
- 1:00 – 1:35pm
  - Reduced external pressure design requirement for transportation packages
  - Solar insolation
- 1:35 – 1:50pm - BREAK
- 1:50 – Close
  - NRC staff-identified items
    - Adequate space for liquid expansion clarification
    - Quality assurance program clarification
    - Fissile clarifications
  - U.S. Department of Transportation items
  - Additional time for clarifying questions
  - Closing



Issue 2

Reduced External Pressure Design Requirement for Transportation Packages

David W. Pstrak

DSFM/Inspections and Operations Branch

Public Meeting

December 5, 2016

Reduced External Pressure

Background

- SSG-26 (Para 645) “The containment system shall retain its radioactive contents under a reduction of ambient pressure to 60 kPa.”
- US DOT
  - July 2014 (79 FR 40590)
    - From 25 kPa (3.6 psia)
    - To 60 kPa (8.7 psia)
  - Harmonized with:
    - TS-R-1 (2009)
    - SSR-6 (2012)

Reduced External Pressure

Background

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10 CFR 71.71(c)(3)

- Current
  - 25 kPa (3.6 psia)
- Proposed
  - 60 kPa (8.7 psia)

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Reduced External Pressure

Factors for Consideration

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What will be the impact to package design requirements if the reduced external pressure is changed from 25 kPa (3.5 lbf/in^2) to 60 kPa (8.7 psia)?

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Reduced External Pressure

Proposed Actions

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In 10 CFR 71.71(c)(3) - revise:

(3) Reduced external pressure. An external pressure of 60 kPa (8.7 psia).

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Issue 4

Solar Insolation

Bernard White
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Solar Insolation

Topics

- Units
- Initial condition for fire test

Units for Solar Insolation

Background

- Safety Series No. 6 - 1985 Edition (as amended in 1990) changed the units for solar insolation from "*g-cal/cm^2 for 12 hours per day*" to "*W/m^2 for 12 hours per day*"
- NRC units remain g-cal/cm^2 for 12 hour period
- Total solar insolation applied by the IAEA regulations is 3% higher than NRC's

Units for Solar Insolation

Issue

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Should the NRC change the units in Part 71 for solar insolation from g-cal/cm^2 to be consistent with the IAEA units of W/m^2?

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Units for Solar Insolation

Factors for Consideration

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- Implications for the NRC certificate holders for adopting the IAEA solar insolation
  - Different thermal evaluation using the IAEA solar insolation values when seeking revalidation of the DOT Certificate of Competent Authority?
  - Other?
- Should the NRC adopt the IAEA units for solar insolation?

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Units for Solar Insolation

Proposed Action

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Form and location of surface	**Total insolation for a 12 hour period (W/m^2)**
Flat surfaces transported horizontally;	
Base	None
Other Surfaces	800
Flat surfaces not transported horizontally	200
Curved surfaces	400

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Fire Test Initial Conditions

Background

- IAEA, SSR-6
  - Thermal equilibrium
  - 38 °C
  - Solar insolation
- NRC, 10 CFR 71.73
  - Temperature between -29 °C and 38 °C
  - Maximum decay heat

Fire Test Initial Conditions

Issue

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Should NRC add solar insolation as an initial condition to the HAC fire test in 10 CFR 71.73?

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Fire Test Initial Conditions

Factors for Consideration

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Do NRC certificate holders perform a different thermal evaluation using the IAEA solar insolation values as an initial condition for the fire test when seeking revalidation of the DOT Certificate of Competent Authority?

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Fire Test Initial Conditions

Proposed Action

Add to 71.73:

the ambient air temperature before and after the tests must remain constant at that value between -29°C (-20°F) and +38°C (+100°F), with solar isolation according to the Insolation Data Table in 71.71, which is most unfavorable for the feature under consideration.

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BREAK

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Issue 11

Adequate Space for Liquid Expansion

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Space for Liquid Expansion

Background

- 10 CFR 71.87(d) requires licensees to ensure adequate ullage or other provision for liquid expansion
- DOT has similar requirement 49 CFR 173.24(h)

Space for Liquid Expansion
Issue

- DOT 49 CFR 173.412(k) requirements for Type A packages:

  "*Each packaging designed for liquids will—(1) Be designed to provide for ullage to accommodate variations in temperature of the contents, dynamic effects and filling dynamics*"

- NRC does not have a similar regulation for package design

Space for Liquid Expansion

Factors for Consideration

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Should the NRC design requirements for all packages (10 CFR 71.43) require sufficient ullage for liquid expansion?

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Space for Liquid Expansion

Proposed Actions

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Add to 10 CFR 71.43:

(i) A package must be designed, constructed, and prepared for shipment so that under the tests specified in § 71.71 ("Normal conditions of transport") § 71.73 (“Hypothetical accident conditions”) neither leakage nor permanent distortion of the packaging or system containing the liquid will occur as a result of an expansion of the liquid

Issue 12

Quality Assurance Program (QAP), §71.106, Clarification

Jeremy Tapp

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December 5, 2016

QAP Clarification

Background

- §71.106 added in 2015 Part 71 rulemaking
  - Applies to QAP changes and includes associated reporting requirements
- Wording in regulation is not as clear as the language provided in the Statements of Consideration (SOCs) or associated guidance
- Questions raised by industry

QAP Clarification

Issue

- Regulation states that changes made to the QAP must be submitted to the NRC every 24-months
- SOCs state that if no changes are made, a report is required to be submitted stating no changes were made
  - Similar language is reflected in Regulatory Guide (RG) 7.10 that accompanied this rule

QAP Clarification

Issue

- Part 71 regulation intended to be similar to Part 50 (§ § 50.54(a)(3) and 50.71(e)(2))
  - Language is essentially the same between § § 50.54(a)(3) and 71.106(b) except § 50.71(e)(2) requires a submittal if no changes were made
- NRC considering clarifying § 71.106 language to clearly align with SOCs, RG 7.10 and Part 50

QAP Clarification

Factors for Consideration

- Should QAP approval holders be required to submit a biennial report even if no changes were made during the reporting period?
- Is there an alternative to stating the requirement in § 71.106?

QAP Clarification

Proposed Action

In § 71.106(b): add language to clarify that a biennial report must be submitted to the NRC even if no changes are made to the QAP during the reporting period

Issue 13

Fissile Clarification: Fissile Material General Licenses

Andrew Barto

DSFM/Criticality, Shielding, and Risk Assessment Branch

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General Licenses

Issue

General Licenses in 10 CFR 71.22 and 71.23 are limited to Type A quantity of material in a Type A package

- Restriction is not consistent with the mass limits for some fissile nuclides
  - 37 gram limit for ^{239}Pu in Table 71-1 corresponds to a mass more than 85 times the A_2 value (0.435 grams)
  - 240 gram limit for ^{239}Pu and ^{241}Pu in 10 CFR 71.23 is more than 21 times the A_1 value for 241Pu (11 grams)

General Licenses

Factors for Consideration

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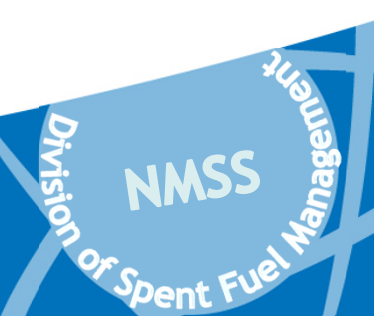
Should the NRC correct the 10 CFR 71.22 and 71.23 criteria to remove the restriction that the material be limited to a Type A quantity, and state that the material must be shipped in a Type A or Type B package?



General Licenses

Proposed Actions

- Revise 10 CFR 71.22(a) and 71.23(a) to state that the material must be in a Type A or Type B package, consistent with the radiological and containment requirements of 10 CFR Part 71
- Remove the restriction in 10 CFR 71.22(c)(1) and 71.23(c)(1) that the material be limited to a Type A quantity

Issue 14

Fissile Clarification: ^{233}U Restriction in 10 CFR 71.22

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^{233}U Restriction

Issue

Table 71-2 of the general license in 10 CFR 71.22 cannot be used if "Uranium-233 is present in the package," according to 10 CFR 71.22(e)(5)(i)

- Initial intent was to limit ^{233}U to levels below the detection limit of existing methods
- Possible to detect ^{233}U at a much lower level than previous equipment was capable of detecting; prevents the use of this general license for some material with very low levels of ^{233}U
- Could be modified to indicate that ^{233}U must be less than 1.0 percent of the mass of ^{235}U, consistent with how ^{233}U is limited in the fissile exemption in 10 CFR 71.15(d)

^{233}U Restriction

Factors for Consideration

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Should the NRC limit ^{233}U to less than 1.0 percent of the mass of ^{235}U when using table 71-2 of 10 CFR 71.22?

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^{233}U Restriction

Proposed Actions

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Revise 10 CFR 71.22(e)(5)(i) to replace “Uranium-233 is present in the package;” with “The mass of uranium-233 exceeds 1 percent of the mass of uranium-235.”

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U.S. Department of Transportation Items

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Public Comment Period

- Issues paper (ML16299A298)
- FRN (81 FR 83171): 60 day period
  - November 21, 2016 through January 20, 2017
- Electronically on Federal Rulemaking Website: http://www.regulations.gov, **Docket ID NRC-2016-0179**
- Mail comments to: Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Division of Administrative Services, Office of Administration, Mail Stop: OWFN-12-H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001

Abbreviations

- CFR – *Code of Federal Regulations*
- CSI – Criticality Safety Index
- DOT – U.S. Department of Transportation
- DSFM – Division of Spent Fuel Management
- HAC – Hypothetical Accident Conditions
- IAEA – International Atomic Energy Agency
- IP – Industrial Package
- LSA – Low Specific Activity
- MOU – Memorandum of Understanding
- NRC – Nuclear Regulatory Commission
- ORNL – Oak Ridge National Lab
- QAP – Quality Assurance Program
- RADB – Rules, Announcements and Directives Branch
- RG – Regulatory Guide
- SCO – Surface Contaminated Object
- SOC – Statement of Consideration
- SRM – Staff Requirements Memorandum
- TI – Transport Index