

Comparison of the International and United States Domestic Radioactive Material Transport Regulations



Sylvia McGhee
TetraTech
Matt Feldman
Oak Ridge
National Laboratory

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Reactor and Nuclear Systems Division

**COMPARISON OF THE INTERNATIONAL AND UNITED STATES DOMESTIC
RADIOACTIVE MATERIAL TRANSPORT REGULATIONS**

Sylvia McGhee, TetraTech
Matt Feldman,
Oak Ridge National Laboratory

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OAK RIDGE NATIONAL
LABORATORY Oak Ridge,
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CONTENTS

LIST OF TABLES	v
ACRONYMS	vii
Introduction	1
Description of the Database Upgrades	1
Regulation Difference Categorization.....	2
3.1 Very Significant Differences.....	2
3.2 Significant Differences.....	6
3.3 Notable Differences.....	9
Summary	10
APPENDIX A	A-1
APPENDIX B.....	B-1
APPENDIX C.....	C-1
APPENDIX D	D-1

LIST OF TABLES

Table	Page
Table 1. Fissile Material Exceptions	4
Table 2. Fissile Packaging Exceptions	7

ACRONYMS

ALEC	activity limits for exempt consignments
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
CoC	certificate of compliance
CSI	criticality safety index
DOT	Department of Transportation
IAEA	International Atomic Energy Agency
IBC	intermediate bulk container
IP-2	industrial package 2
ISO	International Organization for Standardization
LDM	low dispersible material
LSA	low specific activity
NRC	Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
SCO	surface-contaminated object
SSR-6	Specific Safety Requirements No. 6
TI	transport index
UN	United Nations
US	United States

Comparison of the International and United States Domestic Radioactive Material Transport Regulations

Introduction

The International Atomic Energy Agency (IAEA) recently issued a 2012 edition of the *Regulations for the Safe Transport of Radioactive Material, Specific Safety Requirements No. SSR-6*. In the United States (US), the Department of Transportation (DOT) and the Nuclear Regulatory Commission (NRC) jointly regulate the transportation of radioactive material. In 2010, UT-Battelle, the managing contractor for the Oak Ridge National Laboratory (ORNL), compared draft proposed changes to the international regulations (then TS-R-1) to the NRC regulations that were current at the time—Title 10 Code of Federal Regulations Part 71 (10 Code of Federal Regulations [CFR] Part 71)—and the DOT regulations that were current at the time—49 CFR Parts 171-178. The final version of SSR-6 differs from the draft in several areas, some of which are significant. Consequently, NRC requested ORNL to update the comparison. This September 2014 update compares the final version of SSR-6 to NRC and DOT regulations that were in effect in September of 2014.

Description of the Database Upgrades

To execute the initial comparison in 2010, ORNL developed a Microsoft Access database to assess and cross reference international and domestic regulations. In this 2014 update, the database was modified to include the 2012 SSR-6 regulations. The database already included NRC and DOT regulations, now updated to reflect changes made between 2010 and September 2014.

In the current update, changes in SSR-6 paragraph content and numbering required changes in the cross references to corresponding DOT and/or NRC regulations that address the same or similar requirements. Appendix A contains instructions for retrieving the report that summarizes cross referenced IAEA regulations, along with the NRC and DOT transport of radioactive material regulations.

In the 2010 comparison, differences between the proposed TS-R-1 regulations and the US regulations are identified and categorized as (1) very significant, (2) significant, or (3) notable. Publication of SSR-6 created new differences and modified other differences. Changes to the international regulations resulting from SSR-6 were reviewed and the differences reevaluated. New designations have now been made for (1) very significant, (2) significant, or (3) notable differences. Recently, a new field was added to the database to record “Regulatory Comparisons.” This field contains descriptions of differences in regulations. In most cases, the description is the same as that provided in the following section of this report. However, the database also contains more descriptions for “notable” differences than given in this report, and it also includes notations for more minor differences that do not qualify as *very significant*, *significant*, or *notable*. Other notations flag regulations with differences in terminology but similar intent. They also note criteria that only exist in domestic or international transportation (but not both), so would not be expected to be harmonized.

Differences designated as *very significant* or *significant*, along with some of the *notable* differences, are briefly summarized in this document. A report of the very significant differences

between the SSR-6 regulations and the NRC and DOT regulations is given in Appendix A. Appendix B provides a report of significant differences, and a report of the notable differences is given in Appendix C. Appendix D includes a report of all other notations made in the “Regulatory Comparison” column.

It should be noted that DOT recently issued final rule making of docket HM-250, to be effective on October 1, 2014. Unless noted, mandatory compliance will be required for HM-250 on July 13, 2015. NRC has indicated that they plan to issue a companion rule-making document. These regulatory changes are intended to increase compatibility with the 2009 Edition of TS-R-1. When NRC issues the final rulemaking, the database will require updating.

Regulation Difference Categorization

The differences between the IAEA SSR-6 regulations and US regulations were categorized as (1) very significant, (2) significant, and (3) notable. The following definitions were used in both 2010 and 2014.

- **Very Significant:** Differences for which laws and/or the regulatory approach would require significant change in order for the regulations to be harmonized. For example, packaging to be used for air shipments of plutonium is addressed in NRC regulations (10 CFR Part 71), but not in IAEA regulations. Another example is the Uranium Hexafluoride (UF₆) thermal test that is included in IAEA regulations but not in NRC/DOT regulations.
- **Significant:** Differences that are technically or administratively justified by the organization adopting them, but for which other organizations do not have or have not adopted corresponding requirements. For example, the US domestic system requires DOT revalidation of Type B (U) package designs certified by NRC prior to export.
- **Notable:** Differences that do not require major changes in technical approach or approvals but that are not harmonized. Examples of notable differences may be minor variations in test specifications or definitions in which the meanings are not the same. Minor wording differences are not included in this category.

3.1 Very Significant Differences

The following are considered to be very significant differences between IAEA 2012 SSR-6 regulations and NRC and/or DOT regulations. The SSR-6 paragraphs related to the differences are shown in parentheses. Since not all of the differences are a result of SSR-6 (i.e., they already existed in the 2009 version of TS-R-1), new differences are noted.

Fissile Exceptions (417, 570, 606) New in 2012 SSR-6

The criteria for fissile excepted materials have changed from TS-R-1 and are very significantly different from NRC and DOT criteria. Paragraph 417 gives mass limits per package, including four new subparagraphs: c, d, e, and f. Subparagraph f is a provision to obtain competent authority approval for a fissile exception, and additional requirements for exceptions under 417(f) are given in Section 606. Section 570 is a new section with consignment limits, including the relatively low consignment limits of 15g and 45g, depending on the type of exception. The exception for up to 1 kg of plutonium with no more than 20% fissile nuclides has been removed from the fissile excepted materials list and is now included in paragraph 675 as a fissile shipment (discussed

below). Table 1 summarizes the fissile exceptions in international and domestic regulations

UF₆ Proper Shipping Name (419, 425) New in 2012 SSR-6

Table 1 and Paragraphs 419 and 425 in SSR-6 allow for UF₆ to be shipped in an excepted package under the new proper shipping name, “UN3507, Uranium Hexafluoride, Radioactive Material, Excepted Package,” if the UF₆ is fissile excepted or non-fissile, is less than 0.1 kg, and meets the requirements of Paragraphs 420 for packaging and 424 for limited quantities of material. Neither NRC nor DOT includes this proper shipping name. Under current DOT regulations, a limited quantity of UF₆ would be classed as a corrosive material.

Large Freight Containers (543, 544)

Large freight containers are not addressed in NRC or DOT regulations, and radioactive materials packaging is treated as non-bulk packaging, regardless of size. Paragraphs 543 and 544 address placarding, including the option of using orange panels for freight containers, large freight containers, and tanks.

Documentation for Shipments of Fissile Excepted Materials (546) New in 2012 SSR-6

Subparagraph j of this paragraph now includes a requirement for materials excepted under paragraphs 417(a) through (f). The reference to that paragraph and the mass of fissile nuclides must be shown on shipping documentation. Documentation for shipments of fissile materials in packaging excepted from fissile requirements under paragraphs 674 (a) through (c) or 675 must reference that section. DOT requires that fissile excepted shipments include the words “fissile excepted” on the shipping documentation, but DOT has no requirement to reference the citation of the exception.

Documentation for Shipments with Competent Authority Approvals (546) New in 2012 SSR-6

Subparagraph (k) includes requirements for showing Certificate of Compliance (CoC) numbers on shipping documentation as required by DOT. However, SSR-6 includes CoCs for approvals not addressed by NRC or DOT—low dispersible materials and fissile materials excepted under 417(f).

IP-2 Alternate Testing (626)

Industrial packaging is addressed in DOT regulations, but it is not addressed in NRC regulations. DOT regulations do not contain the provision in Paragraph 626 for packaging to be qualified as industrial package 2 (IP-2) via United Nations (UN) Packing Group I or II tests.

UF₆ Packaging (631, 632, 718)

Paragraphs 631 and 632 give requirements for UF₆ packaging, including requirements to comply with the International Organization for Standardization (ISO) 7195 and a thermal test; however, DOT requirements reference American National Standards Institute (ANSI) N14.1. Also, DOT requires a pressure test to 1.4 MPa. Paragraph 718 of SSR-6 requires a pressure test to 1.38 MPa with multilateral approval, or otherwise to 2.76 MPa.

Table 1. Fissile Material Exceptions

The following is a comparison of Fissile Exception provisions in SSR-6 and the NRC and DOT regulations. The exceptions are ordered by paragraph number in SSR-6 and are grouped with the most similar exceptions shown side by side. Differences in the exceptions are shaded.

SSR-6	10 CFR and 49 CFR
417 a: Uranium with wt % U-235 \leq 1% * Pu & U-233 \leq 1% of the U-235 mass * fissile nuclides must be distributed essentially homogeneously throughout the material * U-235 in metallic, oxide or carbide forms must not form a lattice arrangement	71.15 (d) and 173.453 (d): Uranium with wt % U-235 \leq 1% * Pu & U-233 \leq 1% of the U-235 mass * beryllium, graphite, and hydrogenous material enriched in deuterium < 5% of the Uranium mass
417 b: Liquid uranyl nitrate w/ wt % U-235 \leq 2% * Pu & U-233 \leq 0.002% of the Uranium mass * Minimum nitrogen to uranium atomic ratio (N/U) of 2	71.15 (e) and 173.453 (e): Liquid uranyl nitrate w/ wt % U-235 \leq 2% * Pu & U-233 \leq 0.002% of the Uranium mass * Minimum nitrogen to uranium atomic ratio (N/U) of 2 * Type A package required
417 c: Uranium with wt % U-235 \leq 5% * \leq 3.5 g U-235 per package * Pu & U-233 \leq 1% of the U-235 mass per package * Consignment limit of 45 g (§1570 (c))	
417 d: Fissile nuclides \leq 2 g per package * Consignment limit of 15 g (§1570 (d))	71.15 (a) and 173.453 (a): Fissile nuclides \leq 2 g per package *No consignment limit
417 e: Fissile nuclides \leq 45g per package or unpackaged * Consignment limit of 45 g via exclusive use (§1570 (e))	
417 f: A material approved as fissile excepted by the Competent Authority	
675: This is NOT a fissile exception; this is an exception for a fissile shipment of Pu to be made in non-fissile packaging. (Para 674 has similar provisions for uranium shipments.) Pu element \leq 1000 grams, with \leq 20 percent Pu-239 &/or Pu-241 * CSI formula * If present, U \leq 1% of Pu mass	71.15 (f) and 173.453 (f): This is a fissile exception Pu element \leq 1000 grams, with \leq 20 percent Pu-239 &/or Pu-241

Table 1. Fissile Material Exceptions (continued)

The following is a comparison of Fissile Exception provisions in SSR-6 and the NRC and DOT regulations. The exceptions are ordered by paragraph number in SSR-6 and are grouped with the most similar exceptions shown side by side. Differences in the exceptions are shaded.

SSR-6	10 CFR and 49 CFR
<p>822 - grandfather provision for 2009 TS-R-1 * Applies to materials prepared for shipment before 12/31/2014 2009 TS-R-1 417 (a)(i): Fissile nuclides ≤ 15 g per package * For unpackaged material, ≤ 15 g per consignment * Beryllium and deuterium limits * Consignment limits per Tbl 4 of 2009 TS-R-1 (400 g or 290 g, depending on hydrogen density of materials mixed with the fissile material) * Exclusive use shipment required</p>	<p>71.15 (b) and 173.453 (b): Fissile nuclides ≤ 15 g per package * Must have 200 g solid, non-fissile material per g of fissile material * Lead, beryllium, graphite, and hydrogenous material enriched in deuterium are allowed, but not counted in the non-fissile mass * No consignment limit</p>
<p>822 - grandfather provision for 2009 TS-R-1 * Applies to materials prepared for shipment before 12/31/2014 2009 TS-R-1 417 (a)(ii): Homogeneous solution w/ fissile nuclides:Hydrogen ration <5% by mass * Beryllium and deuterium limits * Consignment limits per Tbl 4 of 2009 TS-R-1 (400 g or 290 g, depending on hydrogen density of materials mixed with the fissile material) * Exclusive use shipment required</p>	
<p>822 - grandfather provision for 2009 TS-R-1 * Applies to materials prepared for shipment before 12/31/2014 2009 TS-R-1 417 (a)(iii): < 5 g fissile nuclides per 10 L volume * Beryllium and deuterium limits * Consignment limits per Tbl 4 of 2009 TS-R-1 (400 g or 290 g, depending on hydrogen density of materials mixed with the fissile material) * Exclusive use shipment required</p>	
	<p>71.15 (c) and 173.453 (c): Low concentrations of solid fissile material commingled with solid nonfissile material * There is at least 2000 grams of nonfissile material for every gram of fissile material * There is no more than 180 grams of fissile material distributed within 360 kg of contiguous nonfissile material * Lead, beryllium, graphite, and hydrogenous material enriched in deuterium are allowed, but not counted in the non-fissile mass</p>

Fissile Packaging Exceptions (674, 675) New in 2012 SSR-6

10 CFR 71.22 contains requirements for shipping certain quantities of fissile material in Type A packages that are not required to meet additional requirements for fissile material packaging. Sections 674 and 675 are new to the international regulations. They contain criteria with a similar intent to that in 10 CFR, but the quantities of fissile materials allowed are considerably different. Because several options are available in each regulation and the requirements for the options are not alike, a direct comparison is not possible. In general, for materials with a hydrogen density less than that of water, 10 CFR regulations allow more material. Under some conditions, paragraph 674(a) of SSR-6 allows for a Type A quantity of fissile material in an excepted package rather than using a Type A package. **Table 2** summarizes the fissile packaging exceptions in international and domestic regulations.

Plutonium Shipments in Type A Packages (675) New in 2012 SSR-6

Paragraph 675 is a provision for shipping fissile plutonium in a non-fissile package; the same criterion for the plutonium content was previously for fissile excepted material in Paragraph 417. These quantities will now be fissile shipments, but they may be shipped in Type A (non-fissile) packaging. NRC and DOT have a similar (not identical) exception for plutonium as a fissile excepted material as opposed to being shipped as a fissile shipment in Type A non fissile packaging.

Package Testing (716)

The pass criteria in the international and domestic regulations differ for Type A and Type B packaging. A package could conceivably pass appropriate testing, but the documentation would not be adequate unless records and reporting are intentionally prepared to meet both sets of requirements.

Transitional Arrangements (822) New in 2012 SSR-6

Materials that qualify as *fissile excepted* under the 2009 version of TS-R-1 may continue in transport under certain conditions. Specific types of materials covered by this arrangement are included in Table 1, which summarizes fissile exceptions.

Plutonium Transport by Air

SSR-6 does not contain specific requirements for plutonium shipment by air, but NRC has specific requirements for this. The test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

3.2 Significant Differences

The following are considered to be significant differences between the IAEA 2012 SSR-6 regulations and the NRC and/or DOT regulations. The SSR-6 paragraphs related to the differences are shown in parentheses. Since not all differences result from SSR-6 (i.e., they already existed in the 2009 version of TS-R-1), new differences are noted.

Alternate Activity Limits for Exempt Consignments for Instruments and Articles (403(b)), 839) New in 2012 SSR-6

SSR-6 contains a new provision for using alternate activity limits for exempt consignments (ALECs) for instruments and articles with multilateral approval. NRC and DOT do not address any similar provision.

Table 2. Fissile Packaging Exceptions

The following is a comparison of provisions in SSR-6 and the NRC regulations for certain quantities of fissile materials to be packaged in non-fissile packaging. The values given are maximum allowed quantities (grams) under the conditions required by each paragraph.

	SSR-6			10 CFR 71.22		
	674(a)	674(b)	674 (c)	Table 71-1 w/hydrogen density ≤ H2O	Table 71-1 w/hydrogen density > H2O	Table 71-2 w/hydrogen density ≤ H2O
Minimum packaging	Excepted	Type A	Type A	Type A	Type A	Type A
Max CSI allowed (formula given)	10	10	3.33	10	10	10
Wt % U-235*	mass (g)			mass (g)		
> or = 24	18	45	15	60	38	60
20	23.2	58	15	-	38	63
5	34	85	15	-	38	108
1.5	88	220	15	-	38	408
* Assuming no other fissile isotopes						
Other fissile material w/ U-235 = 0g	11.2	28	15	-	-	-
U233	-	-	-	43	27	-
Pu239 or Pu241	-	-	-	37	24	-

Other requirements:

Beryllium, graphite, or hydrogenous material enriched in deuterium & other allotropic form of carbon ≤ fissile mass (unless ≤ 1 g per 1000 g material)
Formulas for CSI given

Other requirements:

Must contain no more than a Type A quantity
Must contain less than 500 total grams of beryllium, graphite, or hydrogenous material enriched in deuterium
Formulas for CSI given

| Low Specific Activity (LSA)–I with Fissile Excepted Material (409[a][iii])

Materials with unlimited A_2 values are included in the provision for LSA-I material. SSR-6 allows fissile excepted material in the definition, but DOT uses the words “other than fissile material.” In other parts of the definition, DOT allows fissile excepted material, so the wording “other than fissile material” clearly excludes even fissile excepted quantities.

Excepted Package Requirements (422) **New in 2012 SSR-6**

A new requirement has been added to the excepted package conditions for less than 0.1 kg of UF_6 . This is related to the new UF_6 proper shipping name discussed in “Very Significant Differences” above, which NRC and DOT do not recognize. However, this packaging requirement is broader than UF_6 and therefore is considered *significant* rather than *very significant*.

LSA Fissile Shipments (518, 519, 520)

Paragraphs 518–520 contain provisions for LSA materials that are fissile (not fissile excepted). DOT requires that LSA materials that are not fissile excepted be shipped under 10 CFR in appropriate fissile packaging. A proper shipping name other than for LSA material would be used.

Transport Index (TI), Criticality Safety Index (CSI), and Labeling for Freight Containers (523)

Radiation levels can be used for uranium and thorium ores instead of taking a direct measure. DOT requires direct measure in all cases.

TI Determination (529)

Both SSR-6 and DOT regulations contain a footnote in the tables for label determination that allows for a measured TI not greater than 0.05 to be considered as zero. However, the SSR-6 regulations allow this for I-White and II-Yellow labels, where DOT only allows this label determination for I-White.

Labeling for LSA & Fissile Contents (540)

SSR-6 requires that “LSA-II,” “LSA-III,” “surface-contaminated object (SCO)-I,” and “SCO-II” be shown with the list of nuclides on radioactive labels. However, DOT does not require this information. Both regulations allow for “LSA-I” to be shown on a label instead of (not with) the list of nuclides.

SSR-6 allows for mass of fissile nuclides to be shown in lieu of activity. DOT allows this for U-233 and U-235, but not for Pu-239 and Pu-241.

UN Number on Placards (572)

Paragraph 572 requires UN numbers to be shown on placards or orange panels for unpackaged LSA-I, SCO-I, and exclusive use shipments with only one UN number. DOT does not have this requirement.

Customs Operations (582)

NRC and DOT do not address the customs inspections found in this paragraph.

Requirements for Type A Packages (645)

SSR-6 requires that a Type A package retain its contents under an external pressure reduction of 60 kPa; the NRC and DOT requirements are 25 kPa.

Type C Packaging (669-672, 683, and 734-737)

NRC and DOT do not address Type C packaging or testing.

Low Dispersible Material (433, 605, 712)

The NRC and DOT do not currently recognize low dispersible material (LDM) or Type C packages. Higher activities of material are allowed in Type B packages and for shipment by air if LDM is recognized.

Administrative Requirements (802, 805, 806, 817, 818, 832, 835-839) **New in 2012 SSR-6**

Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles and therefore do not address similar administrative requirements.

3.3 Notable Differences

The following are examples of what are considered to be notable differences between the IAEA 2012 SSR-6 regulations and the NRC and/or DOT regulations. The SSR-6 paragraphs related to the differences are shown in parentheses. Since not all of the differences are as a result of SSR-6 (i.e., they already existed in the 2009 version of TS-R-1), new differences are noted. This list presents a sample of notable differences; the complete list can be found in Appendix C.

Scope of Regulations (107) **New in 2012 SSR-6**

Subparagraph 107(d) is an exception for radioactive material in or on a person who is to be transported for medical treatment because of accidental or deliberate intake or contamination. Note that subparagraph (c) and 49 CFR 173.401 provide an exception for radioactive materials implanted into people or animals for diagnosis or treatment, but in SSR paragraph 107(d), the radioactive material is from contamination, not from medical use. NRC and DOT regulations do not provide this exception.

Definition of Fissile Nuclides (222) **New in 2012 SSR-6**

The definitions of fissile nuclides and fissile materials differ slightly in the international and domestic regulations. The domestic regulations state that fissile material means the fissile nuclides themselves, not the material containing fissile nuclides. SSR-6 states, "Fissile material shall mean a material containing any of the fissile nuclides." Exclusions for natural and depleted uranium are found in all three sets of regulations; however, SSR-6 contains an exception for fissile nuclides less than 0.25 grams. That exception is not found in NRC or DOT regulations.

Management System (228, 306) **New in 2012 SSR-6**

The term *management system* is now used in the international regulations instead of *quality assurance*. Although the definition differs from the definition of *quality assurance* in TS-R-1 the intent appears to be the same. *Quality assurance* is not found in the definitions in 10 CFR 71.4 or 49 CFR 171.8; however, it is addressed in detail in 10 CFR Part 71, Subpart H.

Return to Service Criteria (505)

SSR-6 provides decontamination criteria for freight containers, intermediate bulk containers (IBCs), tanks, and other packagings and overpacks that have been used for

radioactive material. The containers may be used for storage or transport of other materials once contamination levels are below the given levels. DOT provides criteria for return to service of a transport vehicle that has been previously dedicated to radioactive material shipments only, but DOT does not have similar criteria for packagings.

Record Retention for Carriers (587) New in 2012 SSR-6

Paragraph 587 of SSR-6 requires that a carrier retain a copy of shipping documentation for three months. TS-R-1 did not contain this requirement. DOT regulations require that a carrier retain documentation related to hazardous waste shipments for three years and documentation related to all other hazardous material shipments for one year.

Safety Factors for Lifting Attachments (608)

Both NRC and DOT regulations specify that any lifting attachment that is a structural part of the package be designed with a minimum safety factor of three. SSR-6 regulations do not specify the required safety factor, but rather they state that an “appropriate” safety factor must be used.

Administrative Requirements (804, 808, 810)

These paragraphs are examples of administrative requirements related to low dispersible material and Type C packages that are not found in the NRC or DOT regulations. Technical, nonadministrative requirements related to those differences are found in the list of *very significant* or *significant* differences.

Summary

The recently published 2012 IAEA SSR-6 regulations were reviewed to identify and evaluate changes from both the 2009 TS-R-1 regulations and the proposed version of SSR-6. The Microsoft Access database was updated to include the 2012 SSR-6 regulations and recent updates to both the NRC 10 CFR Part 71 and the DOT 49 CFR regulations. Cross references to both the NRC and DOT regulations were updated to reflect the information identified in this comparison study. Very significant, significant, and notable differences between the IAEA SSR-6 regulations and the NRC and DOT regulations were identified and summarized in this report and in the database.

APPENDIX A

Very Significant Differences between IAEA SSR-6 Regulations and NRC and DOT Regulations

Note:

The “Very Significant Differences” report may be viewed by clicking on the "Reports" tab in the Access navigation bar on the left-hand side of the screen.

To run the report, double click on the report name: IAEA_NRC_DOT_VS_Reg_Comments. This will open the report in "print preview" mode. To print the report, go to File=>Print on the menu bar once the report is shown on the screen. To save the report to an Adobe portable document format (PDF) file, go to “Print Preview.” Under the *Data* tab, choose either the *PDF* or *XPS* icon. This will allow the report to be saved as an Adobe PDF file.

Note:

To access the Total Summary Report with the cross references of all IAEA, NRC, and DOT citations in the database, follow the same instructions as provided above for *very significant differences*, except choose the report name IAEA_NRC_DOT_All_Summary_Rpt.

IAEA, NRC, and DOT Regulation Comparison Report

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center; margin: 0;">822</p> <p>Packages excepted from the requirements for fissile materials under the 2009 Edition of these Regulations</p> <p>Packages containing fissile material that are excepted from classification as FISSILE according to para. 417(a)(i) or (iii) of the 2009 Edition of these Regulations prepared for transport before 31 December 2014 may continue in transport and may continue to be classified as non-fissile or fissile-excepted except that the consignment limits in Table 4 of the 2009 Edition of these Regulations shall apply to the conveyance. The consignment shall be transported under exclusive use.</p>			<input checked="" type="checkbox"/>	<p>Materials that qualify as fissile excepted under the 2009 version of TS-R-1 may continue in transport under certain conditions. Specific types of materials covered by this arrangement are included on Figure 1 summarizing fissile exceptions.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">718</p> <p>Test for packagings designed to contain uranium hexafluoride</p> <p>Specimens that comprise or simulate packagings designed to contain 0.1 kg or more of uranium hexafluoride shall be tested hydraulically at an internal pressure of at least 1.38 MPa, but, when the test pressure is less than 2.76 MPa, the design shall require multilateral approval. For retesting packagings, any other equivalent non-destructive testing may be applied, subject to multilateral approval.</p>		<p style="text-align: center;">173.420 (a) (3)</p> <p>(a) In addition to any other applicable requirements of this subchapter, quantities greater than 0.1 kg of fissile, fissile excepted or non-fissile uranium hexafluoride must be offered for transportation as follows:</p> <p>(3) Each package shall be designed so that it will:</p> <p>(i) withstand a hydraulic test at an internal pressure of at least 1.4 Mpa (200 psi) without leakage;</p> <p>(ii) withstand the test specified in Sec. 173.465(c) without loss or dispersal of the uranium hexafluoride; and</p> <p>(iii) withstand the test specified in 10 CFR 71.73(c)(4) without rupture of the containment system.</p>	<input checked="" type="checkbox"/>	<p>Paragraphs 631 and 632 give requirements for packaging for UF6, including requirements to be in accordance with the International Organization for Standardization document ISO 7195 and a thermal test; however, DOT requirement reference American National Standard N14.1. Also, DOT requires a pressure test to 1.4 MPa. Paragraph 718 of SSR-6 requires a pressure test to 1.38 MPa with multilateral approval, or otherwise to 2.76 MPa.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">716</p> <p>Testing the integrity of the containment system and shielding and assessing criticality safety</p> <p>After each of the applicable tests specified in paras 718–737:</p> <p>(a) Faults and damage shall be identified and recorded;</p> <p>(b) It shall be determined whether the integrity of the containment system and shielding has been retained to the extent required in Section VI for the package under test;</p> <p>(c) For packages containing fissile material, it shall be determined whether the assumptions and conditions used in the assessments required by paras 673–686 for one or more packages are valid.</p>			☑	<p>The pass criteria in the international and domestic regulations differ for Type A and Type B packaging. A package could conceivably pass appropriate testing, but the documentation would not be adequate unless records and reporting are intentionally prepared to meet both sets of requirements.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

675

Packages containing not more than 1000 g of plutonium are excepted from the application of paras 676–686 provided that:

- (a) Not more than 20% of the plutonium by mass is fissile nuclides.
- (b) The CSI of the package is calculated using the following formula:

$$CSI = 50 \times 2 \times [\text{mass of plutonium (g)} / 1000].$$
- (c) If uranium is present with the plutonium, the mass of uranium shall be no more than 1% of the mass of the plutonium.



10 CFR 71.22 contains requirements for shipping certain quantities of fissile material in Type A packages that are not required to meet additional requirements for fissile material packaging. Sections 674 and 675 are new to the international regulations. They contain criteria with a similar intent to that in 10 CFR, but the quantities of fissile materials allowed are considerably different. Because several options are available in each regulation and the requirements for the options are not alike, a direct comparison is not possible. In general, for materials with a hydrogen density less than that of water, 10 CFR regulations allow more material. Under some conditions, paragraph 674(a) of SSR-6 allows for a Type A quantity of fissile material in an excepted package (rather than a Type A

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

package). Figure 2 summarizes the fissile packaging exceptions in international and domestic regulations.

Paragraph 675 is a provision for shipping fissile plutonium in a non-fissile package; the same criterion for the plutonium content was previously for fissile excepted material in Paragraph 417. These quantities will now be fissile shipments but may be shipped in Type A (non-fissile) packaging. NRC and DOT have a similar (not identical) exception for plutonium as a fissile excepted material (as opposed to a fissile shipment in Type A, non-fissile packaging).

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p align="center">674</p> <p>Packages containing fissile material that meet subpara (d) and one of the provisions of subparagraphs (a)–(c) of this paragraph are excepted from the requirements of paras 676–686.</p> <p>(a) Packages containing fissile material in any form provided that:</p> <p>(i) The smallest external dimension of the package is not less than 10 cm.</p> <p>(ii) The CSI of the package is calculated using the following formula: $CSI = 50 \times 5 \times \{[\text{mass of U-235 in package (g)}] / Z + [\text{mass of other fissile nuclides in package (g)}] / 280\}$ where the values of Z are taken from Table M 13.</p> <p>(iii) The CSI of any package does not exceed 10.</p> <p>(b) Packages containing fissile material in any form provided that:</p> <p>(i) The smallest external dimension of the package is not less than 30 cm.</p> <p>(ii) The package, after being subjected to the tests specified in paras 719–724; —Retains its fissile material contents. —Preserves the minimum overall outside dimensions of the package to at least 30 cm. —Prevents the entry of a 10 cm cube.</p> <p>(iii) The CSI of the package is calculated using the following formula:</p>	<p align="center">71.022</p> <p>General license: Fissile material.</p> <p>(a) A general license is issued to any licensee of the Commission to transport fissile material, or to deliver fissile material to a carrier for transport, if the material is shipped in accordance with this section. The fissile material need not be contained in a package which meets the standards of subparts E and F of this part; however, the material must be contained in a Type A package. The Type A package must also meet the DOT requirements of 49 CFR 173.417(a).</p> <p>(b) The general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of subpart H of this part.</p> <p>(c) The general license applies only when a package's contents:</p> <p>(1) Contain no more than a Type A quantity of radioactive material; and</p> <p>(2) Contain less than 500 total grams of beryllium, graphite, or hydrogenous material enriched in deuterium.</p> <p>(d) The general license applies only to packages containing fissile</p>	<p align="center">173.417 (a) (1) (i)</p> <p>Authorized fissile materials packages.</p> <p>(a) Except as provided in §173.453, fissile materials containing not more than A1 or A2 as appropriate, must be packaged in one of the following packagings:</p> <p>(1)(i) Any packaging listed in §173.415, limited to the Class 7 (radioactive) materials specified in 10 CFR part 71, subpart C;</p>	<p align="center">☑</p>	<p>10 CFR 71.22 contains requirements for shipping certain quantities of fissile material in Type A packages that are not required to meet additional requirements for fissile material packaging. Sections 674 and 675 are new to the international regulations. They contain criteria with a similar intent to that in 10 CFR, but the quantities of fissile materials allowed are considerably different. Because several options are available in each regulation and the requirements for the options are not alike, a direct comparison is not possible. In general, for materials with a hydrogen density less than that of water, 10 CFR regulations allow more material. Under some conditions, paragraph 674(a) of SSR-6 allows for a Type A quantity of fissile material in an excepted package (rather than a Type A</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p>CSI = $50 \times 2 \times \{[\text{mass of U-235 in package (g)}] / Z + [\text{mass of other fissile nuclides in package (g)}] / 280\}$ where the values of Z are taken from Table M 13.</p> <p>(iv) The CSI of any package does not exceed 10.</p> <p>(c) Packages containing fissile material in any form provided that:</p> <p>(i) The smallest external dimension of the package is not less than 10 cm.</p> <p>(ii) The package, after being subjected to the tests specified in paras 719–724; —Retains its fissile material contents; —Preserves the minimum overall outside dimensions of the package to at least 10 cm; —Prevents the entry of a 10 cm cube.</p> <p>(iii) The CSI of the package is calculated using the following formula: CSI = $50 \times 2 \times \{[\text{mass of U-235 in package (g)}] / 450 + [\text{mass of other fissile nuclides in package (g)}] / 280\}$</p> <p>(iv) The maximum mass of fissile nuclides in any package does not exceed 15 g</p> <p>(d) The total mass of beryllium, hydrogenous material enriched in deuterium, graphite and other allotropic forms of carbon in an individual package shall not be greater than the mass of fissile nuclides in the package except</p>	<p>material that are labeled with a CSI which:</p> <p>(1) Has been determined in accordance with paragraph (e) of this section;</p> <p>(2) Has a value less than or equal to 10; and</p> <p>(3) For a shipment of multiple packages containing fissile material, the sum of the CSIs must be less than or equal to 50 (for shipment on a nonexclusive use conveyance) and less than or equal to 100 (for shipment on an exclusive use conveyance).</p> <p>(e)(1) The value for the CSI must be greater than or equal to the number calculated by the following equation:</p> <p>(2) The calculated CSI must be rounded up to the first decimal place;</p> <p>(3) The values of X, Y, and Z used in the CSI equation must be taken from Tables 71-1 or 71-2, as appropriate;</p> <p>(4) If Table 71-2 is used to obtain the value of X, then the values for the terms in the equation for uranium-233 and plutonium must be assumed to be zero; and</p> <p>(5) Table 71-1 values for X, Y, and Z must be used to determine the</p>			<p>package). Figure 2 summarizes the fissile packaging exceptions in international and domestic regulations.</p> <p>Paragraph 675 is a provision for shipping fissile plutonium in a non-fissile package; the same criterion for the plutonium content was previously for fissile excepted material in Paragraph 417. These quantities will now be fissile shipments but may be shipped in Type A (non-fissile) packaging. NRC and DOT have a similar (not identical) exception for plutonium as a fissile excepted material (as opposed to a fissile shipment in Type A, non fissile packaging).</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

where their total concentration does not exceed 1 g in any 1000 g of material. Beryllium incorporated in copper alloys up to 4% in weight of the alloy does not need to be considered.

CSI if:

- (i) Uranium-233 is present in the package;
- (ii) The mass of plutonium exceeds 1 percent of the mass of uranium-235;
- (iii) The uranium is of unknown uranium-235 enrichment or greater than 24 weight percent enrichment; or
- (iv) Substances having a moderating effectiveness (i.e., an average hydrogen density greater than H₂O) (e.g., certain hydrocarbon oils or plastics) are present in any form, except as polyethylene used for packing or wrapping.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">632</p> <p>Each package designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it will meet the following requirements:</p> <p>(a) Withstand without leakage and without unacceptable stress, as specified in ISO 7195 [12], the structural test as specified in para. 718, except as allowed in para. 634;</p> <p>(b) Withstand, without loss or dispersal of the uranium hexafluoride the free drop test specified in para. 722;</p> <p>(c) Withstand, without rupture of the containment system the thermal test specified in para. 728, except as allowed in para. 634.</p>		<p style="text-align: center;">173.420 (a) (2)</p> <p>(2) Packagings must be designed, fabricated, inspected, tested and marked in accordance with--</p> <p>(i) American National Standard N14.1 in effect at the time the packaging was manufactured;</p> <p>(ii) Specifications for Class DOT-106A multi-unit tank car tanks (see Sec. Sec. 179.300 and 179.301 of this subchapter); or</p> <p>(iii) Section VIII of the ASME Code (IBR, see Sec. 171.7 of this subchapter), provided the packaging--</p> <p>(A) Was manufactured on or before June 30, 1987;</p> <p>(B) Conforms to the edition of the ASME Code in effect at the time the packaging was manufactured;</p> <p>(C) Is used within its original design limitations; and</p> <p>(D) Has shell and head thicknesses that have not decreased below the minimum value specified in the following table:</p>	☑	<p>Paragraphs 631 and 632 give requirements for packaging for UF₆, including requirements to be in accordance with the International Organization for Standardization document ISO 7195 and a thermal test; however, DOT requirement reference American National Standard N14.1. Also, DOT requires a pressure test to 1.4 MPa. Paragraph 718 of SSR-6 requires a pressure test to 1.38 MPa with multilateral approval, or otherwise to 2.76 MPa.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

Minimum
thickness;
Packaging
model
millimeters
(inches)

1S,
2S.....
1.58 (0.062)
5A, 5B,
8A.....
3.17 (0.125)
12A,
12B.....
4.76 (0.187)
30B.....
..... 7.93 (0.312)
48A, F, X, and
Y.....
12.70 (0.500)
48T, O, OM, OM Allied, HX,
H, and G..... 6.35
(0.250)

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

(3) Each package shall be designed so that it will:

- (i) withstand a hydraulic test at an internal pressure of at least 1.4 Mpa (200 psi) without leakage;
- (ii) withstand the test specified in Sec. 173.465(c) without loss or dispersal of the uranium hexafluoride; and
- (iii) withstand the test specified in 10 CFR 71.73(c)(4) without rupture of the containment system.

(4) Uranium hexafluoride must be in solid form.

(5) The volume of solid uranium hexafluoride, except solid depleted uranium hexafluoride, at 20 [deg]C (68 [deg]F) may not exceed 61% of the certified volumetric capacity of the packaging. The volume of solid depleted uranium hexafluoride at 20 [deg]C (68 [deg]F) may not exceed 62% of the certified volumetric capacity of the packaging.

(6) The pressure in the

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

package at 20 [deg]C (68 [deg]F) must be less than 101.3 kPa (14.8 psig).

631

REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE
 Packages designed to contain uranium hexafluoride shall meet the requirements that pertain to the radioactive and fissile properties of the material prescribed elsewhere in these Regulations Except as allowed in para. 634, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged and transported in accordance with the provisions of the International Organization for Standardization document ISO 7195: Packaging of Uranium Hexafluoride (UF6) for Transport [12], and the requirements of paras 632 and 633.



Paragraphs 631 and 632 give requirements for packaging for UF6, including requirements to be in accordance with the International Organization for Standardization document ISO 7195 and a thermal test; however, DOT requirement reference American National Standard N14.1. Also, DOT requires a pressure test to 1.4 MPa. Paragraph 718 of SSR-6 requires a pressure test to 1.38 MPa with multilateral approval, or otherwise to 2.76 MPa.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">626</p> <p>Alternative requirements for Type IP-2 and Type IP-3 Packages may be used as Type IP-2, provided that:</p> <ul style="list-style-type: none"> (a) They satisfy the requirements for Type IP-1 specified in para. 623. (b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.1 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [10]. (c) When subjected to the tests required for UN Packing Group I or II, they would prevent: <ul style="list-style-type: none"> (i) Loss or dispersal of the radioactive contents; (ii) More than a 20% increase in the maximum radiation level at any external surface of the package. 			<input checked="" type="checkbox"/>	<p>Industrial packaging is addressed in DOT (not NRC) regulations. The DOT regulations do not contain the provision that is in Paragraph 626 for packaging to be qualified as IP-2 via UN Packing Group I or II tests.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

606

REQUIREMENTS FOR MATERIAL EXCEPTED FROM FISSILE CLASSIFICATION

A fissile material excepted from classification as FISSILE under para. 417(f) shall be subcritical without the need for accumulation control under the following conditions:

- (a) The conditions of para. 673(a)
- (b) The conditions consistent with the assessment provisions stated in paras 684(b) and 685(b) for packages;
- (c) The conditions specified in para. 683(a), if transported by air.



The criteria for fissile excepted materials have changed from TS-R-1 and are very significantly different from NRC and DOT criteria. Paragraph 417 gives mass limits per package, including four new subparagraphs c, d, e, and f. Subparagraph f is a provision to obtain Competent Authority approval for a fissile exception, and additional requirements for exceptions under 417(f) are given in Section 606. Section 570 is a new section with consignment limits, including the relatively low consignment limits of 15g and 45g depending on the type of exception. The exception for up to 1 kg of plutonium with no more than 20% fissile nuclides has been removed from the fissile excepted materials list and is now included in paragraph 675 as a fissile shipment (discussed below). Figure 1 below

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

summarizes the fissile exceptions in international and domestic regulations.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

570

Fissile material meeting one of the provisions (a)-(f) of para. 417 shall meet the following requirements:

(a) Only one of the provisions (a)-(f) of para. 417 is allowed per consignment.

(b) Only one approved fissile material in packages classified in accordance with para. 417(f) is allowed per consignment unless multiple materials are authorized in the certificate of approval.

(c) Fissile material in packages classified in accordance with para. 417(c) shall be transported in a consignment with no more than 45 g of fissile nuclides.

(d) Fissile material in packages classified in accordance with para. 417(d) shall be transported in a consignment with no more than 15 g of fissile nuclides.

(e) Unpackaged or packaged fissile material classified in accordance with para. 417(e) shall be transported under exclusive use on a conveyance with no more than 45 g of fissile nuclides.



The criteria for fissile excepted materials have changed from TS-R-1 and are very significantly different from NRC and DOT criteria. Paragraph 417 gives mass limits per package, including four new subparagraphs c, d, e, and f. Subparagraph f is a provision to obtain Competent Authority approval for a fissile exception, and additional requirements for exceptions under 417(f) are given in Section 606. Section 570 is a new section with consignment limits, including the relatively low consignment limits of 15g and 45g depending on the type of exception. The exception for up to 1 kg of plutonium with no more than 20% fissile nuclides has been removed from the fissile excepted materials list and is now included in paragraph 675 as a fissile shipment (discussed below). Figure 1 below

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

summarizes the fissile exceptions in international and domestic regulations.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p align="center">570</p> <p>Fissile material meeting one of the provisions (a)-(f) of para. 417 shall meet the following requirements:</p> <p>(a) Only one of the provisions (a)-(f) of para. 417 is allowed per consignment.</p> <p>(b) Only one approved fissile material in packages classified in accordance with para. 417(f) is allowed per consignment unless multiple materials are authorized in the certificate of approval.</p> <p>(c) Fissile material in packages classified in accordance with para. 417(c) shall be transported in a consignment with no more than 45 g of fissile nuclides.</p> <p>(d) Fissile material in packages classified in accordance with para. 417(d) shall be transported in a consignment with no more than 15 g of fissile nuclides.</p> <p>(e) Unpackaged or packaged fissile material classified in accordance with para. 417(e) shall be transported under exclusive use on a conveyance with no more than 45 g of fissile nuclides.</p>	<p align="center">71.015</p> <p>Exemption from classification as fissile material.</p> <p>Fissile material meeting the requirements of at least one of the paragraphs (a) through (f) of this section are exempt from classification as fissile material and from the fissile material package standards of §§71.55 and 71.59, but are subject to all other requirements of this part, except as noted.</p> <p>(a) Individual package containing 2 grams or less fissile material.</p> <p>(b) Individual or bulk packaging containing 15 grams or less of fissile material provided the package has at least 200 grams of solid nonfissile material for every gram of fissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass for solid nonfissile material.</p> <p>(c)(1) Low concentrations of solid fissile material commingled with solid nonfissile material, provided that:</p> <p>(i) There is at least 2000 grams of solid nonfissile material for every</p>	<p align="center">173.453</p> <p>Fissile materials—exceptions. Fissile materials meeting the requirements of at least one of the paragraphs (a) through (f) of this section are excepted from the requirements of this subpart for fissile materials, including the requirements of §§173.457 and 173.459, but are subject to all other requirements of this subpart, except as noted.</p> <p>(a) An individual package containing 2 grams or less of fissile material.</p> <p>(b) An individual or bulk packaging containing 15 grams or less of fissile material provided the package has at least 200 grams of solid nonfissile material for every gram of fissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass for solid nonfissile material.</p>	<p align="center">☑</p>	<p>The criteria for fissile excepted materials have changed from TS-R-1 and are very significantly different from NRC and DOT criteria. Paragraph 417 gives mass limits per package, including four new subparagraphs c, d, e, and f. Subparagraph f is a provision to obtain Competent Authority approval for a fissile exception, and additional requirements for exceptions under 417(f) are given in Section 606. Section 570 is a new section with consignment limits, including the relatively low consignment limits of 15g and 45g depending on the type of exception. The exception for up to 1 kg of plutonium with no more than 20% fissile nuclides has been removed from the fissile excepted materials list and is now included in paragraph 675 as a fissile shipment (discussed below). Figure 1 below</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p>gram of fissile material, and</p> <p>(ii) There is no more than 180 grams of fissile material distributed within 360 kg of contiguous nonfissile material.</p> <p>(2) Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass of solid nonfissile material.</p> <p>(d) Uranium enriched in uranium-235 to a maximum of 1 percent by weight, and with total plutonium and uranium-233 content of up to 1 percent of the mass of uranium-235, provided that the mass of any beryllium, graphite, and hydrogenous material enriched in deuterium constitutes less than 5 percent of the uranium mass.</p> <p>(e) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2 percent by mass, with a total plutonium and uranium-233 content not exceeding 0.002 percent of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2. The material must be contained in at least a DOT Type A package.</p> <p>(f) Packages containing, individually, a total plutonium mass</p>	<p>(c) Low concentrations of solid fissile material commingled with solid nonfissile material, provide that:</p> <p>(1) There is at least 2000 grams of nonfissile material for every gram of fissile material, and</p> <p>(2) There is no more than 180 grams of fissile material distributed within 360 kg of contiguous nonfissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass of solid nonfissile material.</p> <p>(d) Uranium enriched in uranium-235 to a maximum of 1 percent by weight, and with total plutonium and uranium-233 content of up to 1 percent of the mass of uranium-235, provided that the mass of any beryllium, graphite, and hydrogenous material enriched in deuterium constitute less than 5 percent of the</p>		<p>summarizes the fissile exceptions in international and domestic regulations.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p>of not more than 1000 grams, of which not more than 20 percent by mass may consist of plutonium-239, plutonium-241, or any combination of these radionuclides.</p>	<p>uranium mass. (e) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2 percent by mass, with a total plutonium and uranium-233 content not exceeding 0.002 percent of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2. The material must be contained in at least a DOT Type A package. (f) Packages containing, individually, a total plutonium mass of not more than 1000 grams, of which not more than 20 percent by mass may consist of plutonium-239, plutonium-241, or any combination of these radionuclides.</p>		

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">546</p> <p>Particulars of consignment</p> <p>The consignor shall include in the transport documents with each consignment the identification of the consignor and consignee, including their names and addresses and the following information, as applicable, in the order given:</p> <p>(a) The UN number assigned to the material as specified in accordance with the provisions of paras 401 and 530, preceded by the letters “UN”;</p> <p>(b) The proper shipping name, as specified in accordance with the provisions of paras 401 and 530;</p> <p>(c) The UN class number “7”;</p> <p>(d) The subsidiary hazard class or division number(s) corresponding to the subsidiary risk label(s) required to be applied, when assigned, shall be entered following the primary hazard class or division and shall be enclosed in parenthesis.;</p> <p>(e) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;</p> <p>(f) A description of the physical and chemical form of the material, or a</p>		<p style="text-align: center;">172.202 (a) (1-3) and 172.203 (d)</p> <p>(a) The shipping description of a hazardous material on the shipping paper must include:</p> <p>(1) The identification number prescribed for the material as shown in Column (4) of the Sec. 172.101 table;</p> <p>(2) The proper shipping name prescribed for the material in Column (2) of the Sec. 172.101 table;</p> <p>(3) The hazard class or division number prescribed for the material, as shown in Column (3) of the Sec. 172.101 table. The subsidiary hazard class or division number is not required to be entered when a corresponding subsidiary hazard label is not required. Except for combustible liquids, the subsidiary hazard class(es) or subsidiary division number(s) must be entered in parentheses immediately following the primary hazard class or division number. In addition--</p>	<input checked="" type="checkbox"/>	<p>1) This paragraph now includes, in subparagraph (j), a requirement for materials excepted under paragraphs 417(a) through (f), the reference to that paragraph and the mass of fissile nuclides be shown on shipping documentation. Documentation for shipments of fissile materials in packaging excepted from fissile requirements under paragraphs 674 (a) through (c) or 675, must reference that section. DOT requires that fissile excepted shipments.</p> <p>2) Subparagraph (k) includes requirements for showing CoC numbers on shipping documentation, which is required by DOT. However, SSR-6 includes CoCs for approvals not addressed by NRC or DOT – low dispersible materials and fissile materials excepted under 417(f). Include the words “fissile</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p>notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form;</p> <p>(g) The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity;</p> <p>(h) The category of the package, i.e. I-WHITE, II-YELLOW, III-YELLOW.;</p> <p>(i) The TI (categories II-YELLOW and III-YELLOW only).;</p> <p>(j) For fissile material:</p> <p>(i) Shipped under one exception of sub- paras 417(a)–(f), reference to that -para;</p> <p>(ii) Shipped under para. 417(c)–(e), the total mass of fissile nuclides;</p> <p>(iii) Contained in a package for which one of paras 674(a)–(c) or 675 is applied, reference to that para;</p> <p>(iv) The CSI, where applicable.</p> <p>(j) The identification mark for each competent authority approval certificate of approval (special form radioactive material, low dispersible radioactive</p>		<p>(i) The words "Class" or "Division" may be included preceding the primary and subsidiary hazard class or division numbers.</p> <p>(ii) The hazard class need not be included for the entry "Combustible liquid, n.o.s."</p> <p>(iii) For domestic shipments, primary and subsidiary hazard class or division names may be entered following the numerical hazard class or division, or following the basic description.</p> <p>(d) Radioactive material. The description for a shipment of a Class 7 (radioactive) material must include the following additional entries as appropriate:</p> <p>(1) The name of each radionuclide in the Class 7 (radioactive) material that is listed in Sec. 173.435 of this subchapter. For mixtures of radionuclides, the radionuclides required to be shown must be determined</p>		<p>excepted" on the shipping documentation, but has no requirement to reference the citation of the exception.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p data-bbox="289 282 344 315">544</p> <p data-bbox="65 331 548 683">Where the consignment in the freight container or tank is unpackaged LSA-I or SCO-I or where a consignment in a freight container is required to be shipped under exclusive use and is packaged radioactive material with a single UN number, the appropriate UN number for the consignment (see Table 1) shall also be displayed, in black digits not less than 65 mm high, either:</p> <p data-bbox="65 688 506 789">(a) In the lower half of the placard shown in Fig. 6 and against the white background; or</p> <p data-bbox="92 795 499 828">(b) On the placard shown in Fig. 7.</p> <p data-bbox="65 833 554 1000">When the alternative given in (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, on all four sides of the freight container or tank.</p>			☑	<p data-bbox="1648 282 1965 532">Large freight containers are not addressed in NRC or DOT regulations, and radioactive materials packaging are treated as non-bulk packages regardless of size.</p> <p data-bbox="1648 537 1965 781">Paragraphs 543 and 544 address placarding, including the option of using orange panels, for freight containers, large freight containers, and tanks.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p data-bbox="289 282 344 315">543</p> <p data-bbox="65 331 193 363">Placarding</p> <p data-bbox="65 370 562 862">Large freight containers carrying packages other than excepted packages, and tanks, shall bear four placards that conform to the model given in Fig. 6. The placards shall be affixed in a vertical orientation to each side wall and to each end wall of the large freight container or tank. Any placards that do not relate to the contents shall be removed. Instead of using both labels and placards, it is permitted as an alternative to use enlarged labels only, where appropriate, as shown in Figs 2–4, except having the minimum size shown in Fig. 6.</p>			☑	<p data-bbox="1648 282 1969 781">Large freight containers are not addressed in NRC or DOT regulations, and radioactive materials packaging are treated as non-bulk packages regardless of size. Paragraphs 543 and 544 address placarding, including the option of using orange panels, for freight containers, large freight containers, and tanks.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p data-bbox="289 282 344 315">425</p> <p data-bbox="65 331 548 574">Uranium hexafluoride not exceeding the limits specified in column 4 of Table 4 may be classified under UN 3XXX RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted provided that:</p> <p data-bbox="65 581 537 649">(a) The mass of uranium hexafluoride in the package is less than 0.1 kg.</p> <p data-bbox="65 656 512 717">(b) The conditions of paras 420 and 424 (a), (b) are met.</p>			☑	<p data-bbox="1648 282 2003 1066">Table 1 and Paragraphs 419 and 425 in SSR-6 allow for UF6 to be shipped in an excepted package under the new proper shipping name, “UN3507, Uranium hexafluoride, Radioactive Material, Excepted Package” if the UF6 is fissile excepted or non-fissile, is less an 0.1 kg, and meets the requirements of Paragraphs 420 for packaging and 424 for limited quantities of material. Neither NRC nor DOT include this proper shipping name. Under current DOT regulations, a limited quantity of UF6 would be classed as a</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">419</p> <p>Uranium hexafluoride Uranium hexafluoride shall only be assigned to one of the following UN numbers only: (a) UN 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE FISSILE; (b) UN 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted; (c) UN 3XXX RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - URANIUM HEXAFLUORIDE, less than 0.1 kg per package , non-fissile or fissile-excepted.</p>			☑	<p>Table 1 and Paragraphs 419 and 425 in SSR-6 allow for UF6 to be shipped in an excepted package under the new proper shipping name, “UN3507, Uranium hexafluoride, Radioactive Material, Excepted Package” if the UF6 is fissile excepted or non-fissile, is less an 0.1 kg, and meets the requirements of Paragraphs 420 for packaging and 424 for limited quantities of material. Neither NRC nor DOT include this proper shipping name. Under current DOT regulations, a limited quantity of UF6 would be classed as a</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p style="text-align: center;">417</p> <p>Fissile material</p> <p>Fissile material and packages containing fissile material shall be classified under the relevant entry as FISSILE in accordance with Table 1 unless excepted by one of the provisions of subparas (a)–(f) of this paragraph and transported subject to the requirements of para 570. All provisions apply only to material in packages that meets the requirements of para. 636 unless unpackaged material is specifically allowed in the provision.</p> <p>(a) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile nuclides are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement.;</p> <p>(b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;</p> <p>(c) Uranium with a maximum uranium enrichment of 5% by mass uranium-235 provided:</p>		<p style="text-align: center;">173.453</p> <p>Fissile materials--exceptions.</p> <p>Fissile materials meeting the requirements of at least one of the paragraphs (a) through (f) of this section are excepted from the requirements of this subpart for fissile materials, including the requirements of Sec. Sec. 173.457 and 173.459, but are subject to all other requirements of this subpart, except as noted.</p> <p>(a) An individual package containing 2 grams or less of fissile material.</p> <p>(b) An individual or bulk packaging containing 15 grams or less of fissile material provided the package has at least 200 grams of solid nonfissile material for every gram of fissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass for solid nonfissile material.</p>	<input checked="" type="checkbox"/>	<p>The criteria for fissile excepted materials have changed from TS-R-1 and are very significantly different from NRC and DOT criteria. Paragraph 417 gives mass limits per package, including four new subparagraphs c, d, e, and f. Subparagraph f is a provision to obtain Competent Authority approval for a fissile exception, and additional requirements for exceptions under 417(f) are given in Section 606. Section 570 is a new section with consignment limits, including the relatively low consignment limits of 15g and 45g depending on the type of exception. The exception for up to 1 kg of plutonium with no more than 20% fissile nuclides has been removed from the fissile excepted materials list and is now included in paragraph 675 as a fissile shipment (discussed below). Figure 1 below</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
<p>(i) There is no more than 3.5 g of uranium-235 per package.;</p> <p>(ii) The total plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per package;</p> <p>(iii) Transport of the package is subject to the consignment limit provided in para 570(c).</p> <p>(d) Fissile nuclides with a total mass not greater than 2.0 g per package provided the package is transported subject to the consignment limit provided in para. 570(d);</p> <p>(e) Fissile nuclides with a total mass not greater than 45 g either packaged or unpackaged subject to limits provided in para 570(e);</p> <p>(f) A fissile material that meets the requirements of paras 570(b), 606 and 802.</p>		<p>(c) Low concentrations of solid fissile material commingled with solid nonfissile material, provide that:</p> <p>(1) There is at least 2000 grams of nonfissile material for every gram of fissile material, and</p> <p>(2) There is no more than 180 grams of fissile material distributed within 360 kg of contiguous nonfissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass of solid nonfissile material.</p> <p>(d) Uranium enriched in uranium-235 to a maximum of 1 percent by weight, and with total plutonium and uranium-233 content of up to 1 percent of the mass of uranium-235, provided that the mass of any beryllium, graphite, and hydrogenous material enriched in deuterium constitute less than 5 percent of the</p>	VS	<p>summarizes the fissile exceptions in international and domestic regulations.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

uranium mass.

(e) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2 percent by mass, with a total plutonium and uranium-233 content not exceeding 0.002 percent of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2. The material must be contained in at least a DOT Type A package.

(f) Packages containing, individually, a total plutonium mass of not more than 1000 grams, of which not more than 20 percent by mass may consist of plutonium-239, plutonium-241, or any combination of these radionuclides.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p align="center">71.088</p> <p>Air transport of plutonium.</p> <p>(a) Notwithstanding the provisions of any general licenses and notwithstanding any exemptions stated directly in this part or included indirectly by citation of 49 CFR chapter I, as may be applicable, the licensee shall assure that plutonium in any form, whether for import, export, or domestic shipment, is not transported by air or delivered to a carrier for air transport unless:</p> <p>(1) The plutonium is contained in a medical device designed for individual human application; or</p> <p>(2) The plutonium is contained in a material in which the specific activity is not greater than 0.002 [mu] Ci/g (70 Bq/g) of material and in which the radioactivity is essentially uniformly distributed; or</p> <p>(3) The plutonium is shipped in a single package containing no more than an A2 quantity of plutonium in any isotope or form, and is shipped in accordance with Sec. 71.5; or</p> <p>(4) The plutonium is shipped in a package specifically authorized for the shipment of plutonium by air in the Certificate of Compliance for that package issued by the</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

Commission.

(b) Nothing in paragraph (a) of this section is to be interpreted as removing or diminishing the requirements of Sec. 73.24 of this chapter.

(c) For a shipment of plutonium by air which is subject to paragraph (a)(4) of this section, the licensee shall, through special arrangement with the carrier, require compliance with 49 CFR 175.704, U.S. Department of Transportation regulations applicable to the air transport of plutonium.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

71.064 (a)

Special requirements for plutonium air shipments.

(a) A package for the shipment of plutonium by air subject to Sec. 71.88(a)(4), in addition to satisfying the requirements of Sec. 71.41 through 71.63, as applicable, must be designed, constructed, and prepared for shipment so that under the tests specified in--

(1) Section 71.74 ("Accident conditions for air transport of plutonium")--

(i) The containment vessel would not be ruptured in its post-tested condition, and the package must provide a sufficient degree of containment to restrict accumulated loss of plutonium contents to not more than an A2 quantity in a period of 1 week;

(ii) The external radiation level would not exceed 10 mSv/h (1 rem/h) at a distance of 1 m (40 in) from the surface of the package in its post-tested condition in air; and

(iii) A single package and an array of packages are demonstrated to be subcritical in accordance with this part, except that the damaged condition of the package must be considered to be that which results



SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p>from the plutonium accident tests in Sec. 71.74, rather than the hypothetical accident tests in Sec. 71.73; and</p> <p>(2) Section 71.74(c), there would be no detectable leakage of water into the containment vessel of the package.</p>			
	<p>71.064 (b) (1) (i)</p> <p>(b) With respect to the package requirements of paragraph (a), there must be a demonstration or analytical assessment showing that--</p> <p>(1) The results of the physical testing for package qualification would not be adversely affected to a significant extent by--</p> <p>(i) The presence, during the tests, of the actual contents that will be transported in the package; and</p> <p>(ii)</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p align="center">71.064 (b) (2)</p> <p>(b) With respect to the package requirements of paragraph (a), there must be a demonstration or analytical assessment showing that--</p> <p>(1)</p> <p>(2) The ability of the package to meet the acceptance standards prescribed for the accident condition sequential tests would not be adversely affected if one or more tests in the sequence were</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>
	<p align="center">71.074 (a) (1)</p> <p>Accident conditions for air transport of plutonium.</p> <p>(a) Test conditions--Sequence of tests. A package must be physically tested to the following conditions in the order indicated to determine their cumulative effect.</p> <p>(1) Impact at a velocity of not less than 129 m/sec (422 ft/sec) at a right angle onto a flat, essentially unyielding, horizontal surface, in the orientation (e.g., side, end, corner) expected to result in maximum damage at the conclusion of the test sequence.</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p style="text-align: center;">71.074 (b)</p> <p>(b) Individual free-fall impact test. (1) An undamaged package must be physically subjected to an impact at a velocity not less than the calculated terminal free-fall velocity, at mean sea level, at a right angle onto a flat, essentially unyielding, horizontal surface, in the orientation (e.g., side, end, corner) expected to result in maximum damage. (2) This test is not required if the calculated terminal free-fall velocity of the package is less than 129 m/sec (422 ft/sec), or if a velocity not less than either 129 m/sec (422 ft/sec) or the calculated terminal free-fall velocity of the package is used in the sequential test of paragraph (a)(1) of this section.</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>
	<p style="text-align: center;">71.074 (c)</p> <p>(c) Individual deep submersion test. An undamaged package must be physically submerged and physically subjected to an external water pressure of at least 4 MPa (600 lbs/in²).</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	
	<p style="text-align: center;">71.074 (a) (2)</p> <p>(a) Test conditions—Sequence of tests. A package must be physically tested to the following conditions in the order indicated to determine their cumulative effect.</p> <p>(1)....</p> <p>(2) A static compressive load of 31,800 kg (70,000 lbs) applied in the orientation expected to result in maximum damage at the conclusion of the test sequence. The force on the package must be developed between a flat steel surface and a 5 cm (2 in) wide, straight, solid, steel bar. The length of the bar must be at least as long as the diameter of the package, and the longitudinal axis of the bar must be parallel to the plane of the flat surface. The load must be applied to the bar in a manner that prevents any members or devices used to support the bar from contacting the package.</p>		☑	<p>SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.</p>

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

71.074 (a) (3)

(a) Test conditions—Sequence of tests. A package must be physically tested to the following conditions in the order indicated to determine their cumulative effect.

(1)....

(2)....

(3) Packages weighing less than 227 kg (500 lbs) must be placed on a flat, essentially unyielding, horizontal surface, and subjected to a weight of 227 kg (500 lbs) falling from a height of 3 m (10 ft) and striking in the position expected to result in maximum damage at the conclusion of the test sequence. The end of the weight contacting the package must be a solid probe made of mild steel. The probe must be the shape of the frustum of a right circular cone, 30 cm (12 in) long, 20 cm (8 in) in diameter at the base, and 2.5 cm (1 in) in diameter at the end. The longitudinal axis of the probe must be perpendicular to the horizontal surface. For packages weighing 227 kg (500 lbs) or more, the base of the probe must be placed on a flat, essentially unyielding horizontal surface, and the package dropped from a height of 3 m (10 ft) onto the probe,



SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

striking in the position expected to result in maximum damage at the conclusion of the test sequence.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

71.074 (a) (4)

(a) Test conditions—Sequence of tests. A package must be physically tested to the following conditions in the order indicated to determine their cumulative effect.

(1)....

(2)....

(3)....

(4) The package must be firmly restrained and supported such that its longitudinal axis is inclined approximately 45° to the horizontal. The area of the package that made first contact with the impact surface in paragraph (a)(1) of this section must be in the lowermost position. The package must be struck at approximately the center of its vertical projection by the end of a structural steel angle section falling from a height of at least 46 m (150 ft). The angle section must be at least 1.8m (6 ft) in length with equal legs at least 13 cm (5 in) long and 1.3 cm (0.5 in) thick. The angle section must be guided in such a way as to fall end-on, without tumbling. The package must be rotated approximately 90° about its longitudinal axis and struck by the steel angle section falling as before.



SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

71.074 (a) (5)

(a) Test conditions—Sequence of tests. A package must be physically tested to the following conditions in the order indicated to determine their cumulative effect.

- (1)....
- (2)....
- (3)....
- (4)....

(5) The package must be exposed to luminous flames from a pool fire of JP-4 or JP-5 aviation fuel for a period of at least 60 minutes. The luminous flames must extend an average of at least 0.9 m (3 ft) and no more than 3 m (10 ft) beyond the package in all horizontal directions. The position and orientation of the package in relation to the fuel must be that which is expected to result in maximum damage at the conclusion of the test sequence. An alternate method of thermal testing may be substituted for this fire test, provided that the alternate test is not of shorter duration and would not result in a lower heating rate to the package. At the conclusion of the thermal test, the package must be allowed to cool naturally or must be cooled



SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

SSR-6	10CRF71	49CFR	Difference	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	

by water sprinkling, whichever is expected to result in maximum damage at the conclusion of the test sequence.

71.074 (a) (6)

(a) Test conditions—Sequence of tests. A package must be physically tested to the following conditions in the order indicated to determine their cumulative effect.

- (1)...
- (2)...
- (3)...
- (4)...
- (5)...
- (6) Immersion under at least 0.9 m (3 ft) of water.



SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

71.063

Special requirements for plutonium shipments.
Shipments containing plutonium must be made with the contents in solid form, if the contents contain greater than 0.74 TBq (20 Ci) of plutonium.



SSR-6 does not specify requirements for plutonium shipment by air, but NRC has specific requirements. Also, the test requirements for packages intended to transport plutonium by air differ from the SSR-6 test requirements for Type C packages.

APPENDIX B

Significant Differences between IAEA SSR-6 Regulations and NRC and DOT Regulations

Note:

The “Significant Differences” report may be viewed by clicking on the "Reports" tab in the Access navigation bar on the left-hand side of the screen.

To run the report, double click on the report name: IAEA_NRC_DOT_Sig_Reg_Comment. This will open the report in "print preview" mode. To print the report, go to File=>Print on the menu bar once the report is shown on the screen. To save the report to an Adobe PDF file, go to “Print Preview.” Under the *Data* tab, choose either the *PDF* or *XPS* icon. This will allow the report to be saved as an Adobe PDF file.

IAEA, NRC, and DOT Regulation Comparison Report

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

839

Certificates for alternative activity limits for an exempt consignment of instruments or articles

Each certificate issued by a competent authority for alternative activity limits for an exempt consignment of instruments or articles according to para. 818 shall include the following information:

- (a) Type of certificate
- (b) The competent authority identification mark.
- (c) The issue date and an expiry date.
- (d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the exemption is approved.
- (e) The identification of the instrument or article
- (f) A description of the instrument or article
- (g) Design specifications for the instrument or article
- (h) A specification of the radionuclide(s), the approved alternative activity limit(s) for the exempt consignment(s) of the instrument(s) or article(s).
- (i) Reference to documentation that demonstrates compliance with para.



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

403(b).

(j) If deemed appropriate by the competent authority, reference to the identity of the applicant.

(k) Signature and identification of the certifying official.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

838

Certificates of approval of package design

Each certificate of approval of the design of a package issued by a competent authority shall include the following information:

- (a) Type of certificate;
- (b) The competent authority identification mark;
- (c) The issue date and an expiry date;
- (d) Any restriction on the modes of transport, if appropriate;
- (e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the design is approved;
- (f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported."
- (g) References to certificates for alternative radioactive contents, other competent authority validation, or additional technical data or information, as deemed appropriate by the competent authority;
- (h) A statement authorizing shipment where approval of shipment is required under para. 825, if deemed appropriate;
- (i) Identification of the packaging;

Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

(j) Description of the packaging by reference to the drawings or specification of the design. If deemed appropriate by the competent authority, a reproducible illustration not larger than 21 cm × 30 cm, showing the make-up of the package, should also be provided, accompanied by a brief description of the packaging, including materials of manufacture, gross mass, general external dimensions and appearance;

(k) Specification of the design by reference to the drawings;

(l) A specification of the authorized radioactive contents, including any restrictions on the radioactive contents that might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), the mass in grams (for fissile material the total mass of fissile nuclides or the mass for each fissile nuclide, when appropriate), and whether special form radioactive material, low dispersible radioactive material or fissile material excepted under para. 417(f), if applicable;

(m) A description of the containment system;

(n) For package designs containing fissile material that require multilateral

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

approval of the package design in accordance with para. 814:

- (i) A detailed description of the authorized radioactive contents;
- (ii) A description of the confinement system;
- (iii) The value of the CSI;
- (iv) Reference to the documentation that demonstrates the criticality safety of the contents;
- (v) Any special features on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;
- (vi) Any allowance (based on para. 677(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience;
- (vii) The ambient temperature range for which the package design has been approved.
- (o) For Type B(M) packages, a statement specifying those prescriptions of paras 639, 655–657 and 660–666 with which the package does not conform and any amplifying information that may be useful to other competent authorities;
- (p) For packages containing more than 0.1 kg of uranium hexafluoride, a statement specifying those prescriptions of para. 634 that apply, if any, and any amplifying information that may be

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

useful to other competent authorities;

(q) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat;

(r) Reference to information provided by the applicant relating to the use of the packaging or to specific actions to be taken prior to shipment;

(s) A statement regarding the ambient conditions assumed for purposes of design if these are not in accordance with those specified in paras 656, 657 and 666, as applicable;

(t) A specification of the applicable management system as required in para. 306;

(u) Any emergency arrangements deemed necessary by the competent authority;

(v) If deemed appropriate by the competent authority, reference to the identity of the applicant;

(w) Signature and identification of the certifying official.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

837

Certificates of shipment approval

Each certificate of approval for a shipment issued by a competent authority shall include the following information:

- (a) Type of certificate;
- (b) The competent authority identification mark(s);
- (c) The issue date and an expiry date;
- (d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the shipment is approved;
- (e) Any restrictions on the modes of transport, type of conveyance, freight container, and any necessary routing instructions;
- (f) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported."
- (g) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat or maintenance of criticality safety;

Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

(h) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;

(i) Reference to the applicable certificate(s) of approval of design;

(j) A specification of the actual radioactive contents, including any restrictions on the radioactive contents that might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), mass in grams (for fissile material or for each fissile nuclide, when appropriate), and whether special form radioactive material, low dispersible radioactive material or fissile material excepted under para. 417(f), if applicable;

(k) Any emergency arrangements deemed necessary by the competent authority;

(l) A specification of the applicable management system as required in para. 306;

(m) If deemed appropriate by the competent authority, reference to the identity of the applicant;

(n) Signature and identification of the certifying official.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

836

Certificates of approval of special arrangement

Each certificate of approval issued by a competent authority for a special arrangement shall include the following information:

- (a) Type of certificate;
- (b) The competent authority identification mark;
- (c) The issue date and an expiry date;
- (d) Mode(s) of transport;
- (e) Any restrictions on the modes of transport, type of conveyance, freight container, and any necessary routing instructions;
- (f) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the special arrangement is approved;
- (g) The following statement: "This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported."
- (h) References to certificates for alternative radioactive contents, other competent authority validation, or additional technical data or information, as deemed appropriate by the



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

competent authority;

(i) Description of the packaging by reference to the drawings or a specification of the design. If deemed appropriate by the competent authority, a reproducible illustration not larger than 21 cm × 30 cm, showing the make-up of the package, should also be provided, accompanied by a brief description of the packaging, including materials of manufacture, gross mass, general external dimensions and appearance;

(j) A specification of the authorized radioactive contents, including any restrictions on the radioactive contents that might not be obvious from the nature of the packaging. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), mass in grams (for fissile material or for each fissile nuclide, when appropriate) and whether special form radioactive material, low dispersible radioactive material or fissile material excepted under para. 417(f), if applicable;

(k) Additionally, for packages containing fissile material:

(i) A detailed description of the authorized radioactive contents;

(ii) The value of the CSI;

(iii) Reference to the documentation that demonstrates the criticality safety of

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

the content;

(iv) Any special features on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;

(v) Any allowance (based on para. 677(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience;

(vi) The ambient temperature range for which the special arrangement has been approved.

(l) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the consignment, including any special stowage provisions for the safe dissipation of heat;

(m) If deemed appropriate by the competent authority, reasons for the special arrangement;

(n) Description of the compensatory measures to be applied as a result of the shipment being under special arrangement;

(o) Reference to information provided by the applicant relating to the use of the packaging or specific actions to be taken prior to the shipment;

(p) A statement regarding the ambient conditions assumed for purposes of

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

design if these are not in accordance with those specified in paras 656, 657 and 666, as applicable;

(q) Any emergency arrangements deemed necessary by the competent authority;

(r) A specification of the applicable management system as required in para. 306;

(s) If deemed appropriate by the competent authority, reference to the identity of the applicant and to the identity of the carrier;

(t) Signature and identification of the certifying official.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

835

Certificates of approval for material excepted from fissile classification
Each certificate of approval issued by a competent authority for material excepted from classification as FISSILE shall include the following information:

- (a) Type of certificate;
- (b) The competent authority identification mark;
- (c) The issue date and an expiry date;
- (d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the exception is approved;
- (e) A description of the excepted material;
- (f) Limiting specifications for the excepted material;
- (g) A specification of the applicable management system as required in para. 306.;
- (h) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;
- (i) If deemed appropriate by the competent authority, reference to the identity of the applicant;
- (j) Signature and identification of the certifying official;
- (k) Reference to documentation that demonstrates compliance with para. 606.



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

832

COMPETENT AUTHORITY CERTIFICATES OF APPROVAL
 Competent authority identification marks
 Each certificate of approval issued by a competent authority shall be assigned an identification mark. The mark shall be of the following generalized type:
 VRI/Number/Type Code
 (a) Except as provided in para. 833(b), VRI represents the international vehicle registration identification code of the country issuing the certificate;
 (b) The number shall be assigned by the competent authority and shall be unique and specific with regard to the particular design, shipment or alternative activity limit for exempt consignment. The identification mark of the approval of shipment shall be clearly related to the identification mark of the approval of design.
 (c) The following type codes shall be used in the order listed to indicate the types of certificate of approval issued:
 AF Type A package design for fissile material
 B(U) Type B(U) package design (B(U)F if for fissile material)
 B(M) Type B(M) package design (B(M)F if for fissile material)
 C Type C package design (CF if for fissile material)



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

IF Industrial package design for fissile material
S Special form radioactive material
LD Low dispersible radioactive material
FE Fissile material complying with the requirements of para. 606
T Shipment
X Special arrangement
AL Alternative activity limits for an exempt consignment of instruments or articles

In the case of package designs for non-fissile or fissile excepted uranium hexafluoride, where none of the above codes apply, the following type codes shall be used:

H(U) Unilateral approval
H(M) Multilateral approval.

(d) For certificates of approval of package design and special form radioactive material, other than those issued under the provisions of paras 820–823, and for certificates of approval of low dispersible radioactive material, the symbol “-96” shall be added to the type code.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p data-bbox="289 289 344 315">818</p> <p data-bbox="65 337 562 574">The competent authority shall establish a certificate of approval stating that the approved alternative activity limit for an exempt consignment of instruments or articles meets the requirements of para. 403(b) and shall attribute to that certificate an identification mark.</p>			<input checked="" type="checkbox"/>	<p data-bbox="1654 295 1976 961">Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

817

Alternative activity limits for an exempt consignment of instruments or articles in accordance with para. 403(b) shall require multilateral approval. An application for approval shall include:

(a) An identification and detailed description of the instrument or article, its intended uses and the radionuclide(s) incorporated.

(b) The maximum activity of the radionuclide(s) in the instrument or article.

(c) Maximum external radiation levels arising from the instrument or article.

(d) The chemical and physical forms of the radionuclide(s) contained in the instrument or article.

(e) Details of the construction and design of the instrument or article, particularly as related to the containment and shielding of the radionuclide in routine, normal and accident conditions of transport.

(f) The applicable management system, including the quality testing and verification procedures to be applied to radioactive sources, components and finished products to ensure that the maximum specified activity of radioactive material or the maximum radiation levels specified for the instrument or article are not exceeded,



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

and that the instruments or articles are constructed according to the design specifications.

(g) The maximum number of instruments or articles expected to be shipped per consignment and annually.

(h) Dose assessments in accordance with the principles and methodologies set out in the BSS [2], including individual doses to transport workers and members of the public and, if appropriate, collective doses arising from routine, normal and accident conditions of transport, based on representative transport scenarios the consignments are subject to.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p data-bbox="289 289 344 315">806</p> <p data-bbox="65 337 558 607">The competent authority shall establish a certificate of approval stating that the approved material meets the requirements for fissile material excepted by the competent authority in accordance with para. 606 and shall attribute to that design an identification mark.</p>			<input checked="" type="checkbox"/>	<p data-bbox="1656 295 1976 959">Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

805

APPROVAL OF MATERIAL EXCEPTED FROM FISSILE CLASSIFICATION

The design for a fissile material excepted from FISSILE classification, in accordance with Table 1, under para. 417(f) shall require multilateral approval. An application for approval shall include:

- (a) A detailed description of the material; particular reference shall be made to both physical and chemical states;;
- (b) A statement of the tests that have been done and their results, or evidence based on calculation methods to show that the material is capable of meeting the requirements specified in para. 606;
- (c) A specification of the applicable management system as required in para. 306.;
- (d) A statement of specific actions to be taken prior to shipment.



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

802

Competent authority approval shall be required for the following:

- (a) Designs for:
 - (i) Special form radioactive material (see paras 803, 804 and 823);
 - (ii) Low dispersible radioactive material (see paras 803 and 804);
 - (iii) Fissile material excepted under para. 417(f) (see paras 805 and 806);
 - (iv) Packages containing 0.1 kg or more of uranium hexafluoride (see para. 807);
 - (v) Packages containing fissile material unless excepted by para. 417, 674 or 675 (see paras 814–816, and 820);
 - (vi) Type B(U) packages and Type B(M) packages (see paras 808–813, and 820);
 - (vii) Type C packages (see paras 808–810).
- (b) Special arrangements (see paras 829–831);
- (c) Certain shipments (see paras 825–828);
- (d) Radiation protection programme for special use vessels (see para. 576(a));
- (e) Calculation of radionuclide values that are not listed in Table 2 (see para. 403(a));
- (f) Calculation of alternative activity limits for an exempt consignment of instruments and articles (see para. 403 (b)).

The certificates of approval for the



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

package design and the shipment may be combined into a single certificate.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

802

Competent authority approval shall be required for the following:

- (a) Designs for:
 - (i) Special form radioactive material (see paras 803, 804 and 823);
 - (ii) Low dispersible radioactive material (see paras 803 and 804);
 - (iii) Fissile material excepted under para. 417(f) (see paras 805 and 806);
 - (iv) Packages containing 0.1 kg or more of uranium hexafluoride (see para. 807);
 - (v) Packages containing fissile material unless excepted by para. 417, 674 or 675 (see paras 814–816, and 820);
 - (vi) Type B(U) packages and Type B(M) packages (see paras 808–813, and 820);
 - (vii) Type C packages (see paras 808–810).
- (b) Special arrangements (see paras 829–831);
- (c) Certain shipments (see paras 825–828);
- (d) Radiation protection programme for special use vessels (see para. 576(a));
- (e) Calculation of radionuclide values that are not listed in Table 2 (see para. 403(a));
- (f) Calculation of alternative activity limits for an exempt consignment of instruments and articles (see para. 403 (b)).

The certificates of approval for the



Many administrative requirements are new or modified due to changes in the provisions for fissile excepted material and alternate ALEC values for instruments and articles which may both be obtained via competent authority. The NRC and DOT do not allow for competent authority approval for fissile exceptions or ALEC values for instruments and articles, and therefore do not address similar administrative requirements.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

package design and the shipment may be combined into a single certificate.

737

Impact test: The specimen shall be subject to an impact on a target at a velocity of not less than 90 m/s, at such an orientation as to suffer maximum damage. The target shall be as defined in para. 717, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.



NRC and DOT do not address Type C packaging or testing.

736

Enhanced thermal test: The conditions for this test shall be as specified in para. 728, except that the exposure to the thermal environment shall be for a period of 60 min.



NRC and DOT do not address Type C packaging or testing.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

735

Puncture-tearing test: The specimen shall be subjected to the damaging effects of a vertical solid probe made of mild steel. The orientation of the package specimen and the impact point on the package surface shall be such as to cause maximum damage at the conclusion of the test sequence specified in para.

734(a):

(a) The specimen, representing a package having a mass of less than 250 kg, shall be placed on a target and subjected to a probe having a mass of 250 kg falling from a height of 3 m above the intended impact point. For this test the probe shall be a 20 cm diameter cylindrical bar with the striking end forming the frustum of a right circular cone with the following dimensions: 30 cm height and 2.5 cm diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed shall be as specified in para. 717.

(b) For packages having a mass of 250 kg or more, the base of the probe shall be placed on a target and the specimen dropped onto the probe. The height of the drop, measured from the point of impact with the specimen to the upper surface of the probe, shall be 3 m. For this test the probe shall have the same



NRC and DOT do not address Type C packaging or testing.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

properties and dimensions as specified in (a), except that the length and mass of the probe shall be such as to cause maximum damage to the specimen. The target on which the base of the probe is placed shall be as specified in para. 717.

734

Tests for Type C packages

Specimens shall be subjected to the effects of each of the following test sequences in the orders specified:

(a) The tests specified in paras 727(a), 727(c), 735 and 736;

(b) The test specified in para. 737.

Separate specimens are allowed to be used for each of the sequences (a) and (b).



NRC and DOT do not address Type C packaging or testing.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p style="text-align: center;">712</p> <p>TESTS FOR LOW DISPERSIBLE RADIOACTIVE MATERIAL</p> <p>A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in para. 736 and the impact test specified in para. 737. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in para. 703. After each test it shall be determined if the applicable requirements of para. 605 have been met.</p>			☑	<p>The NRC and DOT do not currently recognize low dispersible material (LDM) or Type C packages. Higher activities of material are allowed in Type B packages and for shipment by air if LDM is recognized.</p>
<p style="text-align: center;">683</p> <p>For packages to be transported by air:</p> <p>(a) The package shall be subcritical under conditions consistent with the Type C package tests specified in para. 734 assuming reflection by at least 20 cm of water but no water in-leakage;</p> <p>(b) In the assessment of para. 682 allowance shall not be made for special features of para. 680 unless, following the Type C package tests specified in para. 734 and, subsequently, the water in-leakage test of para. 733, leakage of water into or out of the void spaces is prevented.</p>	<p>Type C not in NRC Regs</p>		☑	<p>NRC and DOT do not address Type C packaging or testing.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p>672</p> <p>A package shall be so designed that there will be no rupture of the containment system following performance of the enhanced water immersion test specified in para. 730.</p>			<input checked="" type="checkbox"/>	<p>NRC and DOT do not address Type C packaging or testing.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

671

A package shall be so designed that, if it were at the maximum normal operating pressure and subjected to:

(a) The tests specified in paras 719–724, it would restrict the loss of radioactive contents to not more than 10-6A2 per hour.

(b) The test sequences in para. 734:

(i) It would retain sufficient shielding to ensure that the radiation level 1 m from the surface of the package would not exceed 10 mSv/h with the maximum radioactive contents that the package is designed to contain.

(ii) It would restrict the accumulated loss of radioactive contents in a period of one week to not more than 10A2 for krypton-85 and not more than A2 for all other radionuclides.

Where mixtures of different radionuclides are present, the provisions of paras 405–407 shall apply, except that for krypton-85 an effective A2(i) value equal to 10A2 may be used. For case (a), the assessment shall take into account the external contamination limits of para. 508.



NRC and DOT do not address Type C packaging or testing.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p data-bbox="289 289 344 315">670</p> <p data-bbox="65 337 558 753">A package shall be capable of meeting the assessment criteria prescribed for tests in paras 659(b) and 663 after burial in an environment defined by a thermal conductivity of 0.33 W/(m•K) and a temperature of 38°C in the steady state. Initial conditions for the assessment shall assume that any thermal insulation of the package remains intact, the package is at the maximum normal operating pressure and the ambient temperature is 38°C.</p>			☑	NRC and DOT do not address Type C packaging or testing.
<p data-bbox="289 792 344 818">669</p> <p data-bbox="65 834 558 1078">REQUIREMENTS FOR TYPE C PACKAGES Type C packages shall be designed to meet the requirements specified in paras 607–621 and 636–649, except as specified in para. 648(a), and the requirements specified in paras 653–657, 661–666 and 670–672.</p>			☑	NRC and DOT do not address Type C packaging or testing.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p>645</p> <p>The containment system shall retain its radioactive contents under a reduction of ambient pressure to 60 kPa.</p>	<p>71.071 (c) (03)</p> <p>(3) Reduced external pressure. An external pressure of 25 kPa (3.5 lbf/in2) absolute.</p>	<p>173.412 (f)</p> <p>In addition to meeting the general design requirements prescribed in Sec. 173.410, each Type A packaging must be designed so that--</p> <p>(f) The containment system will retain its radioactive contents under the reduction of ambient pressure to 25 kPa (3.6 psi).</p>	<input checked="" type="checkbox"/>	<p>SSR-6 requires that a Type A package retain its contents under an external pressure reduction of 60 kPa; the NRC and DOT</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

605

Requirements for low dispersible radioactive material

Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package shall meet the following requirements:

(a) The radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h.

(b) If subjected to the tests specified in paras 736 and 737, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100A2. A separate specimen may be used for each test.

(c) If subjected to the test specified in para. 703 the activity in the water would not exceed 100A2. In the application of this test, the damaging effects of the tests specified in (b) shall be taken into account.



The NRC and DOT do not currently recognize low dispersible material (LDM) or Type C packages. Higher activities of material are allowed in Type B packages and for shipment by air if LDM is recognized.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p>582</p> <p>CUSTOMS OPERATIONS</p> <p>Customs operations involving the inspection of the radioactive contents of a package shall be carried out only in a place where adequate means of controlling radiation exposure are provided and in the presence of qualified persons. Any package opened on customs instructions shall, before being forwarded to the consignee, be restored to its original condition</p>			<input checked="" type="checkbox"/>	<p>NRC and DOT do not address the customs inspections found in this paragraph.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p style="text-align: center;">572</p> <p>Where the consignment in or on the vehicle is unpackaged LSA-I material or SCO-I or where a consignment is required to be shipped under exclusive use and is packaged radioactive material with a single UN number, the appropriate UN number (see Table 1) shall also be displayed, in black digits not less than 65 mm high, either:</p> <p>(a) In the lower half of the placard shown in Fig. 6, against the white background; or</p> <p>(b) On the placard shown in Fig. 7. When the alternative given in (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, either on the two external lateral walls in the case of a rail vehicle or on the two external lateral walls and the external rear wall in the case of a road vehicle.</p>		<p style="text-align: center;">173.427 (c)</p> <p>(c) LSA material and SCO in groups LSA-I and SCO-I may be transported unpackaged under the following conditions:</p> <p>(1) All unpackaged material, other than ores containing only naturally occurring radionuclides, shall be transported in such a manner that under normal conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding;</p> <p>(2) Each conveyance must be under exclusive use, except when only transporting SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than 4.0 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.4 Bq/cm² for all other alpha emitters; and</p> <p>(3) For SCO-I where it is suspected that non-fixed contamination exists on</p>	<input checked="" type="checkbox"/>	<p>Paragraph 572 requires UN numbers to be shown on placards or orange panels for unpackaged LSA-I, SCO-I and exclusive use shipments with only one UN number. DOT does not have this requirement.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

inaccessible surfaces in excess of the values specified in paragraph (c)(2) of this section, measures shall be taken to ensure that the radioactive material is not released into the conveyance or to the environment.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

540

Labelling for radioactive contents
 Each label conforming to the applicable models in Figs 2–4 shall be completed with the following information:

(a) Contents:

(i) Except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. The group of LSA or SCO shall be shown following the name(s) of the radionuclide(s). The terms “LSA-II”, “LSA-III”, “SCO-I” and “SCO-II” shall be used for this purpose.

(ii) For LSA-I material, the term “LSA-I” is all that is necessary; the name of the radionuclide is not necessary.

(b) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For fissile material, the total mass of fissile nuclides in units of grams (g), or multiples thereof, may be used in place of activity.

(c) For overpacks and freight containers the “contents” and “activity” entries on the label shall bear the information required in paras 540(a) and (b), respectively, totalled together for the

172.403 (g)

(g) The following applicable items of information must be entered in the blank spaces on the RADIOACTIVE label by legible printing (manual or mechanical), using a durable weather resistant means of marking:

(1) Contents. Except for LSA-1 material, the names of the radionuclides as taken from the listing of radionuclides in Sec. 173.435 of this subchapter (symbols which conform to established radiation protection terminology are authorized, i.e., ^{99}Mo , ^{60}Co , etc.). For mixtures of radionuclides, with consideration of space available on the label, the radionuclides that must be shown must be determined in accordance with Sec. 173.433(g) of this subchapter. For LSA-I material, the term “LSA-I” may be used in place of the names of the radionuclides.

(2) Activity. The activity in



SSR-6 requires that “LSA-II”, “LSA-III”, “SCO-I” and “SCO-II” be shown with the list of nuclides on radioactive labels. DOT does not require that information. Both regulations allow for “LSA-I” to be shown on a label instead of (not with) the list of nuclides.

SSR-6 allows for mass of fissile nuclides to be shown in place of activity. DOT allows that for U-233 and U-235, but not for Pu-239 and Pu-241.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

entire contents of the overpack or freight container except that on labels for overpacks or freight containers containing mixed loads of packages containing different radionuclides, such entries may read "See Transport Documents".

(d) TI: The number determined in accordance with paras 523 and 524 (no TI entry is required for Category I-WHITE).

the package must be expressed in appropriate SI units (e.g., Becquerels (Bq), Terabecquerels (TBq), etc.). The activity may also be stated in appropriate customary units (Curies (Ci), milliCuries (mCi), microCuries (uCi), etc.) in parentheses following the SI units. Abbreviations are authorized. Except for plutonium-239 and plutonium-241, the weight in grams or kilograms of fissile radionuclides may be inserted instead of activity units. For plutonium-239 and plutonium-241, the weight in grams of fissile radionuclides may be inserted in addition to the activity units.

(3) Transport index. (see Sec. 173.403 of this subchapter.)

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

529

CATEGORIES

Packages, overpacks and freight containers shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 8 and with the following requirements:

- (a) For a package overpack or freight container, the TI and the surface radiation level conditions shall be taken into account in determining which category is appropriate. Where the TI satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package, overpack or freight container shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.
- (b) The TI shall be determined following the procedures specified in paras 523 and 524.
- (c) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use and under the provisions of paras 573(a), 575 or 579, as appropriate.
- (d) A package transported under a special arrangement shall be assigned to category III-YELLOW except under the provisions of para. 530.

172.403 (c)

(c) Category of label to be applied to Class 7 (radioactive) materials packages:

 Maximum radiation level at any point on the external surface of the container shall be less than or equal to 0.005 mSv/h (0.5 mrem/h). More than 0 but not more than 0.005 mSv/h (0.5 mrem/h) shall be used for Category I labels. More than 0.005 mSv/h (0.5 mrem/h) but less than or equal to 0.5 mSv/h (5 mrem/h) shall be used for Category II labels. More than 0.5 mSv/h (5 mrem/h) shall be used for Category III labels.



Both SSR-6 and DOT regulations contain a footnote in the tables for label determination that allows for a measured TI not greater than 0.05 to be considered as zero. However, the SSR-6 regulations allow this for I-White and II-Yellow labels, where DOT only allows this label determination for I-White.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

(e) An overpack or freight container that contains packages transported under special arrangement shall be assigned to category III-YELLOW except under the provisions of para. 530.

(50 mrem/h).
 More than 1 but not more than Greater than 0.5 YELLOW-III.
 10. mSv/h
 (50 mrem/h) but less than or equal to 2 mSv/h
 (200 mrem/h).
 More than 10.....
 Greater than 2 mSv/ YELLOW-III (Must be h (200 mrem/h) but shipped under less than or equal exclusive use to 10 mSv/h (1,000 provisions; see
 mrem/h). 173.441(b) of this subchapter).

 \1\ Any package containing a ``highway route controlled quantity'' (Sec. 173.403 of

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

this subchapter) must be labelled as RADIOACTIVE YELLOW- III.
 \2\ If the measured TI is not greater than 0.05, the value may be considered to be zero.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

523

DETERMINATION OF TRANSPORT INDEX

The TI for a package, overpack or freight container, or for unpackaged LSA-I or SCO-I, shall be the number derived in accordance with the following procedure:

- (a) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, freight container or unpackaged LSA-I and SCO-I. The value determined shall be multiplied by 100 and the resulting number is the TI. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:
 - (i) 0.4 mSv/h for ores and physical concentrates of uranium and thorium;
 - (ii) 0.3 mSv/h for chemical concentrates of thorium;
 - (iii) 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride.
- (b) For tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in step (a) shall be multiplied by the appropriate factor from Table 7.
- (c) The value obtained in steps (a) and (b) shall be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be



Radiation levels that can be used for uranium and thorium ores instead of taking a direct measure. DOT requires direct measure in all cases.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

considered as zero.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p style="text-align: center;">520</p> <p>LSA material and SCO in groups LSA-I and SCO-I may be transported, unpackaged, under the following conditions:</p> <p>(a) All unpackaged material other than ores containing only naturally occurring radionuclides shall be transported in such a manner that under routine conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding.</p> <p>(b) Each conveyance shall be under exclusive use, except when only transporting SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than 10 times the applicable level specified in para. 214.</p> <p>(c) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in para. 413(a)(i), measures shall be taken to ensure that the radioactive material is not released into the conveyance.</p> <p>(d) Unpackaged fissile material shall meet the requirements of para 417 (e).</p>		<p style="text-align: center;">173.427 (c)</p> <p>(c) LSA material and SCO in groups LSA-I and SCO-I may be transported unpackaged under the following conditions:</p> <p>(1) All unpackaged material, other than ores containing only naturally occurring radionuclides, shall be transported in such a manner that under normal conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding;</p> <p>(2) Each conveyance must be under exclusive use, except when only transporting SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than 4.0 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.4 Bq/cm² for all other alpha emitters; and</p> <p>(3) For SCO-I where it is suspected that non-fixed</p>	☑	<p>Paragraphs 518-520 contain provisions for LSA materials that are fissile (not fissile excepted). DOT requires that LSA materials that are not fissile excepted be shipped under 10 CFR in appropriate fissile packaging. A proper shipping name other than for LSA material would be used.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

contamination exists on inaccessible surfaces in excess of the values specified in paragraph (c)(2) of this section, measures shall be taken to ensure that the radioactive material is not released into the conveyance or to the environment.

519

For LSA material and SCO that are or contain fissile material, the applicable requirements of para. 673 shall be met.

173.427 (d)

(d) LSA and SCO that exceed the packaging limits in this section must be packaged in accordance with 10 CFR part 71.



Paragraphs 518-520 contain provisions for LSA materials that are fissile (not fissile excepted). DOT requires that LSA materials that are not fissile excepted be shipped under 10 CFR in appropriate fissile packaging. A proper shipping name other than for LSA material would be used.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p style="text-align: center;">518</p> <p>For LSA material and SCO that are or contain fissile material that is not excepted under para. 417, the applicable requirements of paras 568 and 569 shall be met.</p>		<p style="text-align: center;">173.427 (d)</p> <p>(d) LSA and SCO that exceed the packaging limits in this section must be packaged in accordance with 10 CFR part 71.</p>	☑	<p>Paragraphs 518-520 contain provisions for LSA materials that are fissile (not fissile excepted). DOT requires that LSA materials that are not fissile excepted be shipped under 10 CFR in appropriate fissile packaging. A proper shipping name other than for LSA material would be used.</p>
<p style="text-align: center;">433</p> <p>Type B(U) and Type B(M) packages, if transported by air, shall meet the requirements of para. 432 and shall not contain activities greater than the following:</p> <p>(a) For low dispersible radioactive material — as authorized for the package design as specified in the certificate of approval;</p> <p>(b) For special form radioactive material —3000A1 or 105 A2, whichever is the lower;</p> <p>(c) For all other radioactive material —3000 A2.</p>			☑	<p>The NRC and DOT do not currently recognize low dispersible material (LDM) or Type C packages. Higher activities of material are allowed in Type B packages and for shipment by air if LDM is recognized.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p style="text-align: center;">422</p> <p>Classification as excepted package A Package may be classified as an excepted package if it meets one of the following conditions:</p> <p>(a) It is an empty package having contained radioactive material.</p> <p>(b) It contains instruments or articles not exceeding the activity limits specified in Table 4;</p> <p>(c) It contains articles manufactured of natural uranium, depleted uranium or natural thorium.</p> <p>(d) It contains radioactive material not exceeding the activity limits specified in Table 4;</p> <p>(e) It contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column 4 of Table 4.</p>		<p style="text-align: center;">173.422</p> <p>Excepted packages for limited quantities of Class 7 (radioactive) materials.</p> <p>(a) A Class 7 (radioactive) material with an activity per package which does not exceed the limited quantity package limits specified in Table 4 in Sec. 173.425, and its packaging, are excepted from requirements in this subchapter for specification packaging, labeling, marking (except for the UN identification number marking requirement described in Sec. 173.422(a)), and if not a hazardous substance or hazardous waste, shipping papers, and the requirements of this subpart if:</p> <p>(1) Each package meets the general design requirements of Sec. 173.410;</p> <p>(2) The radiation level at any point on the external surface of the package does not exceed 0.005 mSv/hour (0.5 mrem/ hour);</p>	<input checked="" type="checkbox"/>	<p>A new requirement has been added to the excepted package conditions for less than 0.1 kg of UF6. This is related to the new UF6 proper shipping name discussed in the Very Significant Differences section, which NRC and DOT do not recognize. However, this packaging requirement is broader than UF6 and therefore is considered Significant rather than Very Significant.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

(3) The nonfixed (removable) radioactive surface contamination on the external surface of the package does not exceed the limits specified in Sec. 173.443(a);

(4) The outside of the inner packaging or, if there is no inner packaging, the outside of the packaging itself bears the marking "Radioactive";

(5) The package does not contain fissile material unless excepted by Sec. 173.453.

(6) The material is otherwise prepared for shipment as specified in accordance with Sec. 173.422.

(b) A limited quantity of Class 7 (radioactive) material that is a hazardous substance or a hazardous waste, is not subject to the provisions in Sec. 172.203(d) or Sec. 172.204(c)(4) of this subchapter.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

409

LSA material shall be in one of three groups:

- (a) LSA-I
 - (i) Uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides;
 - (ii) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form;
 - (iii) Radioactive material for which the A2 value is unlimited. Fissile material may be included only if excepted under para. 417;
 - (iv) Other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in paras 402–407. Fissile material may be included only if excepted under para. 417.
- (b) LSA-II
 - (i) Water with a tritium concentration of up to 0.8 TBq/L;
 - (ii) Other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10-4A2/g for solids and gases, and 10-5A2/g for liquids.
- (c) LSA-III

Solids (e.g. consolidated wastes,

173.403

see LSA definition



Materials with unlimited A2 values are included in the provision for LSA-I material. SSR-6 allows fissile excepted material in the definition, but DOT uses the words “other than fissile material”. In other parts of the definition, DOT allows fissile excepted material, so the wording “other than fissile material” clearly excludes even fissile excepted quantities.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

activated materials), excluding powders, that meet the requirements of para. 601, in which:

(i) The radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen; and ceramic);

(ii) The radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed 0.1A2;

(iii) The estimated average specific activity of the solid, excluding any shielding material, does not exceed $2 \times 10^{-3}A2/g$.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
<p style="text-align: center;">403</p> <p>DETERMINATION OF BASIC RADIONUCLIDE VALUES</p> <p>For individual radionuclides:</p> <p>(a) That are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require multilateral approval. For these radionuclides, activity concentrations for exempt material and activity limits for exempt consignments shall be calculated in accordance with the principles established in the BSS [2]. It is permissible to use an A2 value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 3 may be used without obtaining competent authority approval.</p> <p>(b) In instruments or articles in which the radioactive material is enclosed in or is included as a component part of the instrument or other manufactured article and which meet para. 423 (c), alternative basic radionuclide values to those in Table 2 for the activity limit for an exempt consignment are permitted and</p>	<p style="text-align: center;">71 Appendix A II(a)</p> <p>II.a. For individual radionuclides whose identities are known, but which are not listed in Table A–1, the A1 and A2 values contained in Table A–3 may be used. Otherwise, the licensee shall obtain prior Commission approval of the A1 and A2 values for radionuclides not listed in Table A–1, before shipping the material.</p>	<p style="text-align: center;">173.433 (b)</p> <p>(b) For individual radionuclides which are not listed in the tables in Sec. 173.435 or Sec. 173.436:</p> <p>(1) the radionuclide values in Tables 7 or 8 of this section may be used; or</p> <p>(2) other basic radionuclide values may be used provided they are first approved by the Associate Administrator or, for international transport, multilateral approval is obtained from the pertinent Competent Authorities.</p>	<input checked="" type="checkbox"/>	<p>SSR-6 contains a new provision for using alternate activity limits for exempt consignments (ALEC) for Instruments and Articles with multilateral approval. NRC and DOT do not address any similar provision.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

shall require multilateral approval. Such alternative activity limits for an exempt consignment shall be calculated in accordance with the principles set out in the BSS [2].

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	
	<p style="text-align: center;">71.022</p> <p>General license: Fissile material.</p> <p>(a) A general license is issued to any licensee of the Commission to transport fissile material, or to deliver fissile material to a carrier for transport, if the material is shipped in accordance with this section. The fissile material need not be contained in a package which meets the standards of subparts E and F of this part; however, the material must be contained in a Type A package. The Type A package must also meet the DOT requirements of 49 CFR 173.417(a).</p> <p>(b) The general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of subpart H of this part.</p> <p>(c) The general license applies only when a package's contents:</p> <p>(1) Contain no more than a Type A quantity of radioactive material; and</p> <p>(2) Contain less than 500 total grams of beryllium, graphite, or hydrogenous material enriched in deuterium.</p> <p>(d) The general license applies only to packages containing fissile</p>	<p style="text-align: center;">173.417 (a) (1) (i)</p> <p>Authorized fissile materials packages.....any packaging listed in 173.415, limited to the Class 7 (radioactive) materials specified in 10 CFR part 71, subpart C</p>	<input checked="" type="checkbox"/>	<p>This provision for using a Type A container for certain quantities of fissile material is a domestic regulation found only in NRC regulations.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

material that are labeled with a CSI which:

- (1) Has been determined in accordance with paragraph (e) of this section;
- (2) Has a value less than or equal to 10; and
- (3) For a shipment of multiple packages containing fissile material, the sum of the CSIs must be less than or equal to 50 (for shipment on a nonexclusive use conveyance) and less than or equal to 100 (for shipment on an exclusive use conveyance).

(e)(1) The value for the CSI must be greater than or equal to the number calculated by the following equation: $CSI = \frac{\text{grams of U X} + \text{grams of U Y} + \text{grams of Pu Z}}{235 + 233}$

- (2) The calculated CSI must be rounded up to the first decimal place;
- (3) The values of X, Y, and Z used in the CSI equation must be taken from Tables 71–1 or 71–2, as appropriate;
- (4) If Table 71–2 is used to obtain the value of X, then the values for the terms in the equation for uranium-233 and plutonium must be assumed to be zero; and

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

(5) Table 71–1 values for X, Y, and Z must be used to determine the CSI if:

- (i) Uranium-233 is present in the package;
- (ii) The mass of plutonium exceeds 1 percent of the mass of uranium-235;
- (iii) The uranium is of unknown uranium-235 enrichment or greater than 24 weight percent enrichment; or
- (iv) Substances having a moderating effectiveness (i.e., an average hydrogen density greater than H₂O) (e.g., certain hydrocarbon oils or plastics) are present in any form, except as polyethylene used for packing or wrapping.

TABLE 71–1.—MASS LIMITS FOR GENERAL LICENSE PACKAGES CONTAINING MIXED QUANTITIES OF FISSILE MATERIAL OR URANIUM-235 OF UNKNOWN ENRICHMENT PER Sec. 71.22(E)

Fissile material Fissile material mass mixed with moderating substances having an average hydrogen density less than or equal to H₂O (grams)

Fissile material mass mixed with moderating substances having an

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

average hydrogen density greater than H₂O_a (grams)
 235 U
 (X).....
 60 38
 233 U
 (Y).....
 43 27
 239 Pu or 241 Pu
 (Z)..... 37 24
 a When mixtures of moderating substances are present, the lower mass limits shall be used if more than 15 percent of the moderating substance has an average hydrogen density greater than H₂O.

TABLE 71-2.—MASS LIMITS FOR GENERAL LICENSE PACKAGES CONTAINING URANIUM-235 OF KNOWN ENRICHMENT PER Sec. 71.22(E)

Uranium enrichment in weight percent of 235 U not exceeding Fissile material mass of 235 U (X) (grams)

24	60
20	63
15	67
11	72
10	76
9.5	78

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

9	81
8.5	82
8	85
7.5	88
7	90
6.5	93
6	97
5.5	102
5	108
4.5	114
4	120
3.5	132
3	150
2.5	180
2	246
1.5	408
1.35	480
1	1,020
0.92	1,800

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

71.038

Renewal of a certificate of compliance or quality assurance program approval.

(a) Except as provided in paragraph (b) of this section, each Certificate of Compliance or Quality Assurance Program Approval expires at the end of the day, in the month and year stated in the approval.

(b) In any case in which a person, not less than 30 days before the expiration of an existing Certificate of Compliance or Quality Assurance Program Approval issued pursuant to the part, has filed an application in proper form for renewal of either of those approvals, the existing Certificate of Compliance or Quality Assurance Program Approval for which the renewal application was filed shall not be deemed to have expired until final action on the application for renewal has been taken by the Commission.

(c) In applying for renewal of an existing Certificate of Compliance or Quality Assurance Program Approval, an applicant may be required to submit a consolidated application that incorporates all changes to its program that, are



SSR-6 paragraph 838 notes that the expiration date is part of a certificate of approval, but does not address renewals of certificates or approvals of a QA program.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	S	

incorporated by reference in the existing approval or certificate, into as few referenceable documents as reasonably achievable.

APPENDIX C

Notable Differences between IAEA SSR-6 Regulations and NRC and DOT Regulations

Note:

The “Notable Differences” report may be viewed by clicking on the "Reports" tab in the Access navigation bar on the left-hand side of the screen.

To run the report, double click on the report name: IAEA_NRC_DOT_Notable_Reg_Comments. This will open the report in "print preview" mode. To print the report, go to File=>Print on the menu bar once the report is shown on the screen. To save the report to an Adobe PDF file, go to “Print Preview.” Under the *Data* tab, choose either the *PDF* or *XPS* icon. This will allow the report to be saved as an Adobe PDF file.

IAEA, NRC, and DOT Regulation Comparison Report

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

834

CONTENTS OF CERTIFICATES OF APPROVAL

Certificates of approval of special form radioactive material and of low dispersible radioactive material

Each certificate of approval issued by a competent authority for special form radioactive material or low dispersible radioactive material shall include the following information:

- (a) Type of certificate;
- (b) The competent authority identification mark;
- (c) The issue date and an expiry date;
- (d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the special form radioactive material or low dispersible radioactive material is approved;
- (e) The identification of the special form radioactive material or low dispersible radioactive material;
- (f) A description of the special form radioactive material or low dispersible radioactive material;
- (g) Design specifications for the special form radioactive material or low dispersible radioactive material, which



NRC and DOT regulations do not address low dispersible radioactive material.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

may include references to drawings;

- (h) A specification of the radioactive contents that includes the activities involved and which may include the physical and chemical forms;
- (i) A specification of the applicable management system as required in para. 306;
- (j) Reference to information provided by the applicant relating to specific actions to be taken prior to shipment;
- (k) If deemed appropriate by the competent authority, reference to the identity of the applicant;
- (l) Signature and identification of the certifying official.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

833

These identification marks shall be applied as follows:

- (a) Each certificate and each package shall bear the appropriate identification mark, comprising the symbols prescribed in paras 828 832(a)-(d), except that, for packages, only the applicable design type codes including, if applicable, the symbol ‘-96’ shall appear following the second stroke, that is, the “T” or “X” shall not appear in the identification marking on the package. Where the approval of design and the approval of shipment are combined, the applicable type codes do not need to be repeated. For example:
A/132/B(M)F-96: A Type B(M) package design approved for fissile material, requiring multilateral approval, for which the competent authority of Austria has assigned the design number 132 (to be marked both on the package and on the certificate of approval for the package design);
A/132/B(M)F-96T: The approval of shipment issued for a package bearing the identification mark elaborated above (to be marked on the certificate only);
A/137/X: An approval of special arrangement issued by the competent authority of Austria, to which the number 137 has been assigned (to be marked on the certificate only);



NRC and DOT regulations do not address competent authority approvals of shipments by special provision and the associated markings and documents.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

A/139/IF-96: An industrial package design for fissile material approved by the competent authority of Austria, to which package design number 139 has been assigned (to be marked both on the package and on the certificate of approval for the package design;

A/145/H(U)-96: A package design for fissile excepted uranium hexafluoride approved by the competent authority of Austria, to which package design number 145 has been assigned (to be marked both on the package and on the certificate of approval for the package design).

(b)Where multilateral approval is effected by validation in accordance with para. 840, only the identification mark issued by the country of origin of the design or shipment shall be used. Where multilateral approval is effected by issue of certificates by successive countries, each certificate shall bear the appropriate identification mark, and the package whose design was so approved shall bear all appropriate identification marks.

For example:

A/132/B(M)F-96

CH/28/B(M)F-96

would be the identification mark of a package that was originally approved by Austria and was subsequently approved,

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

by separate certificate, by Switzerland. Additional identification marks would be tabulated in a similar manner on the package.

(c) The revision of a certificate shall be indicated by a parenthetical expression following the identification mark on the certificate. For example, A/132/B(M)F-96(Rev.2) would indicate revision 2 of the Austrian certificate of approval for the package design approval certificate; or A/132/B(M)F-96(Rev.0) would indicate the original issuance of the Austrian certificate of approval for the package design. For original issuances, the parenthetical entry is optional and other words such as “original issuance” may also be used in place of “Rev.0”. Certificate revision numbers may only be issued by the country issuing the original certificate of approval.

(d) Additional symbols (as may be necessitated by national requirements) may be added in brackets to the end of the identification mark, for example, A/132/B(M)F-96(SP503).

(e) It is not necessary to alter the identification mark on the packaging each time that a revision to the design certificate is made. Such re-marking shall be required only in those cases where the revision to the package design certificate involves a change in the letter

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

type codes for the package design following the second stroke.

828

Upon approval of the shipment, the competent authority shall issue a certificate of approval.



NRC and DOT regulations do not address competent authority approvals of shipments by special provision and the associated markings and documents

827

An application for approval of shipment shall include:

- (a) The period of time, related to the shipment, for which the approval is sought;
- (b) The actual radioactive contents, the expected modes of transport, the type of conveyance and the probable or proposed route;
- (c) The details of how the precautions and administrative or operational controls, referred to in the certificate of approval for the package design, if applicable, issued under paras 810, 813 and 816, are to be put into effect.



NRC and DOT regulations do not address competent authority approvals of shipments by special provision and the associated markings and documents.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">826</p> <p data-bbox="65 331 554 467">A competent authority may authorize transport through or into its country without shipment approval, by a specific provision in its design approval.</p>			<input checked="" type="checkbox"/>	<p data-bbox="1648 282 2003 532">NRC and DOT regulations do not address competent authority approvals of shipments by special provision and the associated markings and documents</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">825</p> <p>APPROVAL OF SHIPMENTS</p> <p>Multilateral approval shall be required for:</p> <p>(a) The shipment of Type B(M) packages not conforming with the requirements of para. 639 or designed to allow controlled intermittent venting;</p> <p>(b) The shipment of Type B(M) packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower;</p> <p>(c) The shipment of packages containing fissile materials if the sum of the CSIs of the packages in a single freight container or in a single conveyance exceeds 50. Excluded from this requirement shall be shipments by seagoing vessels, if the sum of the CSIs does not exceed 50 for any hold, compartment or defined deck area and the distance of 6 m between groups of packages or overpacks as required in Table 11 is met;</p> <p>(d) Radiation protection programmes for shipments by special use vessels in accordance with para. 576(a).</p>			☑	<p>Both NRC and DOT note that multilateral approval is required for Type B(M) packages but do not address multilateral approval for "notificaiton quantities", fissile shipmments with the sum of the CSIs greater than 50 or radiation protection programs for special use vessels. 10 CFR 71.97 contains domestic requirements for advanced notifications of irradiated reactor fuel and nuclear waste. 49 CFR 175.700 provides limits for cummulative CSIs by air shipment, but does not require multilateral approval.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>824</p> <p>NOTIFICATION AND REGISTRATION OF SERIAL NUMBERS</p> <p>The competent authority shall be informed of the serial number of each packaging manufactured to a design approved under paras 808, 811, 814 and 820.</p>			☑	NRC does not require registration of serial numbers.
<p>810</p> <p>The competent authority shall establish a certificate of approval stating that the approved design meets the requirements for Type B(U) or Type C packages and shall attribute to that design an identification mark.</p>			☑	NRC and DOT do not include Type C packages.
<p>808</p> <p>Approval of Type B(U) and Type C package designs</p> <p>Each Type B(U) and Type C package design shall require unilateral approval, except that:</p> <p>(a) A package design for fissile material, which is also subject to paras 814–816, shall require multilateral approval;</p> <p>(b) A Type B(U) package design for low dispersible radioactive material shall require multilateral approval.</p>			☑	NRC and DOT do not include Type C packages.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>804</p> <p>The competent authority shall establish a certificate of approval stating that the approved design meets the requirements for special form radioactive material or low dispersible radioactive material and shall attribute to that design an identification mark.</p>			☑	<p>NRC and DOT regulations do not address low dispersible radioactive material.</p>
<p>679</p> <p>The package shall be designed for an ambient temperature range of -40°C to +38°C unless the competent authority specifies otherwise in the certificate of approval for the package design.</p>	<p>71.071 (b)</p> <p>(b) Initial conditions. With respect to the initial conditions for the tests in this section, the demonstration of compliance with the requirements of this part must be based on the ambient temperature preceding and following the tests remaining constant at that value between -29°C (-20°F) and +38°C (+100°F) which is most unfavorable for the feature under consideration. The initial internal pressure within the containment system must be considered to be the maximum normal operating pressure, unless a lower internal pressure consistent with the ambient temperature considered to precede and follow the tests is more unfavorable.</p>		☑	<p>For fissile material packages, SSR-6 requires that the package be designed to a different temperature range than what NRC regulations require as the ambient temperature preceding and following tests. (-40 C and -29 C, respectively)</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">677</p> <p>For irradiated nuclear fuel the assessments of paras 680–685 shall be based on an isotopic composition demonstrated to provide either:</p> <p>(a) The maximum neutron multiplication during the irradiation history; or</p> <p>(b) A conservative estimate of the neutron multiplication for the package assessments. After irradiation but prior to shipment, a measurement shall be performed to confirm the conservatism of the isotopic composition.</p>	<p style="text-align: center;">71.055 (e) (1-3)</p> <p>(e) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in §71.73 (“Hypothetical accident conditions”), the package would be subcritical. For this determination, it must be assumed that:</p> <p>(1) The fissile material is in the most reactive credible configuration consistent with the damaged condition of the package and the chemical and physical form of the contents;</p> <p>(2) Water moderation occurs to the most reactive credible extent consistent with the damaged condition of the package and the chemical and physical form of the contents; and</p> <p>(3) There is full reflection by water on all sides, as close as is consistent with the damaged condition of the package.</p>		☑	<p>NRC regulations do not specifically contain a requirement related to assessment of irradiated nuclear fuel, but do require conservative assumptions for assessments.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>673</p> <p>REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL</p> <p>Fissile material shall be transported so as to:</p> <p>(a) Maintain subcriticality during routine, normal and accident conditions of transport; in particular, the following contingencies shall be considered:</p> <p>(i) Leakage of water into or out of packages;</p> <p>(ii) Loss of efficiency of built-in neutron absorbers or moderators;</p> <p>(iii) Rearrangement of the contents either within the package or as a result of loss from the package;</p> <p>(iv) Reduction of spaces within or between packages;</p> <p>(v) Packages becoming immersed in water or buried in snow;</p> <p>(vi) Temperature changes.</p> <p>(b) Meet the requirements:</p> <p>(i) Of para. 636 except for unpackaged material when specifically allowed by para. 417(e);</p> <p>(ii) Prescribed elsewhere in these Regulations that pertain to the radioactive properties of the material;</p> <p>(iii) Of para. 637 unless the material is excepted by para. 417;</p> <p>(iv) Of paras 676–686, unless the material is excepted by para. 417, 674 or</p>	<p>71.055 (d) (4) (i)</p> <p>(d) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in Sec. 71.71 ("Normal conditions of transport")--</p> <p>(1) ...;</p> <p>(2) ...;</p> <p>(3) ...; and</p> <p>(4) There will be no substantial reduction in the effectiveness of the packaging, including:</p> <p>(i) No more than 5 percent reduction in the total effective volume of the packaging on which nuclear safety is assessed;</p> <p>(ii) ...; and</p> <p>(iii) ...</p>		<input checked="" type="checkbox"/>	<p>SSR-6 does not quantify the 5% reduction found in NRC.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

675.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>673</p> <p>REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL</p> <p>Fissile material shall be transported so as to:</p> <p>(a) Maintain subcriticality during routine, normal and accident conditions of transport; in particular, the following contingencies shall be considered:</p> <p>(i) Leakage of water into or out of packages;</p> <p>(ii) Loss of efficiency of built-in neutron absorbers or moderators;</p> <p>(iii) Rearrangement of the contents either within the package or as a result of loss from the package;</p> <p>(iv) Reduction of spaces within or between packages;</p> <p>(v) Packages becoming immersed in water or buried in snow;</p> <p>(vi) Temperature changes.</p> <p>(b) Meet the requirements:</p> <p>(i) Of para. 636 except for unpackaged material when specifically allowed by para. 417(e);</p> <p>(ii) Prescribed elsewhere in these Regulations that pertain to the radioactive properties of the material;</p> <p>(iii) Of para. 637 unless the material is excepted by para. 417;</p> <p>(iv) Of paras 676–686, unless the material is excepted by para. 417, 674 or</p>	<p>71.055 (d) (4) (ii)</p> <p>(d) A package used for the shipment of fissile material must be so designed and constructed and its contents so limited that under the tests specified in Sec. 71.71 ("Normal conditions of transport")--</p> <p>(1) ...;</p> <p>(2) ...;</p> <p>(3) ...; and</p> <p>(4) There will be no substantial reduction in the effectiveness of the packaging, including:</p> <p>(i) ...;</p> <p>(ii) No more than 5 percent reduction in the effective spacing between the fissile contents and the outer surface of the packaging; and</p> <p>(iii) ...</p>		<input checked="" type="checkbox"/>	<p>SSR-6 does not quantify the 5% reduction found in NRC.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
675.				
<p>668</p> <p>Intermittent venting of Type B(M) packages may be permitted during transport, provided that the operational controls for venting are acceptable to the relevant competent authorities.</p>	<p>71.043 (h)</p> <p>(h) A package may not incorporate a feature intended to allow continuous venting during transport.</p>		☑	<p>NRC regulations prohibit continuous venting while SSR-6 allows intermittent venting as approved by the competent authorities. Intermittent venting is not continuous venting, so the regulations are not necessarily in conflict, but are different.</p>
<p>665</p> <p>A package containing low dispersible radioactive material shall be so designed that any features added to the low dispersible radioactive material that are not part of it, or any internal components of the packaging, shall not adversely affect the performance of the low dispersible radioactive material.</p>			☑	<p>NRC and DOT regulations do not address low dispersible radioactive material.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">658</p> <p data-bbox="58 331 575 756">A package that includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in para. 728 shall be so designed that such protection will remain effective if the package is subjected to the tests specified in paras 719–724 and 727(a) and (b) or 727(b) and (c), as appropriate. Any such protection on the exterior of the package shall not be rendered ineffective by ripping, cutting, skidding, abrading or rough handling.</p>			<input checked="" type="checkbox"/>	<p data-bbox="1648 282 2001 823">NRC and DOT do not specifically address damage to thermal protection, but in essence capture this requirement in the "pass" criteria for tests. However, the criteria are somewhat different in that SSR-6 includes tests for normal conditions of transport which could be performed on a separate specimen and therefore would be evaluated separately.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">653</p> <p data-bbox="65 337 562 829">A package shall be so designed that, under the ambient conditions specified in paras 656 and 657, heat generated within the package by the radioactive contents shall not, under normal conditions of transport, as demonstrated by the tests in paras 719–724, adversely affect the package in such a way that it would fail to meet the applicable requirements for containment and shielding if left unattended for a period of one week. Particular attention shall be paid to the effects of heat, that may cause one or more of the following:</p> <p data-bbox="65 836 562 1078">(a) Alter the arrangement, the geometrical form or the physical state of the radioactive contents or, if the radioactive material is enclosed in a can or receptacle (for example, clad fuel elements), cause the can, receptacle or radioactive material to deform or melt;</p> <p data-bbox="65 1084 562 1224">(b) Lessen the efficiency of the packaging through differential thermal expansion, or cracking or melting of the radiation shielding material;</p> <p data-bbox="65 1230 562 1295">(c) In combination with moisture, accelerate corrosion.</p>	<p data-bbox="730 282 890 315">71.51 (a) (i)</p> <p data-bbox="590 337 1016 402">Additional requirements for Type B packages.</p> <p data-bbox="590 409 1016 618">(a) A Type B package, in addition to satisfying the requirements of §§71.41 through 71.47, must be designed, constructed, and prepared for shipment so that under the tests specified in:</p> <p data-bbox="590 625 1016 976">(1) Section 71.71 (“Normal conditions of transport”), there would be no loss or dispersal of radioactive contents—as demonstrated to a sensitivity of 10–6 A2 per hour, no significant increase in external surface radiation levels, and no substantial reduction in the effectiveness of the packaging; and</p>		☑	NRC requirements do not specifically address heat generation related to package testing.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">638</p> <p>Any tie-down attachments on the package shall be so designed that, under normal and accident conditions of transport, the forces in those attachments shall not impair the ability of the package to meet the requirements of these Regulations.</p>	<p style="text-align: center;">71.045 (b)</p> <p>(b) Tie-down devices:</p> <p>(1) If there is a system of tie-down devices that is a structural part of the package, the system must be capable of withstanding, without generating stress in any material of the package in excess of its yield strength, a static force applied to the center of gravity of the package having a vertical component of 2 times the weight of the package with its contents, a horizontal component along the direction in which the vehicle travels of 10 times the weight of the package with its contents, and a horizontal component in the transverse direction of 5 times the weight of the package with its contents.</p> <p>(2) Any other structural part of the package that could be used to tie down the package must be capable of being rendered inoperable for tying down the package during transport, or must be designed with strength equivalent to that required for tie-down devices.</p> <p>(3) Each tie-down device that is a structural part of a package must be designed so that failure of the</p>	<p style="text-align: center;">173.410 (b)</p> <p>In addition to the requirements of subparts A and B of this part, each package used for the shipment of Class 7 (radioactive) materials must be designed so that--</p> <p>(a) ...</p> <p>(b) Each lifting attachment that is a structural part of the package must be designed with a minimum safety factor of three against yielding when used to lift the package in the intended manner, and it must be designed so that failure of any lifting attachment under excessive load would not impair the ability of the package to meet other requirements of this subpart. Any other structural part of the package which could be used to lift the package must be capable of being rendered inoperable for lifting the package during transport or must be designed with strength equivalent to that required for lifting</p>	<input checked="" type="checkbox"/>	<p>In addition to the requirements of subparts A and B of this part, each package used for the shipment of Class 7 (radioactive) materials must be designed so that--</p> <p>(a) ...</p> <p>(b) Each lifting attachment that is a structural part of the package must be designed with a minimum safety factor of three against yielding when used to lift the package in the intended manner, and it must be designed so that failure of any lifting attachment under excessive load would not impair the ability of the package to meet other requirements of this subpart. Any other structural part of the package which could be used to lift the package must be capable of being rendered inoperable for lifting the package during transport or must be designed with</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
	device under excessive load would not impair the ability of the package to meet other requirements of this part.	attachments.		strength equivalent to that required for lifting attachments.
<p>633</p> <p>Packages designed to contain 0.1 kg or more of uranium hexafluoride shall not be provided with pressure relief devices.</p>			☑	49 CFR 173.420 contains UF6 requirements, including a reference to ANSI N14.1. Although the prohibition on pressure relief devices is not stated, the design requirements do not allow for pressure relief devices.
<p>619</p> <p>ADDITIONAL REQUIREMENTS FOR PACKAGES TRANSPORTED BY AIR</p> <p>For packages to be transported by air, the temperature of the accessible surfaces shall not exceed 50°C at an ambient temperature of 38°C with no account taken for insolation.</p>	<p>71.43 (g)</p> <p>General standards for all packages.</p> <p>(a)</p> <p>(b) ...</p> <p>(c)</p> <p>(d)</p> <p>(e)</p> <p>(f)</p> <p>(g) A package must be designed, constructed, and prepared for transport so that in still air at 38 °C (100 °F) and in the shade, no accessible surface of a package would have a temperature exceeding 50 °C (122 °F) in a nonexclusive use shipment, or 85 °C (185 °F) in an exclusive use shipment.</p> <p>(h)</p>	<p>173.410 (i) (1)</p> <p>(i) For transport by air--</p> <p>(1) The temperature of the accessible surfaces of the package will not exceed 50 [deg]C (122 [deg]F) at an ambient temperature of 38 [deg]C (100 [deg]F) with no account taken for insulation;</p>	☑	The NRC requirement is for all (Type B and fissile) packages, not just for air shipments.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">617</p> <p>A package shall be so designed that it provides sufficient shielding to ensure that, under routine conditions of transport and with the maximum radioactive contents that the package is designed to contain, the radiation level at any point on the external surface of the package would not exceed the values specified in paras 516, 527 and 528, as applicable, with account taken of paras 566(b) and 573.</p>			☑	Limits on increasing dose rates are found in packaging test criteria in international and domestic regulations, but a requirement for sufficient shielding is only stated in this manner in international regulations.
<p style="text-align: center;">616</p> <p>The design of the package shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.</p>		<p style="text-align: center;">173.024 (b) (2)</p> <p>(2) The effectiveness of the package will not be substantially reduced; for example, impact resistance, strength, packaging compatibility, etc. must be maintained for the minimum and maximum temperatures, changes in humidity and pressure, and shocks, loadings and vibrations, normally encountered during transportation;</p>	☑	SSR-6 does not specifically mention humidity. See SSR-6 paragraph 613 for other requirements contained in 49 CFR 173.24 (b)(2).

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">608</p> <p>The design shall be such that any lifting attachments on the package will not fail when used in the intended manner and that, if failure of the attachments should occur, the ability of the package to meet other requirements of these Regulations would not be impaired. The design shall take account of appropriate safety factors to cover snatch lifting.</p>	<p style="text-align: center;">71.045 (a) 1</p> <p>Lifting and tie-down standards for all packages.</p> <p>(a) Any lifting attachment that is a structural part of a package must be designed with a minimum safety factor of three against yielding when used to lift the package in the intended manner, and it must be designed so that failure of any lifting device under excessive load would not impair the ability of the package to meet other requirements of this subpart.</p> <p>...snip...</p>	<p style="text-align: center;">173.410 (b)</p> <p>In addition to the requirements of subparts A and B of this part, each package used for the shipment of Class 7 (radioactive) materials must be designed so that--</p> <p>(a) ...</p> <p>(b) Each lifting attachment that is a structural part of the package must be designed with a minimum safety factor of three against yielding when used to lift the package in the intended manner, and it must be designed so that failure of any lifting attachment under excessive load would not impair the ability of the package to meet other requirements of this subpart. Any other structural part of the package which could be used to lift the package must be capable of being rendered inoperable for lifting the package during transport or must be designed with strength equivalent to that required for lifting attachments.</p>	<input checked="" type="checkbox"/>	<p>Both NRC and DOT regulations specify that any lifting attachment that is a structural part of the package be designed with a minimum safety factor of three. SSR-6 regulations do not specify the required safety factor, but rather state that an “appropriate” safety factor must be used.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">587</p> <p>The carrier shall retain a copy of the transport document and additional information and documentation as specified in these Regulations, for a minimum period of three months</p>		<p style="text-align: center;">177.817 (f)</p> <p>(f) Retention of shipping papers. Each person receiving a shipping paper required by this section must retain a copy or an electronic image thereof, that is accessible at or through its principal place of business and must make the shipping paper available, upon request, to an authorized official of a Federal, State, or local government agency at reasonable times and locations. For a hazardous waste, the shipping paper copy must be retained for three years after the material is accepted by the initial carrier. For all other hazardous materials, the shipping paper copy must be retained for one year after the material is accepted by the carrier. Each shipping paper copy must include the date of acceptance by the carrier. A motor carrier (as defined in §390.5 of subchapter B of chapter III of subtitle B) using a shipping</p>	<input checked="" type="checkbox"/>	<p>Paragraph 587 of SSR-6 requires that a carrier retain a copy of shipping documentation for three months. TS-R-1 did not contain this requirement. DOT regulations require that a carrier retain documentation related to hazardous waste shipments for three years and documentation related to all other hazardous material shipments for one year.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

paper without change for multiple shipments of one or more hazardous materials having the same shipping name and identification number may retain a single copy of the shipping paper, instead of a copy for each shipment made, if the carrier also retains a record of each shipment made that includes shipping name, identification number, quantity transported, and date of shipment.

586

When the information applicable to the consignment is given to the carrier in electronic form, the information shall be available to the carrier at all times during transport to final destination. The information shall be able to be produced without delay as a paper document.



DOT allows for EDI transmission of shipping papers only for rail shipments (see 172.201 and 172.204(a)(3)); otherwise paperwork is required.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>585</p> <p>The information applicable to the consignment shall accompany the consignment to final destination. This information may be on the dangerous goods transport document or may be on another document. This information shall be given to the consignee when the consignment is delivered.</p>			☑	<p>DOT requires that the consignor give shipping documents to the carrier and that the carrier have the documents while in transit, but not that the documents be given to the consignee.</p>
<p>583</p> <p>UNDELIVERABLE CONSIGNMENTS</p> <p>Where a consignment is undeliverable, it shall be placed in a safe location and the appropriate competent authority shall be informed as soon as possible and a request made for instructions on further action.</p>			☑	<p>NRC & DOT do not address undeliverable consignments.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

581

A consignment that conforms to the requirements of para. 515, in which the activity of the radioactive contents does not exceed one tenth of the limits prescribed in Table 4, and that does not contain uranium hexafluoride, may be accepted for international movement by post, subject in particular to the following additional requirements as prescribed by the Acts of the Universal Postal Union:

(a) It shall be deposited with the postal service only by consignors authorized by the national authority.

(b) It shall be dispatched by the quickest route, normally by air.

(c) It shall be plainly and durably marked on the outside with the words "RADIOACTIVE MATERIAL — QUANTITIES PERMITTED FOR MOVEMENT BY POST". These words shall be crossed out if the packaging is returned empty.

(d) It shall carry on the outside the name and address of the consignor with the request that the consignment be returned in the case of non-delivery.

(e) The name and address of the consignor and the contents of the consignment shall be indicated on the internal packaging.



NRC & DOT do not address transport by post.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">580</p> <p>Additional requirements relating to transport by post</p> <p>A consignment that conforms to the requirements of para. 515, in which the activity of the radioactive contents does not exceed one tenth of the limits prescribed in Table 4, and that does not contain uranium hexafluoride, may be accepted for domestic movement by national postal authorities, subject to such additional requirements as those authorities may prescribe.</p>		<p style="text-align: center;">Publication 52</p> <p>347.2 Mailability</p> <p>The following conditions apply:</p> <p>a. International Mail. Radioactive material is prohibited in international mail if required to bear a Class 7 Radioactive White–I, Radioactive Yellow–II, or Radioactive Yellow–III hazardous materials warning label (see Exhibit 325a). See IMM 135 for the specific admissibility requirements that are applicable to international shipments of radioactive material. Mailable radioactive materials must be sent as registered air letters.</p> <p>b. Domestic Mail via Air Transportation. All radioactive material is prohibited per DMM 601.10.18.</p> <p>c. Domestic Mail via Surface Transportation. Radioactive material is prohibited if it is required to bear a Class 7 Radioactive White–I, Radioactive Yellow–II, Radioactive Yellow–III</p>	☑	<p>Domestic shipments of radioactive material by post are more restricted than for international mail.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

hazardous materials warning label, or the Fissile label (see Exhibit 325a). Mailable radioactive materials may not have an activity content that exceeds the limits in Exhibit 347.22 (which are one-tenth of the values specified in 49 CFR 173.425), and must be one of the following materials (proper shipping names and/or UN identification numbers in 49 CFR 172.101):

1. A radioactive material eligible to be shipped as a limited quantity under 49 CFR 172.101, Radioactive material, excepted package — Limited quantity of material, UN2910.
2. An excepted instrument, article, or device including an instrument and manufactured article (such as a clock, electronic tube, or apparatus) or a similar device that has a radioactive material in gaseous or nondispersible solid form as a component part, Radioactive material, excepted package —

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

instruments or articles, UN2911.
 An excepted article containing natural uranium or thorium, including manufactured articles in which the sole radioactive material is natural or depleted uranium or natural thorium, Radioactive material, excepted package — articles manufactured from natural uranium or depleted uranium or natural thorium, UN2909.

574

In the case of road vehicles, no persons other than the driver and assistants shall be permitted in vehicles carrying packages, overpacks or freight containers bearing category II-YELLOW or III-YELLOW labels.



DOT restrictions on passengers are based on dose rates and the requirement for a person to be covered by a radiological protection program and are not based on labeling.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

558



For each shipment listed in (a), (b), (c) or (d) below, the consignor shall notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be transported. This notification shall be in the hands of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance.

(a) Type C packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower;.

(b) Type B(U) packages containing radioactive material with an activity greater than 3000A1 or 3000A2, as appropriate, or 1000 TBq, whichever is the lower;

(c) Type B(M) packages;

(d) Shipments under special arrangement.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">555</p> <p>The consignor shall retain a copy of each of the transport documents containing the information specified in paras. 546, 547, 551, 552 and 554, as applicable, for a minimum period of three months. When the documents are kept electronically the consignor shall be able to reproduce them in a printed form.</p>		<p style="text-align: center;">172.201 (e)</p> <p>(e) Retention and Recordkeeping. Each person who provides a shipping paper must retain a copy of the shipping paper required by §172.200(a), or an electronic image thereof, that is accessible at or through its principal place of business and must make the shipping paper available, upon request, to an authorized official of a Federal, State, or local government agency at reasonable times and locations. For a hazardous waste, the shipping paper copy must be retained for three years after the material is accepted by the initial carrier. For all other hazardous materials, the shipping paper must be retained for two years after the material is accepted by the initial carrier. Each shipping paper copy must include the date of acceptance by the initial carrier, except that, for rail, vessel, or air shipments, the</p>	<input checked="" type="checkbox"/>	<p>DOT requirements for the consignor to retain records are considerably longer than the SSR-6 requirement of 3 months. DOT requires that the consignor keep shipping papers for hazardous waste for 3 years and shipping papers for other hazardous materials shipments for 2 years.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

date on the shipment waybill, airbill, or bill of lading may be used in place of the date of acceptance by the initial carrier. A motor carrier (as defined in §390.5 of subchapter B of chapter III of subtitle B) using a shipping paper without change for multiple shipments of one or more hazardous materials having the same shipping name and identification number may retain a single copy of the shipping paper, instead of a copy for each shipment made, if the carrier also retains a record of each shipment made, to include shipping name, identification number, quantity transported, and date of shipment.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">554</p> <p data-bbox="65 331 348 363">Information for carriers</p> <p data-bbox="65 370 562 646">The consignor shall provide in the transport documents a statement regarding actions, if any that are required to be taken by the carrier. The statement shall be in the languages deemed necessary by the carrier or the authorities concerned, and shall include at least the following points:</p> <p data-bbox="65 652 562 928">(a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack or freight container, including any special stowage provisions for the safe dissipation of heat (see para. 565), or a statement that no such requirements are necessary;</p> <p data-bbox="65 935 466 1032">(b) Restrictions on the mode of transport or conveyance and any necessary routeing instructions;</p> <p data-bbox="65 1039 457 1110">(c) Emergency arrangements appropriate to the consignment.</p>			☑	DOT regulations do not contain this requirement, except for exclusive use shipments similar instructions are required.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">553</p> <p data-bbox="65 337 541 472">The declaration shall be made on the same transport document that contains the particulars of consignment listed in para. 546.</p>		<p data-bbox="1142 282 1325 315">176.27 (c) (2)</p> <p data-bbox="1058 337 1398 721">(2) The certification may appear on a shipping paper or on a separate document as a statement, such as “It is declared that the packing of the container has been carried out in accordance with the applicable provisions [of 49 CFR], [of the IMDG Code], or [of 49 CFR and the IMDG Code].”</p>	☑	DOT allows for separate documents, but SSR-6 requires the certification to be on the shipping document.
<p data-bbox="289 753 344 786">550</p> <p data-bbox="65 797 558 1040">If the dangerous goods documentation is presented to the carrier by means of electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques, the signature(s) may be replaced by the name(s) (in capitals) of the person authorized to sign.</p>			☑	DOT allows for EDI transmission of shipping papers only for rail shipments (see 172.201 and 172.204(a)(3); otherwise paperwork is required.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>534</p> <p>Each package that conforms to:</p> <p>(a) An IP-1, IP-2 or IP-3 design shall be legibly and durably marked on the outside of the packaging with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate.</p> <p>(b) A Type A package design shall be legibly and durably marked on the outside of the packaging with "TYPE A".</p> <p>(c) An IP-2, IP-3 or a Type A package design shall be legibly and durably marked on the outside of the packaging with the international vehicle registration code (VRI code) of the country of origin of design and either the name of the manufacturer or other identification of the packaging specified by the competent authority of the country of origin of design.</p>	<p>71.085 (c)</p> <p>Preliminary determinations.</p> <p>Before the first use of any packaging for the shipment of licensed material--</p> <p>(a) ...;</p> <p>(b) ...; and</p> <p>(c) The licensee shall conspicuously and durably mark the packaging with its model number, serial number, gross weight, and a package identification number assigned by NRC. Before applying the model number, the licensee shall determine that the packaging has been fabricated in accordance with the design approved by the Commission.</p>	<p>172.310 (b) (c)</p> <p>(b) Each industrial, Type A, Type B(U), or Type B(M) package must be legibly and durably marked on the outside of the packaging, in letters at least 13 mm (0.5 in) high, with the words "TYPE IP-1," "TYPE IP-2," "TYPE IP-3," "TYPE A," "TYPE B(U)" or "TYPE B(M)," as appropriate. A package which does not conform to Type IP-1, Type IP-2, Type IP-3, Type A, Type B(U) or Type B(M) requirements may not be so marked.</p> <p>(c) Each package which conforms to an IP-1, IP-2, IP-3 or a Type A package design must be legibly and durably marked on the outside of the packaging with the international vehicle registration code of the country of origin of the design. The international vehicle registration code for packages designed by a United States company or agency is the symbol "USA."</p>	<input checked="" type="checkbox"/>	<p>DOT specifies a size for package marking, but SSR-6 does not.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">532</p> <p>Each package shall be legibly and durably marked on the outside with the UN marking as specified in Table 9. Additionally, each overpack shall be legibly and durably marked with the word “OVERPACK” and the UN marking as specified in Table 9 unless all markings of the packages within the overpack are clearly visible.</p>		<p style="text-align: center;">172.301 (a) (i)</p> <p>(a) Proper shipping name and identification number. (1) Except as otherwise provided by this subchapter, each person who offers a hazardous material for transportation in a non-bulk packaging must mark the package with the proper shipping name and identification number (preceded by “UN”, “NA” or “ID,” as appropriate) for the material as shown in the §172.101 Hazardous Materials Table. The identification number marking preceded by “UN”, “NA”, or “ID” as appropriate must be marked in characters at least 12 mm (0.47 inches) high. Packages with a maximum capacity of 30 liters (8 gallons) or less, 30 kg (66 pounds) maximum net mass, or cylinders with a water capacity of 60 liters (16 gallons) or less must be marked with characters at least 6 mm (0.24 inches) high. Packages with a maximum capacity of 5 liters</p>	<input checked="" type="checkbox"/>	<p>DOT recently added a size requirement (12mm or 6mm depending on package size) for the UN identification number. The requirement is in transition until Jan 2017. The requirement was based on alignment with the 17th Revised Edition of the UN Model Regulations as well as to provide better communication for first responders.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

(1.32 gallons) or 5 kg (11 pounds) or less must be marked in a size appropriate for the size of the package.

(i) Transitional exception. For domestic transportation, until January 1, 2017, the identification number markings are not subject to the minimum size requirements specified in this paragraph (a)(1)

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">531</p> <p>Marking</p> <p>Each package shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, or both. Each overpack shall be legibly and durably marked on the outside of the overpack with an identification of either the consignor or consignee, or both unless these markings of all the packages within the overpack are clearly visible.</p>		<p style="text-align: center;">172.301 (d)</p> <p>(d) Consignee's or consignor's name and address. Each person who offers for transportation a hazardous material in a non-bulk package shall mark that package with the name and address of the consignor or consignee except when the package is--</p> <p>(1) Transported by highway only and will not be transferred from one motor carrier to another; or</p> <p>(2) Part of a carload lot, truckload lot or freight container load, and the entire contents of the rail car, truck or freight container are shipped from one consignor to one consignee.</p>	<input checked="" type="checkbox"/>	<p>SSR-6 does not contain the exception given in the DOT regulations for truck and rail if there is no transfer to additional carriers. Note that shippers generally mark addresses for the consignee and consignor as a best practice regardless of this exception.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">515</p> <p>REQUIREMENTS AND CONTROLS FOR TRANSPORT OF EXCEPTED PACKAGES</p> <p>Excepted packages shall be subject only to the following provisions in Sections V and VI:</p> <p>(a) The requirements specified in paras 503, 504, 505, 507-513, 516, 530-533, 545, 546 introductory sentence, 546(a) and (k), 550-553, 555, 556, 561, 564, 582 and 583;</p> <p>(b) The requirements for excepted packages specified in para. 622;</p> <p>(c) The requirements specified in paras 580 and 581, if transported by post. All relevant provisions of the other sections shall also apply to excepted packages. If the excepted package contains fissile material, para. 417 shall apply.</p>		<p style="text-align: center;">173.421 (a) (1)</p> <p>Excepted packages for limited quantities of Class 7 (radioactive) materials.</p> <p>(a) A Class 7 (radioactive) material with an activity per package which does not exceed the limited quantity package limits specified in Table 4 in Sec. 173.425, and its packaging, are excepted from requirements in this subchapter for specification packaging, labeling, marking (except for the UN identification number marking requirement described in Sec. 173.422(a)), and if not a hazardous substance or hazardous waste, shipping papers, and the requirements of this subpart if:</p> <p>(1) Each package meets the general design requirements of Sec. 173.410;</p>	☑	<p>DOT regulations do not include transportation by post in this section; see Section 347.2 of Publication 52 - Hazardous, Restricted, and Perishable Mail.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>510</p> <p>If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a qualified person shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package. The scope of the assessment shall include the package, the conveyance, the adjacent loading and unloading areas, and, if necessary, all other material that has been carried in the conveyance. When necessary, additional steps for the protection of persons, property and the environment, in accordance with provisions established by the relevant competent authority, shall be taken to overcome and minimize the consequences of such leakage or damage.</p>			<input checked="" type="checkbox"/>	<p>DOT provisions for handling leaking packages are found in the modal requirements. While the wording is not identical to the SSR-6 wording, the intent is the essentially the same. See 175.090 (air), 176.050 (rail) and 177.854 (hwy).</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>505</p> <p>Freight containers, IBCs, tanks, as well as other packagings and overpacks, used for the transport of radioactive material shall not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm² for all other alpha emitters.</p>		<p>173.443 (c)</p> <p>(c) Except as provided in paragraph (d) of this section, each transport vehicle used for transporting Class 7 (radioactive) materials as an exclusive use shipment that utilizes the provisions of paragraph (b) of this section must be surveyed with appropriate radiation detection instruments after each use. A vehicle may not be returned to service until the radiation dose rate at each accessible surface is 0.005 mSv per hour (0.5 mrem per hour) or less, and there is no significant removable (non-fixed) radioactive surface contamination as specified in paragraph (a) of this section.</p>	<input checked="" type="checkbox"/>	<p>SSR-6 provides decontamination criteria for freight containers, IBCs, tanks and other packagings and overpacks that have been used for radioactive material. The containers may be used for storage or transport of other materials once contamination levels are below the given levels. DOT provides criteria for return to service of a transport vehicle that has been previously dedicated to radioactive material shipments only, but does not have similar criteria for packagings.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">423</p> <p>Radioactive material that is enclosed in or is included as a component part of an instrument or other manufactured article, may be classified under UN 2911, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – INSTRUMENTS or ARTICLES, provided that:</p> <p>(a) The radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h.</p> <p>(b) Each instrument or article bears the marking “RADIOACTIVE” on its external surface except for the following:</p> <p>(i) Radioluminescent timepieces or devices do not require markings.</p> <p>(ii) Consumer products that have either received regulatory approval in accordance with para. 107(e) or do not individually exceed the activity limit for an exempt consignment in Table 2 (column 5) do not require markings, provided that such products are transported in a package that bears the marking “RADIOACTIVE” on its an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.</p> <p>(iii) Other instruments or articles too small to bear the marking “RADIOACTIVE” do not require markings,</p>		<p style="text-align: center;">173.424</p> <p>Excepted packages for radioactive instruments and articles.</p> <p>A radioactive instrument or article and its packaging are excepted from requirements in this subchapter for specification packaging, labeling, marking (except for the UN identification number marking requirement described in Sec. 173.422(a)), and if not a hazardous substance or hazardous waste, shipping papers and the requirements of this subpart if:</p> <p>(a) Each package meets the general design requirements of Sec. 173.410;</p> <p>(b) The activity of the instrument or article does not exceed the relevant limit listed in Table 4 in Sec. 173.425;</p> <p>(c) The total activity per package does not exceed the relevant limit listed in Table 4 in Sec. 173.425;</p>	<input checked="" type="checkbox"/>	<p>DOT does not have the requirements related to the "Radioactive" marking that SSR-6 requires for instruments and articles in paragraph 423 (b).</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

provided that they are transported in a package that bears the marking "RADIOACTIVE" on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article).

(d) The limits specified in columns 2 and 3 of Table 4 are met for each individual item and each package, respectively;

(e) For transport by post, the total activity in each excepted package shall not exceed one tenth of the relevant limits specified in column 3 of Table 4.

(d) The radiation level at 10 cm (4 in) from any point on the external surface of any unpackaged instrument or article does not exceed 0.1 mSv/hour (10 mrem/hour);

(e) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article);

(f) The radiation level at any point on the external surface of a package bearing the article or instrument does not exceed 0.005 mSv/hour (0.5 mrem/hour), or, for exclusive use domestic shipments, 0.02 mSv/hour (2 mrem/hour);

(g) The nonfixed (removable) radioactive surface contamination on the external surface of the package does not exceed the limits specified in Sec. 173.443(a);

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
		<p>(h) Except as provided in Sec. 173.426, the package does not contain more than 15 g of uranium-235; and</p> <p>(i) The package is otherwise prepared for shipment as specified in Sec. 173.422.</p>		
<p>416</p> <p>Low dispersible radioactive material Radioactive material may be classified as low dispersible radioactive material only if it meets the requirements of para. 605 taking into account the requirements of paras 665 and 802.</p>			<input checked="" type="checkbox"/>	<p>NRC and DOT regulations do not address low dispersible radioactive material.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">309</p> <p>NON-COMPLIANCE</p> <p>In the event of non-compliance with any limit in these Regulations applicable to radiation level or contamination:</p> <p>(a) The consignor, consignee, carrier and any organization involved during transport, who may be affected, as appropriate, shall be informed of the non-compliance by:</p> <p>(i) The carrier if the non-compliance is identified during transport; or</p> <p>(ii) The consignee if the non-compliance is identified at receipt.</p> <p>(b) The carrier, consignor or consignee, as appropriate, shall:</p> <p>(i) Take immediate steps to mitigate the consequences of the non-compliance;</p> <p>(ii) Investigate the non-compliance and its causes, circumstances and consequences;</p> <p>(iii) Take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of circumstances similar to those that led to the non-compliance;</p> <p>(iv) Communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken;</p> <p>(c) The communication of the non-compliance to the consignor and the</p>	<p style="text-align: center;">71.095 (a)</p> <p>(a) The licensee, after requesting the certificate holder's input, shall submit a written report to the Commission of—</p> <p>(1) Instances in which there is a significant reduction in the effectiveness of any NRC-approved Type B or Type AF packaging during use; or</p> <p>(2) Details of any defects with safety significance in any NRC-approved Type B or fissile material packaging, after first use.</p> <p>(3) Instances in which the conditions of approval in the Certificate of Compliance were not observed in making a shipment.</p>	<p style="text-align: center;">171.015 & 171.016</p> <p>171.015 Immediate notice of certain hazardous materials incidents.</p> <p>(a) General. As soon as practical but no later than 12 hours after the occurrence of any incident described in paragraph</p> <p>(b) of this section, each person in physical possession of the hazardous material must provide notice by telephone to the National Response Center (NRC) on 800-424-8802 (toll free) or 202-267-2675 (toll call) or online at http://www.nrc.uscg.mil. Each notice must include the following information:</p> <p>(1) Name of reporter;</p> <p>(2) Name and address of person represented by reporter;</p> <p>(3) Phone number where reporter can be contacted;</p> <p>(4) Date, time, and location of incident;</p> <p>(5) The extent of injury, if any;</p> <p>(6) Class or division, proper shipping name, and</p>	<input checked="" type="checkbox"/>	<p>NRC regulations address reporting related to non-compliances involving certificated packages. DOT regulations address reporting requirements for certain incidences involving hazardous materials transportation. Neither are identical to the SSR-6 requirements.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

relevant competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.

quantity of hazardous materials involved, if such information is available; and

(7) Type of incident and nature of hazardous material involvement and whether a continuing danger to life exists at the scene.

(b) Reportable incident. A telephone report is required whenever any of the following occurs during the course of transportation in commerce (including loading, unloading, and temporary storage):

(1) As a direct result of a hazardous material—

- (i) A person is killed;
- (ii) A person receives an injury requiring admittance to a hospital;
- (iii) The general public is evacuated for one hour or more;
- (iv) A major transportation artery or facility is closed or shut down for one hour or more; or
- (v) The operational flight pattern or routine of an aircraft is altered;

(2) Fire, breakage, spillage,

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

or suspected radioactive contamination occurs involving a radioactive material (see also §176.48 of this subchapter);

(3) Fire, breakage, spillage, or suspected contamination occurs involving an infectious substance other than a regulated medical waste;

(4) A release of a marine pollutant occurs in a quantity exceeding 450 L (119 gallons) for a liquid or 400 kg (882 pounds) for a solid;

(5) A situation exists of such a nature (e.g., a continuing danger to life exists at the scene of the incident) that, in the judgment of the person in possession of the hazardous material, it should be reported to the NRC even though it does not meet the criteria of paragraphs (b)(1), (2), (3) or (4) of this section; or

(6) During transportation by aircraft, a fire, violent rupture, explosion or

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

dangerous evolution of heat (i.e., an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a battery or battery-powered device.

(c) Written report. Each person making a report under this section must also make the report required by §171.16 of this subpart.

171.016 Detailed hazardous materials incident reports.

(a) General. Each person in physical possession of a hazardous material at the time that any of the following incidents occurs during transportation (including loading, unloading, and temporary storage) must submit a Hazardous Materials Incident Report on DOT Form F 5800.1 (01/2004) within 30 days of discovery of the incident:

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

- (1) Any of the circumstances set forth in §171.15(b);
- (2) An unintentional release of a hazardous material or the discharge of any quantity of hazardous waste;
- (3) A specification cargo tank with a capacity of 1,000 gallons or greater containing any hazardous material suffers structural damage to the lading retention system or damage that requires repair to a system intended to protect the lading retention system, even if there is no release of hazardous material;
- (4) An undeclared hazardous material is discovered; or
- (5) A fire, violent rupture, explosion or dangerous evolution of heat (i.e., an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

direct result of a battery or battery-powered device.

(b) Providing and retaining copies of the report. Each person reporting under this section must—

(1) Submit a written Hazardous Materials Incident Report to the Information Systems Manager, PHH-60, Pipeline and Hazardous Materials Safety Administration, Department of Transportation, East Building, 1200 New Jersey Ave., SE., Washington, DC 20590-0001, or an electronic Hazardous Material Incident Report to the Information System Manager, PHH-60, Pipeline and Hazardous Materials Safety Administration, Department of Transportation, Washington, DC 20590-0001 at <http://hazmat.dot.gov>;

(2) For an incident involving transportation by aircraft, submit a written or electronic copy of the Hazardous Materials Incident Report to the FAA

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

Security Field Office nearest the location of the incident; and

(3) Retain a written or electronic copy of the Hazardous Materials Incident Report for a period of two years at the reporting person's principal place of business. If the written or electronic Hazardous Materials Incident Report is maintained at other than the reporting person's principal place of business, the report must be made available at the reporting person's principal place of business within 24 hours of a request for the report by an authorized representative or special agent of the Department of Transportation.

(c) Updating the incident report. A Hazardous Materials Incident Report must be updated within one year of the date of occurrence of the incident whenever:

(1) A death results from injury caused by a hazardous

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

material;

- (2) There was a misidentification of the hazardous material or package information on a prior incident report;
- (3) Damage, loss or related cost that was not known when the initial incident report was filed becomes known; or
- (4) Damage, loss, or related cost changes by \$25,000 or more, or 10% of the prior total estimate, whichever is greater.

(d) Exceptions. Unless a telephone report is required under the provisions of §171.15 of this part, the requirements of paragraphs (a), (b), and (c) of this section do not apply to the following incidents:

- (1) A release of a minimal amount of material from—
 - (i) A vent, for materials for which venting is authorized;
 - (ii) The routine operation of a seal, pump, compressor, or valve; or
 - (iii) Connection or disconnection of loading or

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

unloading lines, provided that the release does not result in property damage.

(2) An unintentional release of a hazardous material when:

(i) The material is—

(A) A limited quantity material packaged under authorized exceptions in the §172.101 Hazardous Materials Table of this subchapter excluding Class 7 (radioactive) material; or

(B) A Packing Group III material in Class or Division 3, 4, 5, 6.1, 8, or 9;

(ii) The material is released from a package having a capacity of less than 20 liters (5.2 gallons) for liquids or less than 30 kg (66 pounds) for solids;

(iii) The total amount of material released is less than 20 liters (5.2 gallons) for liquids or less than 30 kg (66 pounds) for solids; and

(iv) The material is not—

(A) Offered for transportation or transported by aircraft;

(B) A hazardous waste; or

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
		<p>(C) An undeclared hazardous material; (3) An undeclared hazardous material discovered in an air passenger's checked or carry-on baggage during the airport screening process. (For discrepancy reporting by carriers, see §175.31 of this subchapter.)</p>		
<p>307 COMPLIANCE ASSURANCE The competent authority shall assure compliance with these Regulations.</p>		<p>171.8 "Competent Authority" means a national agency responsible under its national law for the control or regulation of a particular aspect of the transportation of hazardous materials (dangerous goods.)....</p>	<input checked="" type="checkbox"/>	<p>DOT does not define "compliance assurance" but does assign the responsibility to the competent authority.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">306</p> <p data-bbox="65 375 352 407">MANAGEMENT SYSTEM</p> <p data-bbox="65 412 562 691">A management system based on international, national or other standards acceptable to the competent authority shall be established and implemented for all activities within the scope of the Regulations, as identified in para. 106, to ensure compliance with the relevant provisions of these Regulations. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared:</p> <p data-bbox="65 712 558 800">(a) To provide facilities for inspection during manufacture and use;</p> <p data-bbox="65 821 527 1049">(b) To demonstrate compliance with these Regulations to the competent authority.</p> <p data-bbox="65 1053 541 1154">Where competent authority approval is required, such approval shall take into account and be contingent upon the</p>	<p data-bbox="722 282 898 355">71.037 71 Subpart H</p> <p data-bbox="590 375 814 407">Quality assurance.</p> <p data-bbox="590 412 1014 656">(a) The applicant shall describe the quality assurance program (see Subpart H of this part) for the design, fabrication, assembly, testing, maintenance, repair, modification, and use of the proposed package.</p> <p data-bbox="590 660 1020 904">(b) The applicant shall identify any specific provisions of the quality assurance program that are applicable to the particular package design under consideration, including a description of the leak testing procedures.</p>	<p data-bbox="1173 282 1289 315">173.474</p> <p data-bbox="1058 375 1373 443">Quality control for construction of packaging.</p> <p data-bbox="1058 448 1409 618">Prior to the first use of any packaging for the shipment of Class 7 (radioactive) material, the offeror shall determine that--</p> <p data-bbox="1058 623 1379 797">(a) The packaging meets the quality of design and construction requirements as specified in this subchapter; and</p> <p data-bbox="1058 802 1394 1045">(b) The effectiveness of the shielding, containment and, when required, the heat transfer characteristics of the package, are within the limits specified for the package design.</p>	<input checked="" type="checkbox"/>	<p data-bbox="1654 282 1986 891">The term “Management System” is now used in the international regulations instead of “Quality Assurance”. Although the definition differs from the definition of Quality Assurance in TS-R-1 the intent appears to be the same. “Quality Assurance” is not found in the definitions in 10 CFR 71.4 or 49 CFR 171.8; however, Quality Assurance is addressed in detail in 10 CFR Part 71, Subpart H.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>305</p> <p>Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of an accident.</p>			☑	<p>DOT regulations do not contain these words, however, the Emergency Response Guidebook (to which DOT is a contributor and is often used to obtain the information required in Subpart G) does consider formation of dangerous substances.</p>
<p>304</p> <p>EMERGENCY RESPONSE</p> <p>In the event of accidents or incidents during the transport of radioactive material, emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. Appropriate guidelines for such provisions are contained in Ref. [4].</p>			☑	<p>DOT regulations address emergency response information to be provided by the shipper to the carrier (subpart G), but do not address the response itself.</p>
<p>243</p> <p>Through or into</p> <p>Through or into shall mean through or into the countries in which a consignment is transported but specifically excludes countries over which a consignment is carried by air, provided that there are no scheduled stops in those countries.</p>			☑	<p>NRC and DOT regulations do not include this definition.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p data-bbox="289 282 344 315">228</p> <p data-bbox="65 337 562 574">Management system Management system shall mean a set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner.</p>	<p data-bbox="743 282 877 315">71.101 (a)</p> <p data-bbox="590 337 1020 1185">Quality assurance requirements. (a) Purpose. This subpart describes quality assurance requirements applying to design, purchase, fabrication, handling, shipping, storing, cleaning, assembly, inspection, testing, operation, maintenance, repair, and modification of components of packaging that are important to safety. As used in this subpart, "quality assurance" comprises all those planned and systematic actions necessary to provide adequate confidence that a system or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to control of the physical characteristics and quality of the material or component to predetermined requirements.</p>	<p data-bbox="1178 282 1289 315">173.403</p> <p data-bbox="1058 337 1409 688">Quality assurance means a systematic program of controls and inspections applied by each person involved in the transport of radioactive material which provides confidence that a standard of safety prescribed in this subchapter is achieved in practice.</p>	<input checked="" type="checkbox"/>	<p data-bbox="1644 282 1986 889">The term "Management System" is now used in the international regulations instead of "Quality Assurance". Although the definition differs from the definition of Quality Assurance in TS-R-1 the intent appears to be the same. "Quality Assurance" is not found in the definitions in 10 CFR 71.4 or 49 CFR 171.8; however, Quality Assurance is addressed in detail in 10 CFR Part 71, Subpart H.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>225</p> <p>Low dispersible radioactive material Low dispersible radioactive material shall mean either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.</p>			☑	<p>NRC and DOT regulations do not address low dispersible radioactive material.</p>
<p>223</p> <p>Freight container – small, large Freight container shall mean an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or other modes of transport, without intermediate reloading, designed to be secured and/or readily handled, having fittings for these purposes. The term "freight container" does not include the vehicle.</p> <p>A small freight container shall mean a freight container that has an internal volume of not more than 3 m³. A large freight container shall mean a freight container that has an internal volume of more than 3 m³.</p>		<p>171.008</p> <p>Freight container means a reusable container having a volume of 64 cubic feet or more, designed and constructed to permit being lifted with its contents intact and intended primarily for containment of packages (in unit form) during transportation.</p>	☑	<p>SSR-6 defines large and small freight containers; DOT does not separate into categories. The volumes are not equivalent; 3 cu m = 106 cu ft & 64 cu ft = 1.8 cu m</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p align="center">222</p> <p>Fissile nuclides and fissile material Fissile nuclides shall mean uranium-233, uranium-235, plutonium-239 and plutonium-241. Fissile material shall mean a material containing any of the fissile nuclides. Excluded from the definition of fissile material are the following:</p> <ul style="list-style-type: none"> (a) Natural uranium or depleted uranium that is unirradiated and; (b) Natural uranium or depleted uranium that has been irradiated in thermal reactors only; (c) Material with fissile nuclides less than a total of 0.25g; (d) Any combination of (a), (b) and/or (c). <p>These exclusions are only valid if there is no other material with fissile nuclides in the package or in the consignment if shipped unpackaged.</p>	<p align="center">71.004.15</p> <p>Fissile material means the radionuclides uranium-233, uranium-235, plutonium-239, and plutonium-241, or any combination of these radionuclides. Fissile material means the fissile nuclides themselves, not material containing fissile nuclides. Unirradiated natural uranium and depleted uranium and natural uranium or depleted uranium, that has been irradiated in thermal reactors only, are not included in this definition. Certain exclusions from fissile material controls are provided in Sec. 71.15.</p>	<p align="center">173.403</p> <p>Fissile material means plutonium\239\, plutonium\241\, uranium\233\, uranium\235\, or any combination of these radionuclides. This term does not apply to material containing fissile nuclides, unirradiated natural uranium and unirradiated depleted uranium, or to natural uranium or depleted uranium that has been irradiated in thermal reactors only.</p>	<p align="center">☑</p>	<p>The definitions of fissile nuclides and fissile materials differ slightly in the international and domestic regulations. The domestic regulations state that fissile material means the fissile nuclides themselves, not the material containing fissile nuclides. SSR-6 includes the statement that “Fissile material shall mean a material containing any of the fissile nuclides.” Exclusions for natural and depleted uranium are found in all three sets of regulations; however, SSR-6 contains an exception for fissile nuclides less than 0.25 grams. That exception is not found in the NRC or DOT regulations.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>221</p> <p>Exclusive use Exclusive use shall mean the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading and shipment are carried out in accordance with the directions of the consignor or consignee, where so required by these Regulations.</p>	<p>71.004.14</p> <p>Exclusive use means the sole use by a single consignor of a conveyance for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee. The consignor and the carrier must ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor must issue specific instructions, in writing, for maintenance of exclusive use shipment controls, and include them with the shipping paper information provided to the carrier by the consignor.</p>	<p>173.403</p> <p>Exclusive use means sole use by a single consignor of a conveyance for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee. The consignor and the carrier must ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor must provide to the initial carrier specific written instructions for maintenance of exclusive use shipment controls, including the vehicle survey requirement of Sec. 173.443 (c) as applicable, and include these instructions with the shipping paper information provided to the carrier by the consignor.</p>	<input checked="" type="checkbox"/>	<p>For exclusive use shipments, NRC & DOT regulations include more requirements for the consignor and carrier than does SSR-6, including that personnel must have radiological training and appropriate resources.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p style="text-align: center;">220</p> <p>Design Design shall mean the description of fissile material excepted under para. 417 (f), special form radioactive material, low dispersible radioactive material, package or packaging that enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.</p>		<p style="text-align: center;">173.403</p> <p>Design means the description of a special form Class 7 (radioactive) material, a package, packaging, or LSA-III, that enables those items to be fully identified. The description may include specifications, engineering drawings, reports showing compliance with regulatory requirements, and other relevant documentation.</p>	☑	<p>The SSR-6 definition for design includes "low dispersible radioactive material" which is not included in DOT or NRC regulations.</p>
<p style="text-align: center;">212</p> <p>Consignor Consignor shall mean any person, organization or government that prepares a consignment for transport.</p>			☑	<p>NRC and DOT do not define consignor, but use the term. They do define "consignee".</p>
<p style="text-align: center;">209</p> <p>Confinement system Confinement system shall mean the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety.</p>			☑	<p>NRC and DOT do not define a confinement system.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>107 (f)</p> <p>These Regulations do not apply to any of the following:</p> <p>(a) ...</p> <p>(b) ...</p> <p>(c)</p> <p>(d)</p> <p>(e)</p> <p>(f) Natural material and ores containing naturally occurring radionuclides, which may have been processed, provided the activity concentration of the material does not exceed 10 times the values specified in Table 2, or calculated in accordance with paras 403(a) and 404 - 407. For natural materials and ores containing naturally occurring radionuclides that are not in secular equilibrium the calculation of the activity concentration shall be performed in accordance with para. 405;</p> <p>(g)</p>		<p>173.401 (b) (4)</p> <p>(4) Natural material and ores containing naturally occurring radionuclides which are not intended to be processed for use of these radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in Sec. 173.436.</p>	<input checked="" type="checkbox"/>	<p>SSR-6 does not include the limitation found in DOT regulations that the materials "are not intended to be processed for use of these nuclides".</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
<p>107 (d)</p> <p>These Regulations do not apply to any of the following:</p> <ul style="list-style-type: none"> (a) ... (b) ... (c) (d) Radioactive material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of radioactive material or to contamination; (e) ... (f) ... (g)... 			<input checked="" type="checkbox"/>	<p>Subparagraph 107(d) is an exception for radioactive material in or on a person who is to be transported for medical treatment because of accidental or deliberate intake or contamination. (Note that subparagraph (c) and 49 CFR 173.401 provide an exception for radioactive materials implanted into people or animals for diagnosis or treatment, but in paragraph (d), the radioactive material is not for medical use.) NRC and DOT regulations do not provide this exception.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	
	<p align="center">71.097</p> <p>Advance notification of shipment of irradiated reactor fuel and nuclear waste.</p> <p>(a) (1) As specified in paragraphs (b), (c) and (d) of this section, each licensee shall provide advance notification to the governor of a State, or the governor's designee, of the shipment of licensed material, within or across the boundary of the State, before the transport, or delivery to a carrier, for transport, of licensed material outside the confines of the licensee's plant or other place of use or storage.</p> <p>(2) As specified in paragraphs (b), (c), and (d) of this section, after June 11, 2013, each licensee shall provide advance notification to the Tribal official of participating Tribes referenced in paragraph (c) (3) (iii) of this section, or the official's designee, of the shipment of licensed material, within or across the boundary of the Tribe's reservation, before the transport, or delivery to a carrier, for transport, of licensed material outside the confines of the licensee's plant or other place of use or storage.</p>		☑	<p>SSR-6 requires multilateral approval for shipments of certain quantities (different from the NRC requirement) in Paragraph 825.</p>

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

(b) Advance notification is also required under this section for shipment of licensed material, other than irradiated fuel, meeting the following three conditions:

(1) The licensed material is required by this part to be in Type B packaging for transportation;

(2) The licensed material is being transported to or across a State boundary en route to a disposal facility or to a collection point for transport to a disposal facility; and

(3) The quantity of licensed material in a single package exceeds the least of the following:

(i) 3000 times the A1 value of the radionuclides as specified in appendix A, Table A-1 for special form radioactive material;

(ii) 3000 times the A2 value of the radionuclides as specified in appendix A, Table A-1 for normal form radioactive material; or

(iii) 1000 TBq (27,000 Ci).

(c) Procedures for submitting advance notification. (1) The notification must be made in writing to:

(i) The office of each appropriate governor or governor's designee;

(ii) The Office of each appropriate Tribal official or Tribal official's

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

designee; and
 (iii) The Director, Division of Security Policy, Office of Nuclear Security and Incident Response.
 (2) A notification delivered by mail must be postmarked at least 7 days before the beginning of the 7-day period during which departure of the shipment is estimated to occur.
 (3) A notification delivered by any other means than mail must reach the office of the governor or of the governor's designee or the Tribal official or Tribal official's designee at least 4 days before the beginning of the 7-day period during which departure of the shipment is estimated to occur.
 (i) A list of the names and mailing addresses of the governors' designees receiving advance notification of transportation of nuclear waste was published in the Federal Register on June 30, 1995 (60 FR 34306).
 (ii) The list of governor's designees and Tribal official's designees of participating Tribes will be published annually in the Federal Register on or about June 30 to reflect any changes in information.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

(iii) A list of the names and mailing addresses of the governors' designees and Tribal officials' designees of participating Tribes is available on request from the Director, Division of Intergovernmental Liaison and Rulemaking, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

(4) The licensee shall retain a copy of the notification as a record for 3 years.

(d) Information to be furnished in advance notification of shipment. Each advance notification of shipment of irradiated reactor fuel or nuclear waste must contain the following information:

(1) The name, address, and telephone number of the shipper, carrier, and receiver of the irradiated reactor fuel or nuclear waste shipment;

(2) A description of the irradiated reactor fuel or nuclear waste contained in the shipment, as specified in the regulations of DOT in 49 CFR 172.202 and 172.203(d);

(3) The point of origin of the shipment and the 7-day period

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

during which departure of the shipment is estimated to occur;

(4) The 7-day period during which arrival of the shipment at State boundaries or Tribal reservation boundaries is estimated to occur;

(5) The destination of the shipment, and the 7-day period during which arrival of the shipment is estimated to occur; and

(6) A point of contact, with a telephone number, for current shipment information.

(e) Revision notice. A licensee who finds that schedule information previously furnished to a governor or governor's designee or a Tribal official or Tribal official's designee, in accordance with this section, will not be met, shall telephone a responsible individual in the office of the governor of the State or of the governor's designee or the Tribal official or the Tribal official's designee and inform that individual of the extent of the delay beyond the schedule originally reported. The licensee shall maintain a record of the name of the individual contacted for 3 years.

(f) Cancellation notice. (1) Each licensee who cancels an irradiated reactor fuel or nuclear waste

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

shipment for which advance notification has been sent shall send a cancellation notice to the governor of each State or to the governor's designee previously notified, each Tribal official or to the Tribal official's designee previously notified, and to the Director, Division of Security Policy, Office of Nuclear Security and Incident Response.

(2) The licensee shall state in the notice that it is a cancellation and identify the advance notification that is being canceled. The licensee shall retain a copy of the notice as a record for 3 years.

173.428 (e)

Any labels previously applied in conformance with subpart E of part 172 of this subchapter are removed, obliterated, or covered and the "Empty" label prescribed in Sec. 172.450 of this subchapter is affixed to the packaging;



SSR-6 does not require an "Empty" label.

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

172.312

(a) Except as provided in this section, each non-bulk combination package having inner packagings containing liquid hazardous materials, single packaging fitted with vents, or open cryogenic receptacle intended for the transport of refrigerated liquefied gases must be:

- (1) Packed with closures upward, and
- (2) Legibly marked with package orientation markings that are similar to the illustration shown in this paragraph, on two opposite vertical sides of the package with the arrows pointing in the correct upright direction. The arrows must be either black or red on white or other suitable contrasting background and commensurate with the size of the package. Depicting a rectangular border around the arrows is optional.

(b) Arrows for purposes other than indicating proper package orientation may not be displayed on a package



Orientation arrows are not required by SSR-6; note that Class 7 packages are excepted in 172.312 (c) (7).

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

containing a liquid hazardous material.

(c) The requirements of paragraph (a) of this section do not apply to—

(1) A non-bulk package with inner packagings which are cylinders.

(2) Except when offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of 1 L or less prepared in accordance with §173.150 (b) or (c) of this subchapter.

(3) When offered or intended for transportation by aircraft, packages containing liquid hazardous materials in inner packagings of 120 mL (4 fluid oz.) or less when packed with sufficient absorption material between the inner and outer packagings to completely absorb the liquid contents.

(4) Liquids contained in manufactured articles (e.g., alcohol or mercury in thermometers) which are leak-tight in all orientations.

(5) A non-bulk package

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	N	

with hermetically sealed inner packagings not exceeding 500 mL each.

(6) Packages containing liquid infectious substances in primary receptacles not exceeding 50 mL (1.7 oz.).

(7) Class 7 radioactive material in Type A, IP-2, IP-3, Type B(U), or Type B(M) packages.

APPENDIX D

Other Notations of differences between IAEA SSR-6 Regulations and NRC and DOT Regulations

Note:

The “Other Notations” report may be viewed by clicking on the "Reports" tab in the Access navigation bar on the left-hand side of the screen.

To run the report, double click on the report name: IAEA_NRC_DOT_No_Checks. This will open the report in "print preview" mode. To print the report, go to File=>Print on the menu bar once the report is shown on the screen. To save the report to an Adobe PDF file, go to “Print Preview.” Under the *Data* tab, choose either the *PDF* or *XPS* icon. This will allow the report to be saved as an Adobe PDF file.

IAEA, NRC, and DOT Regulation Comparison Report

SSR-6	10CRF71	49CFR	Differences	Regulation Comparison
Citation Text	Citation Text	Citation Text	VS S N	
<p style="text-align: center; color: #4F81BD; font-weight: bold;">829</p> <p>APPROVAL FOR SHIPMENTS UNDER SPECIAL ARRANGEMENT</p> <p>Each consignment transported under special arrangement shall require multilateral approval.</p>		<p style="text-align: center; color: #4F81BD; font-weight: bold;">172.101 Special Provisions, 139</p> <p>Use of the “special arrangement” proper shipping names for international shipments must be made under an IAEA Certificate of Competent Authority issued by the Associate Administrator in accordance with the requirements in §173.471, §173.472, or §173.473 of this subchapter. Use of these proper shipping names for domestic shipments may be made only under a DOT special permit, as defined in, and in accordance with the</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>DOT does not define "special arrangement" but does have a special provision (#139) related to the radioactive material proper shipping name for materials shipped under special arrangement which is essentially the same as the SSR-6 definition.</p>
<p style="text-align: center; color: #4F81BD; font-weight: bold;">731</p> <p>Water leakage test for packages containing fissile material</p> <p>Packages for which water in-leakage or out-leakage to the extent that results in greatest reactivity has been assumed for purposes of assessment under paras 680–685 shall be excepted from the test.</p>	<p style="text-align: center; color: #4F81BD; font-weight: bold;">71.073 (c)(5)</p> <p>Immersion—fissile material. For fissile material subject to §71.55, in those cases where water inleakage has not been assumed for criticality analysis, immersion under a head of water of at least 0.9 m (3 ft) in the attitude for which maximum leakage is expected.</p>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<p>SSR-6 states the exception in the positive and NRC states it in the negative, but the meaning is equivalent.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p align="center">710</p> <p>Leaching and volumetric leakage assessment methods</p> <p>For specimens that comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:</p> <p>(a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6–8 and a maximum conductivity of 1 mS/m at 20°C.</p> <p>(b) The water with the specimen shall then be heated to a temperature of 50 ± 5 °C and maintained at this temperature for 4 h.</p> <p>(c) The activity of the water shall then be determined.</p> <p>(d) The specimen shall then be kept for at least 7 days in still air at not less than 30°C and with a relative humidity of not less than 90%.</p> <p>(e) The specimen shall then be immersed in water of the same specification as in (a) and the water with the specimen heated to 50 ± 5 °C and maintained at this temperature for 4 h.</p>	<p align="center">71.075 (c) (1)</p> <p>(c) Leaching assessment methods.</p> <p>(1) For indispersible solid material--</p> <p>(i) The specimen must be immersed for 7 days in water at ambient temperature. The water must have a pH of 6-8 and a maximum conductivity of 10 micromho per centimeter at 20° (68°F);</p> <p>(ii) The water with specimen must then be heated to a temperature of 50°C ± 5°C (122°F±9°F) and maintained at this temperature for 4 hours.</p> <p>(iii) The activity of the water must then be determined;</p> <p>(iv) The specimen must then be stored for at least 7 days in still air of relative humidity not less than 90 percent at 30°C (86°F);</p> <p>(v) The specimen must then be immersed in water under the same conditions as in paragraph (c)(1)(i) of this section, and the water with specimen must be heated to 50°C ± 5°C (122°F ± 9°F) and maintained at that temperature for 4 hours;</p> <p>(vi) The activity of the water must then be determined. The sum of the activities determined here and in paragraph (c)(1)(iii) of this</p>	<p align="center">173.469 (c) (1)</p> <p>(c) Leaching assessment methods.</p> <p>(1) For indispersible solid material--</p> <p>(i) The specimen shall be immersed for seven days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the seven day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m (10 micromho/cm) at 20 [deg]C (68 [deg]F).</p> <p>(ii) The water with specimen must then be heated to a temperature of 50 [deg]C 5[deg] (122 [deg]F 9[deg]) and maintained at this temperature for four hours.</p> <p>(iii) The activity of the water must then be determined.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 gives the assessment procedure in paragraph 710, but the criteria are found elsewhere. For special form materials, the criteria is in paragraph 603(c) and is the same as for NRC & DOT, 2kBq.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p>(f) The activity of the water shall then be determined.</p>	<p>section must not exceed 2 kilobecquerels (kBq) (0.05 microcurie ([mu]Ci)).</p> <p>(2) For encapsulated material--</p> <p>(i) The specimen must be immersed in water at ambient temperature. The water must have a pH of 6-8 and a maximum conductivity of 10 micromho per centimeter;</p> <p>(ii) The water and specimen must be heated to a temperature of 50°C ± 5°C (122°F± 9°F) and maintained at this temperature for 4 hours;</p> <p>(iii) The activity of the water must then be determined;</p> <p>(iv) The specimen must then be stored for at least 7 days in still air at a temperature of 30°C (86°F) or greater;</p> <p>(v) The process in paragraph (c)(2)(i), (ii), and (iii) of this section must be repeated; and</p> <p>(vi) The activity of the water must then be determined. The sum of the activities determined here and in paragraph (c)(2)(iii) of this section must not exceed 2 kilobecquerels (kBq) (0.05 microcurie ([mu]Ci)).</p>	<p>(iv) The specimen shall then be kept for at least seven days in still air at not less than 30 [deg]C (86 [deg]F) and relative humidity not less than 90%.</p> <p>(v) The specimen must then be immersed in water under the same conditions as in paragraph (c)(1)(i) of this section, and the water with specimen must be heated to 50 C 5[deg] (122 [deg]F 9[deg]) and maintained at that temperature for four hours.</p> <p>(vi) The activity of the water must then be determined. The activities determined in paragraph (c)(1)(iii) of this section and this paragraph, (c)(1)(vi), may not exceed 2 kilobecquerels (0.05 microcurie).</p>				

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p align="center">702</p> <p>After the specimen, prototype or sample has been subjected to the tests, appropriate methods of assessment shall be used to ensure that the requirements of this section have been fulfilled in compliance with the performance and acceptance standards prescribed in Section VI.</p>	<p align="center">71.071 (a)</p> <p>(a) Evaluation. Evaluation of each package design under normal conditions of transport must include a determination of the effect on that design of the conditions and tests specified in this section. Separate specimens may be used for the free drop test, the compression test, and the penetration test, if each specimen is subjected to the water spray test before being subjected to any of the other tests.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>The wording of these regulations is different, but the intent is the same. Also, other sections of NRC and DOT regulations (e.g. special form testing) have a similar intent.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p style="text-align: center;">576</p> <p>The transport of consignments by means of a special use vessel that, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in para. 566 provided that the following conditions are met:</p> <p>(a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call.</p> <p>(b) Stowage arrangements shall be predetermined for the whole voyage, including any consignments to be loaded at ports of call en route.</p> <p>(c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.</p>		<p style="text-align: center;">176.704 (f)</p> <p>(f) The limitations specified in paragraphs (a) through (c) of this section do not apply when the entire vessel is reserved or chartered for use by a single offeror under exclusive use conditions if--</p> <p>(1) The number of packages of fissile Class 7 (radioactive) material satisfies the individual package CSI limits of Sec. 173.457 of this subchapter, except that the total sums of CSI's in the last column of Table IIIB of this section, including table note (d) apply;</p> <p>(2) A radiation protection program for the shipment has been established and approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call;</p> <p>(3) Stowage arrangements have been predetermined for the whole voyage, including any consignments</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Modal regulation (e.g., IATA) have further restrictions.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

to be loaded at ports of call;
 (4) The loading, transport and unloading are to be supervised by persons qualified in the transport of radioactive material; and
 (5) The entire shipment operation is approved by the Associate Administrator in advance.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p style="text-align: center;">571</p> <p>Additional requirements relating to transport and storage in transit of fissile material</p> <p>Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels shown in Figs 2-5, or carrying consignments under exclusive use, shall display the placard shown in Fig. 6 on each of:</p> <p>(a) The two external lateral walls in the case of a rail vehicle;</p> <p>(b) The two external lateral walls and the external rear wall in the case of a road vehicle.</p> <p>In the case of a vehicle without sides, the placards may be affixed directly on the cargo carrying unit provided that they are readily visible; in the case of large tanks or freight containers, the placards on the tanks or freight containers shall suffice. In the case of vehicles that have insufficient area to allow the fixing of larger placards, the dimensions of the placard described in Fig. 6 may be reduced to 100 mm. Any placards that do not relate to the contents shall be removed.</p>		<p style="text-align: center;">172.504 (a)</p> <p>(a) General. Except as otherwise provided in this subchapter, each bulk packaging, freight container, unit load device, transport vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in tables 1 and 2 of this section and in accordance with other placarding requirements of this subpart, including the specifications for the placards named in the tables and described in detail in Sec. Sec. 172.519 through 172.560.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>A recent DOT interpretation calls for placarding a vehicle AND bulk packaging or freight container.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p data-bbox="289 285 344 315">238</p> <p data-bbox="67 376 315 406">Special arrangement</p> <p data-bbox="67 412 537 620">Special arrangement shall mean those provisions, approved by the competent authority, under which consignments that do not satisfy all the applicable requirements of these Regulations may be transported.</p>		<p data-bbox="1125 285 1335 354">172.101 Special Provisions, 139</p> <p data-bbox="1058 376 1402 1010">Use of the “special arrangement” proper shipping names for international shipments must be made under an IAEA Certificate of Competent Authority issued by the Associate Administrator in accordance with the requirements in §173.471, §173.472, or §173.473 of this subchapter. Use of these proper shipping names for domestic shipments may be made only under a DOT special permit, as defined in, and in accordance with the</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p data-bbox="1663 292 1982 639">DOT does not define "special arrangement" but does have a special provision (#139) related to the radioactive material proper shipping name for materials shipped under special arrangement which is essentially the same as the SSR-6 definition.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p align="center">224</p> <p>Intermediate bulk container Intermediate bulk container (IBC) shall mean a portable packaging that: (a) Has a capacity of not more than 3 m3; (b) Is designed for mechanical handling; and (c) Is resistant to the stresses produced in handling and transport, as determined by tests.</p>		<p align="center">171.008</p> <p>Intermediate bulk container or IBC means a rigid or flexible portable packaging, other than a cylinder or portable tank, which is designed for mechanical handling. Standards for IBCs manufactured in the United States are set forth in subparts N and O of part 178 of this subchapter.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>The same volume capacity of 3 cu m is found in the definition of "body" related to IBC requirements in subpart N, 178.700.</p>
<p align="center">107 (e)</p> <p>These Regulations do not apply to any of the following: (a) ... (b) ... (c) ... (d) ... (e) Radioactive material in consumer products that have received regulatory approval, following their sale to the end user; (f) ... (g)...</p>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Subparagraph 107(e) is an exception for radioactive material in consumer products after sale to the end user. While DOT regulations do not state the exception in the same manner, the same results are obtained via 49 CFR 171.1, which states that the DOT regulations apply to materials in commerce.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
<p>107 (b)</p> <p>These Regulations do not apply to any of the following:</p> <p>(a)</p> <p>(b) Radioactive material moved within an establishment that is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;</p> <p>(c) ...</p> <p>(d) ...</p> <p>(e) ...</p> <p>(f) ...</p> <p>(g)...</p>	<p>71.005 (a)</p> <p>(a) Each licensee who transports licensed material outside the site of usage, as specified in the NRC license, or where transport is on public highways, or who delivers licensed material to a carrier for transport, shall comply with the applicable requirements of the DOT regulations in 49 CFR parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport.</p> <p>(1) The licensee shall particularly note DOT regulations in the following areas:</p> <p>(i) Packaging—49 CFR part 173: subparts A, B, and I.</p> <p>(ii) Marking and labeling—49 CFR part 172: subpart D; and §§ 172.400 through 172.407 and §§ 172.436 through 172.441 of subpart E.</p> <p>(iii) Placarding—49 CFR part 172: subpart F, especially §§ 172.500 through 172.519 and 172.556; and appendices B and C.</p> <p>(iv) Accident reporting—49 CFR part 171: §§ 171.15 and 171.16.</p> <p>(v) Shipping papers and emergency information—49 CFR part 172: subparts C and G.</p> <p>(vi) Hazardous material employee</p>	<p>173.401 (b) (1)</p> <p>(b) This subpart does not apply to:</p> <p>(1) Class 7 (radioactive) materials produced, used, transported, or stored within an establishment other than during the course of transportation, including storage in transportation.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>Subparagraph 107(d) is an exception for radioactive material in or on a person who is to be transported for medical treatment because of accidental or deliberate intake or contamination. (Note that subparagraph (c) and 49 CFR 173.401 provide an exception for radioactive materials implanted into people or animals for diagnosis or treatment, but in SSR paragraph 107(d), the radioactive material is from contamination, not from medical use.) NRC and DOT regulations do not provide this exception.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p>training—49 CFR part 172: subpart H.</p> <p>(vii) Security plans—49 CFR part 172: subpart I.</p> <p>(viii) Hazardous material shipper/carrier registration—49 CFR part 107: subpart G.</p> <p>(2) The licensee shall also note DOT regulations pertaining to the following modes of transportation:</p> <p>(i) Rail—49 CFR part 174: subparts A through D and K.</p> <p>(ii) Air—49 CFR part 175.</p> <p>(iii) Vessel—49 CFR part 176: subparts A through F and M.</p> <p>(iv) Public Highway—49 CFR part 177 and parts 390 through 397.</p>					

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.000 (g)

(g) This part also gives notice to all persons who knowingly provide to any licensee, certificate holder, quality assurance program approval holder, applicant for a license, certificate, or quality assurance program approval, or to a contractor, or subcontractor of any of them, components, equipment, materials, or other goods or services, that relate to a licensee's, certificate holder's, quality assurance program approval holder's, or applicant's activities subject to this part, that they may be individually subject to NRC enforcement action for violation of Sec. 71.8.

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.023

General license: Plutonium beryllium special form material.

(a) A general license is issued to any licensee of the Commission to transport fissile material in the form of plutonium-beryllium (Pu-Be) special form sealed sources, or to deliver Pu-Be sealed sources to a carrier for transport, if the material is shipped in accordance with this section. This material need not be contained in a package which meets the standards of subparts E and F of this part; however, the material must be contained in a Type A package. The Type A package must also meet the DOT requirements of 49 CFR 173.417(a).

(b) The general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of subpart H of this part.

(c) The general license applies only when a package's contents:

(1) Contain no more than a Type A quantity of radioactive material; and

(2) Contain less than 1000 g of plutonium, provided that: plutonium-239, plutonium-241, or any combination of these

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

radionuclides, constitutes less than 240 g of the total quantity of plutonium in the package.

(d) The general license applies only to packages labeled with a CSI which:

(1) Has been determined in accordance with paragraph (e) of this section;

(2) Has a value less than or equal to 100; and

(3) For a shipment of multiple packages containing Pu-Be sealed sources, the sum of the CSIs must be less than or equal to 50 (for shipment on a nonexclusive use conveyance) and less than or equal to 100 (for shipment on an exclusive use conveyance).

(e)(1) The value for the CSI must be greater than or equal to the number calculated by the following equation: $CSI = \frac{\text{grams of Pu}}{\text{grams of Pu} + 239.046625}$; and

(2) The calculated CSI must be rounded up to the first decimal place.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.000 (d)

(d)(1) Exemptions from the requirement for license in Sec. 71.3 are specified in Sec. 71.14. General licenses for which no NRC package approval is required are issued in Sec. 71.20 through 71.23. The general license in Sec. 71.17 requires that an NRC certificate of compliance or other package approval be issued for the package to be used under this general license.

(2) Application for package approval must be completed in accordance with subpart D of this part, demonstrating that the design of the package to be used satisfies the package approval standards contained in subpart E of this part, as related to the tests of subpart F of this part.

(3) A licensee transporting licensed material, or delivering licensed material to a carrier for transport, shall comply with the operating control requirements of subpart G of this part; the quality assurance requirements of subpart H of this part; and the general provisions of subpart A of this part, including DOT regulations referenced in Sec. 71.5.

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.003

Requirement for license.
 Except as authorized in a general license or a specific license issued by the Commission, or as exempted in this part, no licensee may--
 (a) Deliver licensed material to a carrier for transport; or
 (b) Transport licensed material.

This section addresses domestic licensing.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p style="text-align: center;">71.006</p> <p>Information collection requirements: OMB approval.</p> <p>(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval, as required by the Paperwork Reduction Act (44 U.S.C. 3501 et seq.). The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. OMB has approved the information collection requirements contained in this part, under control number 3150-0008.</p> <p>(b) The approved information collection requirements contained in this part appear in Sec. 71.5, 71.7, 71.8, 71.12, 71.13, 71.31, 71.33, 71.35, 71.37, 71.38, 71.39, 71.47, 71.85, 71.87, 71.89, 71.91, 71.93, 71.95, 71.97, 71.101, 71.103, 71.105, 71.107, 71.109, 71.111, 71.113, 71.115, 71.117, 71.119, 71.121, 71.123, 71.125, 71.127, 71.129, 71.131, 71.133, 71.135, and 71.137.</p>	<p style="text-align: center;">110.007</p> <p>Control Number under the Paperwork Reduction Act.</p> <p>The Office of Management and Budget control number assigned to collection of information in Sec. Sec. 110.30, 110.70, 110.80, and 110.90 is 2137-0586.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>This section addresses domestic licensing.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.007

Completeness and accuracy of information.

(a) Information provided to the Commission by an applicant for a license, or by a licensee, or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee must be complete and accurate in all material respects.

(b) Each applicant or licensee shall notify the Commission of information identified by the applicant or licensee as having, for the regulated activity, a significant implication for public health and safety or common defense and security. An applicant or licensee violates this requirement only if the applicant or licensee fails to notify the Commission of information that the applicant or licensee has identified as having a significant implication for public health and safety or common defense and security. Notification must be provided to the Administrator of the appropriate Regional Office within two working days of identifying the information. This requirement is not applicable to

This section addresses domestic licensing.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

information that is already required to be provided to the Commission by other reporting or updating requirements.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.008

Deliberate misconduct.

(a) This section applies to any—

- (1) Licensee;
- (2) Certificate holder;
- (3) Quality assurance program approval holder;

(4) Applicant for a license, certificate, or quality assurance program approval;

(5) Contractor (including a supplier or consultant) or subcontractor, to any person identified in paragraph (a)(4) of this section; or

(6) Employees of any person identified in paragraphs (a)(1) through (a)(5) of this section.

(b) A person identified in paragraph (a) of this section who knowingly provides to any entity, listed in paragraphs (a)(1) through (a)(5) of this section, any components, materials, or other goods or services that relate to a licensee’s, certificate holder’s, quality assurance program approval holder’s, or applicant’s activities subject to this part may not:

- (1) Engage in deliberate misconduct that causes or would have caused, if not detected, a licensee, certificate holder, quality

SSR-6 does not address misconduct.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

assurance program approval holder, or any applicant to be in violation of any rule, regulation, or order; or any term, condition or limitation of any license, certificate, or approval issued by the Commission; or

(2) Deliberately submit to the NRC, a licensee, a certificate holder, quality assurance program approval holder, an applicant for a license, certificate or quality assurance program approval, or a licensee's, applicant's, certificate holder's, or quality assurance program approval holder's contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the NRC.

(c) A person who violates paragraph (b)(1) or (b)(2) of this section may be subject to enforcement action in accordance with the procedures in 10 CFR part 2, subpart B.

(d) For the purposes of paragraph (b)(1) of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) Would cause a licensee,

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

certificate holder, quality assurance program approval holder, or applicant for a license, certificate, or quality assurance program approval to be in violation of any rule, regulation, or order; or any term, condition, or limitation of any license or certificate issued by the Commission; or

(2) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order, or policy of a licensee, certificate holder, quality assurance program approval holder, applicant, or the contractor or subcontractor of any of them.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.008</p> <p>Deliberate misconduct.</p> <p>(a) This section applies to any--</p> <p>(1) Licensee;</p> <p>(2) Certificate holder;</p> <p>(3) Quality assurance program approval holder;</p> <p>(4) Applicant for a license, certificate, or quality assurance program approval;</p> <p>(5) Contractor (including a supplier or consultant) or subcontractor, to any person identified in paragraphs (a)(1) through (a)(4) of this section; or</p> <p>(6) Employee of any person identified in paragraphs (a)(1) through (a)(5) of this section.</p> <p>(b) A person identified in paragraph (a) of this section who knowingly provides to any entity, listed in paragraphs (a)(1) through (a)(5) of this section any components, materials, or other goods or services that relate to a licensee's, certificate holder's, quality assurance program approval holder's or applicant's activities subject to this part may not:</p> <p>(1) Engage in deliberate misconduct that causes or would have caused, if not detected, a licensee, certificate holder, quality</p>	<p align="center">107.307</p> <p>(a) When the Associate Administrator and the Office of Chief Counsel have reason to believe that a person is knowingly engaging or has knowingly engaged in conduct which is a violation of the Federal hazardous material transportation law or any provision of this subchapter or subchapter C of this chapter, or any exemption, special permit, or order issued thereunder, for which the Associate Administrator or the Office of Chief Counsel exercise enforcement authority, they may--</p> <p>(1) Issue a warning letter, as provided in Sec. 107.309;</p> <p>(2) Initiate proceedings to assess a civil penalty, as provided in either Sec. 107.310 or 107.311;</p> <p>(3) Issue an order directing compliance, regardless of whether a warning letter has been issued or a civil penalty assessed; and</p> <p>(4) Seek any other remedy available under the Federal</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 does not address violations.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

assurance program approval holder, or any applicant to be in violation of any rule, regulation, or order; or any term, condition, or limitation of any license, certificate or approval issued by the Commission; or

(2) Deliberately submit to the NRC, a licensee, a certificate holder, quality assurance program approval holder, an applicant for a license, certificate or quality assurance program approval, or a licensee's, applicant's, certificate holder's or quality assurance program approval holder's contractor or subcontractor, information that the person submitting the information knows to be incomplete or inaccurate in some respect material to the NRC.

(c) A person who violates paragraph (b)(1) or (b)(2) of this section may be subject to enforcement action in accordance with the procedures in 10 CFR part 2, subpart B.

(d) For the purposes of paragraph (b)(1) of this section, deliberate misconduct by a person means an intentional act or omission that the person knows:

(1) Would cause a licensee,

hazardous material transportation law.

(b) In the case of a proceeding initiated for failure to comply with an exemption or special permit, the allegation of a violation of a term or condition thereof is considered by the Associate Administrator and the Office of Chief Counsel to constitute an allegation that the special permit holder or party to the special permit is failing, or has failed to comply with the underlying regulations from which relief was granted by the special permit.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

certificate holder, quality assurance program approval holder or applicant for a license, certificate, or quality assurance program approval to be in violation of any rule, regulation, or order; or any term, condition, or limitation, of any license or certificate issued by the Commission; or

(2) Constitutes a violation of a requirement, procedure, instruction, contract, purchase order, or policy of a licensee, certificate holder, quality assurance program approval holder, applicant, or the contractor or subcontractor of any of them.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.017

General license: NRC-approved package.

(a) A general license is issued to any licensee of the Commission to transport, or to deliver to a carrier for transport, licensed material in a package for which a license, certificate of compliance (CoC), or other approval has been issued by the NRC.

(b) This general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of subpart H of this part.

(c) This general license applies only to a licensee who—

(1) Has a copy of the CoC, or other approval of the package, and has the drawings and other documents referenced in the approval relating to the use and maintenance of the packaging and to the actions to be taken before shipment;

(2) Complies with the terms and conditions of the license, certificate, or other approval, as applicable, and the applicable requirements of subparts A, G, and H of this part; and

(3) Before the licensee's first

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

use of the package, submits in writing to: ATTN: Document Control Desk, Director, Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards, using an appropriate method listed in Sec. 71.1(a), the licensee's name and license number and the package identification number specified in the package approval.

(d) This general license applies only when the package approval authorizes use of the package under this general license.

(e) For a Type B or fissile material package, the design of which was approved by NRC before April 1, 1996, the general license is subject to the additional restrictions of Sec. 71.19.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.020

General license: DOT specification container.

(a) A general license is issued to any licensee of the Commission to transport, or to deliver to a carrier for transport, licensed material in a specification container for fissile material or for a Type B quantity of radioactive material as specified in DOT regulations at 49 CFR parts 173 and 178.

(b) This general license applies only to a licensee who has a quality assurance program approved by the Commission as satisfying the provisions of subpart H of this part.

(c) This general license applies only to a licensee who—

(1) Has a copy of the specification; And

(2) Complies with the terms and conditions of the specification and the applicable requirements of subparts A, G, and H of this part.

(d) This general license is subject to the limitation that the specification container may not be used for a shipment to a location outside the United States, except by multilateral approval, as defined in DOT regulations at 49 CFR 173.403.

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

(e) This section expires October 1, 2008.

71.081

Applicability of operating controls and procedures.

A licensee subject to this part, who, under a general or specific license, transports licensed material or delivers licensed material to a carrier for transport, shall comply with the requirements of this subpart G, with the quality assurance requirements of subpart H of this part, and with the general provisions of subpart A of this part.

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.091

Records.

(a) Each licensee shall maintain, for a period of 3 years after shipment, a record of each shipment of licensed material not exempt under Sec. 71.10, showing where applicable--

(1) Identification of the packaging by model number and serial number;

(2) Verification that there are no significant defects in the packaging, as shipped;

(3) Volume and identification of coolant;

(4) Type and quantity of licensed material in each package, and the total quantity of each shipment;

(5) For each item of irradiated fissile material--

(i) Identification by model number and serial number;

(ii) Irradiation and decay history to the extent appropriate to demonstrate that its nuclear and thermal characteristics comply with license conditions; and

(iii) Any abnormal or unusual condition relevant to radiation safety;

(6) Date of the shipment;

(7) For fissile packages and for

SSR-6 and DOT address retention of shipping documents.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

Type B packages, any special controls exercised;

(8) Name and address of the transferee;

(9) Address to which the shipment was made; and

(10) Results of the determinations required by Sec. 71.87 and by the conditions of the package approval.

(b) Each certificate holder shall maintain, for a period of 3 years after the life of the packaging to which they apply, records identifying the packaging by model number, serial number, and date of manufacture.

(c) The licensee, certificate holder, and an applicant for a CoC, shall make available to the Commission for inspection, upon reasonable notice, all records required by this part. Records are only valid if stamped, initialed, or signed and dated by authorized personnel, or otherwise authenticated.

(d) The licensee, certificate holder, and an applicant for a CoC shall maintain sufficient written records to furnish evidence of the quality of packaging. The records to be maintained include results of the

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

determinations required by Sec. 71.85; design, fabrication, and assembly records; results of reviews, inspections, tests, and audits; results of monitoring work performance and materials analyses; and results of maintenance, modification, and repair activities. Inspection, test, and audit records must identify the inspector or data recorder, the type of observation, the results, the acceptability, and the action taken in connection with any deficiencies noted. These records must be retained for 3 years after the life of the packaging to which they apply.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.093

Inspection and tests.

(a) The licensee or certificate holder shall permit the Commission, at all reasonable times, to inspect the licensed material, packaging, premises, and facilities in which the licensed material or packaging is used, provided, constructed, fabricated, tested, stored, or shipped.

(b) The licensee shall perform, and permit the Commission to perform, any tests the Commission deems necessary or appropriate for the administration of the regulations in this chapter.

(c) The licensee shall notify the Director, Spent Fuel Project Office, at least 45 days before fabrication of a package to be used for the shipment of licensed material having a decay heat load in excess of 5 kW or with a maximum normal operating pressure in excess of 103 kPa (15 lbf/in²) gauge.

This section addresses domestic licensing, applications, and QA.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.095

Reports.

(a) The licensee, after requesting the certificate holder's input, shall submit a written report to the Commission of—

(1) Instances in which there is a significant reduction in the effectiveness of any NRC-approved Type B or Type AF packaging during use; or

(2) Details of any defects with safety significance in any NRC-approved Type B or fissile material packaging, after first use.

(3) Instances in which the conditions of approval in the Certificate of Compliance were not observed in making a shipment.

(b) The licensee shall submit a written report to the Commission of instances in which the conditions in the certificate of compliance were not followed during a shipment.

(c) Each licensee shall submit, in accordance with Sec. 71.1, a written report required by paragraph (a) or (b) of this section within 60 days of the event or discovery of the event. The licensee shall also provide a copy of each report submitted to the NRC to the

SSR-6 addresses non-compliances of a different scope in Paragraph 309.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

applicable certificate holder.
 Written reports prepared under other regulations may be submitted to fulfill this requirement if the reports contain all the necessary information, and the appropriate distribution is made. Using an appropriate method listed in Sec. 71.1(a), the licensee shall report to: ATTN: Document Control Desk, Director, Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards. These written reports must include the following:

- (1) A brief abstract describing the major occurrences during the event, including all component or system failures that contributed to the event and significant corrective action taken or planned to prevent recurrence.
- (2) A clear, specific, narrative description of the event that occurred so that knowledgeable readers conversant with the requirements of part 71, but not familiar with the design of the packaging, can understand the complete event. The narrative description must include the following specific information as appropriate for the particular event.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

(i) Status of components or systems that were inoperable at the start of the event and that contributed to the event;

(ii) Dates and approximate times of occurrences;

(iii) The cause of each component or system failure or personnel error, if known;

(iv) The failure mode, mechanism, and effect of each failed component, if known;

(v) A list of systems or secondary functions that were also affected for failures of components with multiple functions;

(vi) The method of discovery of each component or system failure or procedural error;

(vii) For each human performance related root cause, a discussion of the cause(s) and circumstances;

(viii) The manufacturer and model number (or other identification) of each component that failed during the event; and

(ix) For events occurring during use of a packaging, the quantities and chemical and physical form(s) of the package contents.

(3) An assessment of the safety consequences and implications of

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

the event. This assessment must include the availability of other systems or components that could have performed the same function as the components and systems that failed during the event.

(4) A description of any corrective actions planned as a result of the event, including the means employed to repair any defects, and actions taken to reduce the probability of similar events occurring in the future.

(5) Reference to any previous similar events involving the same packaging that are known to the licensee or certificate holder.

(6) The name and telephone number of a person within the licensee's organization who is knowledgeable about the event and can provide additional information.

(7) The extent of exposure of individuals to radiation or to radioactive materials without identification of individuals by name.

(d) Report legibility. The reports submitted by licensees and/or certificate holders under this section must be of sufficient quality to permit reproduction and micrographic processing.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.099</p> <p>Violations.</p> <p>(a) The Commission may obtain an injunction or other court order to prevent a violation of the provisions of--</p> <p>(1) The Atomic Energy Act of 1954, as amended;</p> <p>(2) Title II of the Energy Reorganization Act of 1974, as amended; or</p> <p>(3) A regulation or order issued pursuant to those Acts.</p> <p>(b) The Commission may obtain a court order for the payment of a civil penalty imposed under section 234 of the Atomic Energy Act:</p> <p>(1) For violations of--</p> <p>(i) Sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Atomic Energy Act of 1954, as amended;</p> <p>(ii) Section 206 of the Energy Reorganization Act;</p> <p>(iii) Any rule, regulation, or order issued pursuant to the sections specified in paragraph (b)(1)(i) of this section; or</p> <p>(iv) Any term , condition, or limitation of any license issued under the sections specified in paragraph (b)(1)(i) of this section.</p> <p>(2) For any violation for which a</p>	<p align="center">107.301</p> <p>Delegated authority for enforcement.</p> <p>Source: Amdt. 107-11, 48 FR 2651, Jan. 20, 1983, unless otherwise noted.</p> <p>Under redelegation from the Administrator, Pipeline and Hazardous Materials Safety Administration, the Associate Administrator for Hazardous Materials Safety and the Office of the Chief Counsel exercise their authority for enforcement of the Federal hazardous material transportation law, this subchapter, and subchapter C of this subchapter, in accordance with Sec. 1.53 of this title.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 does not address violations.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

license may be revoked under section 186 of the Atomic Energy Act of 1954, as amended.

71.100
 Criminal penalties.
 (a) Section 223 of the Atomic Energy Act of 1954, as amended, provides for criminal sanctions for willful violation of, attempted violation of, or conspiracy to violate, any regulation issued under sections 161b, 161i, or 161o of the Act. For purposes of section 223, all the regulations in part 71 are issued under one or more of sections 161b, 161i, or 161o, except for the sections listed in paragraph (b) of this section.
 (b) The regulations in part 71 that are not issued under sections 161b, 161i, or 161o for the purposes of section 223 are as follows: Sec. 71.0, 71.2, 71.4, 71.6, 71.7, 71.9, 71.10, 71.31, 71.33, 71.35, 71.37, 71.38, 71.39, 71.41, 71.43, 71.45, 71.47, 71.51, 71.52, 71.53, 71.55, 71.59, 71.65, 71.71, 71.73, 71.74, 71.75, 71.77, 71.99, and 71.100.

107.333
 A person who knowingly violates Sec. 171.2(l) of this title or willfully or recklessly violates a requirement of the Federal hazardous material transportation law or a regulation, order, special permit, or approval issued thereunder shall be fined under title 18, United States Code, or imprisoned for not more than 5 years, or both, except the maximum amount of imprisonment shall be 10 years in any case in which the violation involves the release of a hazardous material which results in death or bodily injury to any person.

SSR-6 does not address violations.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.107

Package design control.

(a) The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that applicable regulatory requirements and the package design, as specified in the license or CoC for those materials and components to which this section applies, are correctly translated into specifications, drawings, procedures, and instructions. These measures must include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from standards are controlled. Measures must be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the functions of the materials, parts, and components of the packaging that are important to safety.

(b) The licensee, certificate holder, and applicant for a CoC shall establish measures for the identification and control of design interfaces and for coordination among participating design organizations. These measures

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

must include the establishment of written procedures, among participating design organizations, for the review, approval, release, distribution, and revision of documents involving design interfaces. The design control measures must provide for verifying or checking the adequacy of design, by methods such as design reviews, alternate or simplified calculational methods, or by a suitable testing program. For the verifying or checking process, the licensee shall designate individuals or groups other than those who were responsible for the original design, but who may be from the same organization. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, the licensee, certificate holder, and applicant for a CoC shall include suitable qualification testing of a prototype or sample unit under the most adverse design conditions. The licensee, certificate holder, and applicant for a CoC shall apply design control measures to the following:

- (1) Criticality physics, radiation

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p>shielding, stress, thermal, hydraulic, and accident analyses;</p> <p>(2) Compatibility of materials;</p> <p>(3) Accessibility for inservice inspection, maintenance, and repair;</p> <p>(4) Features to facilitate decontamination; and</p> <p>(5) Delineation of acceptance criteria for inspections and tests.</p> <p>(c) The licensee, certificate holder, and applicant for a CoC shall subject design changes, including field changes, to design control measures commensurate with those applied to the original design. Changes in the conditions specified in the CoC</p>					

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.109</p> <p>Procurement document control. The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that adequate quality is required in the documents for procurement of material, equipment, and services, whether purchased by the licensee, certificate holder, and applicant for a CoC or by its contractors or subcontractors. To the extent necessary, the licensee, certificate holder, and applicant for a CoC shall require contractors or subcontractors to provide a quality assurance program consistent with the applicable provisions of this part.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.111</p> <p>Instructions, procedures, and drawings.</p> <p>The licensee, certificate holder, and applicant for a CoC shall prescribe activities affecting quality by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall require that these instructions, procedures, and drawings be followed. The instructions, procedures, and drawings must include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.113</p> <p>Document control.</p> <p>The licensee, certificate holder, and applicant for a CoC shall establish measures to control the issuance of documents such as instructions, procedures, and drawings, including changes, that prescribe all activities affecting quality. These measures must assure that documents, including changes, are reviewed for adequacy, approved for release by authorized personnel, and distributed and used at the location where the prescribed activity is performed.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.115

Control of purchased material, equipment, and services.

(a) The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that purchased material, equipment, and services, whether purchased directly or through contractors and subcontractors, conform to the procurement documents. These measures must include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor or subcontractor, inspection at the contractor or subcontractor source, and examination of products on delivery.

(b) The licensee, certificate holder, and applicant for a CoC shall have available documentary evidence that material and equipment conform to the procurement specifications before installation or use of the material and equipment. The licensee, certificate holder, and applicant for a CoC shall retain, or have available, this documentary evidence for the life of the package to which it applies. The licensee, certificate

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

holder, and applicant for a CoC shall assure that the evidence is sufficient to identify the specific requirements met by the purchased material and equipment.

(c) The licensee, certificate holder, and applicant for a CoC shall assess the effectiveness of the control of quality by contractors and subcontractors at intervals consistent with the importance, complexity, and quantity of the product or services.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.117</p> <p>Identification and control of materials, parts, and components. The licensee, certificate holder, and applicant for a CoC shall establish measures for the identification and control of materials, parts, and components. These measures must assure that identification of the item is maintained by heat number, part number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, installation, and use of the item. These identification and control measures must be designed to prevent the use of incorrect or defective materials, parts, and components.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.119</p> <p>Control of special processes. The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that special processes, including welding, heat treating, and nondestructive testing are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.121

Internal inspection.

The licensee, certificate holder, and applicant for a CoC shall establish and execute a program for inspection of activities affecting quality by or for the organization performing the activity, to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity. The inspection must be performed by individuals other than those who performed the activity being inspected.

Examination, measurements, or tests of material or products processed must be performed for each work operation where necessary to assure quality. If direct inspection of processed material or products is not carried out, indirect control by monitoring processing methods, equipment, and personnel must be provided. Both inspection and process monitoring must be provided when quality control is inadequate without both. If mandatory inspection hold points, which require witnessing or inspecting by the licensee's designated representative and beyond which work should not

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

proceed without the consent of its designated representative, are required, the specific hold points must be indicated in appropriate documents.

71.123

Test control.

The licensee, certificate holder, and applicant for a CoC shall establish a test program to assure that all testing required to demonstrate that the packaging components will perform satisfactorily in service is identified and performed in accordance with written test procedures that incorporate the requirements of this part and the requirements and acceptance limits contained in the package approval. The test procedures must include provisions for assuring that all prerequisites for the given test are met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. The licensee, certificate holder, and applicant for a CoC shall document and evaluate the test results to assure that test requirements have been satisfied.

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.125</p> <p>Control of measuring and test equipment.</p> <p>The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly controlled, calibrated, and adjusted at specified times to maintain accuracy within necessary limits.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>
	<p align="center">71.127</p> <p>Handling, storage, and shipping control.</p> <p>The licensee, certificate holder, and applicant for a CoC shall establish measures to control, in accordance with instructions, the handling, storage, shipping, cleaning, and preservation of materials and equipment to be used in packaging to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmosphere, and specific moisture content and temperature levels must be specified and provided.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p style="text-align: center;">71.129</p> <p>Inspection, test, and operating status.</p> <p>(a) The licensee, certificate holder, and applicant for a CoC shall establish measures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the packaging. These measures must provide for the identification of items that have satisfactorily passed required inspections and tests, where necessary to preclude inadvertent bypassing of the inspections and tests.</p> <p>(b) The licensee shall establish measures to identify the operating status of components of the packaging, such as tagging valves and switches, to prevent inadvertent operation.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.131</p> <p>Nonconforming materials, parts, or components.</p> <p>The licensee, certificate holder, and applicant for a CoC shall establish measures to control materials, parts, or components that do not conform to the licensee’s requirements to prevent their inadvertent use or installation. These measures must include, as appropriate, procedures for identification, documentation, segregation, disposition, and notification to affected organizations. Nonconforming items must be reviewed and accepted, rejected, repaired, or reworked in accordance with documented procedures.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.133</p> <p>Corrective action.</p> <p>The licensee, certificate holder, and applicant for a CoC shall establish measures to assure that conditions adverse to quality, such as deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected. In the case of a significant condition adverse to quality, the measures must assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken must be documented and reported to appropriate levels of management.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.135

Quality assurance records. The licensee, certificate holder, and applicant for a CoC shall maintain sufficient written records to describe the activities affecting quality. The records must include the instructions, procedures, and drawings required by Sec. 71.111 to prescribe quality assurance activities and must include closely related specifications such as required qualifications of personnel, procedures, and equipment. The records must include the instructions or procedures which establish a records retention program that is consistent with applicable regulations and designates factors such as duration, location, and assigned responsibility. The licensee, certificate holder, and applicant for a CoC shall retain these records for 3 years beyond the date when the licensee, certificate holder, and applicant for a CoC last engage in the activity for which the quality assurance program was developed. If any portion of the written procedures or instructions is superseded, the licensee, certificate holder, and

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

applicant for a CoC shall retain the superseded material for 3 years after it is superseded.

71.137

Audits.
 The licensee, certificate holder, and applicant for a CoC shall carry out a comprehensive system of planned and periodic audits to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program. The audits must be performed in accordance with written procedures or checklists by appropriately trained personnel not having direct responsibilities in the areas being audited. Audited results must be documented and reviewed by management having responsibility in the area audited. Followup action, including reaudit of deficient areas, must be taken where indicated.

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p>71.101 (b)</p> <p>(b) Establishment of program. Each licensee shall establish, maintain, and execute a quality assurance program satisfying each of the applicable criteria of Sec. 71.101 through 71.137 and satisfying any specific provisions that are applicable to the licensee's activities including procurement of packaging. The licensee shall apply each of the applicable criteria in a graded approach, i.e., to an extent that is consistent with its importance to safety.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.101 (c)</p> <p>(c) Approval of program. Before the use of any package for the shipment of licensed material subject to this subpart, each licensee shall obtain Commission approval of its quality assurance program. Using an appropriate method listed in Sec. 71.1(a), each licensee shall file a description of its quality assurance program, including a discussion of which requirements of this subpart are applicable and how they will be satisfied, by submitting the description to: ATTN: Document Control Desk, Director, Spent Fuel Project Office, Office of Nuclear Material Safety and Safeguards.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.101 (d)</p> <p>(d) Existing package designs. The provisions of this paragraph deal with packages that have been approved for use in accordance with this part before January 1, 1979, and which have been designed in accordance with the provisions of this part in effect at the time of application for package approval. Those packages will be accepted as having been designed in accordance with a quality assurance program that satisfies the provisions of paragraph (b) of this section.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.101 (e)</p> <p>(e) Existing packages. The provisions of this paragraph deal with packages that have been approved for use in accordance with this part before January 1, 1979; have been at least partially fabricated prior to that date; and for which the fabrication is in accordance with the provisions of this part in effect at the time of application for approval of package design. These packages will be accepted as having been fabricated and assembled in accordance with a quality assurance program that satisfies the provisions of paragraph (b) of this section.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p>71.101 (f)</p> <p>(f) Previously approved programs. A Commission-approved quality assurance program that satisfies the applicable criteria of Appendix B of Part 50 of this chapter, and that is established, maintained, and executed with regard to transport packages, will be accepted as satisfying the requirements of paragraph (b) of this section. Before first use, the licensee shall notify the Director, Spent Fuel Project Office, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, of its intent to apply its previously approved Appendix B program to transportation activities. The licensee shall identify the program by date of submittal to the Commission, Docket Number, and date of Commission approval.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p>71.101 (g)</p> <p>(g) Radiography containers. A program for transport container inspection and maintenance limited to radiographic exposure devices, source changers, or packages transporting these devices and meeting the requirements of Sec. 34.31(b) or equivalent Agreement State requirement, is deemed to satisfy the requirements of Sec. 71.12(b) and 71.101(b) of this chapter.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.105 (b)

(b) The licensee, certificate holder, and applicant for a CoC, through its quality assurance program, shall provide control over activities affecting the quality of the identified materials and components to an extent consistent with their importance to safety, and as necessary to assure conformance to the approved design of each individual package used for the shipment of radioactive material. The licensee, certificate holder, and applicant for a CoC shall assure that activities affecting quality are accomplished under suitably controlled conditions. Controlled conditions include the use of appropriate equipment; suitable environmental conditions for accomplishing the activity, such as adequate cleanliness; and assurance that all prerequisites for the given activity have been satisfied. The licensee, certificate holder, and applicant for a CoC shall take into account the need for special controls, processes, test equipment, tools, and skills to attain the required quality, and the need for verification of quality by inspection

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SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

and test.

71.105 (c)

(c) The licensee, certificate holder, and applicant for a CoC shall base the requirements and procedures of its quality assurance program on the following considerations concerning the complexity and proposed use of the package and its components:

- (1) The impact of malfunction or failure of the item to safety;
- (2) The design and fabrication complexity or uniqueness of the item;
- (3) The need for special controls and surveillance over processes and equipment;
- (4) The degree to which functional compliance can be demonstrated by inspection or test; and
- (5) The quality history and degree of standardization of the item.

SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.004.03</p> <p>A2 means the maximum activity of radioactive material, other than special form material, LSA, and SCO material, permitted in a Type A package. This value is either listed in Appendix A, Table A-1, of this part, or may be derived in accordance with the procedures prescribed in Appendix A of this part.</p>	<p align="center">173.403</p> <p>A2 means the maximum activity of Class 7 (radioactive) material, other than special form material, LSA material, and SCO, permitted in a Type A package. This value is either listed in Sec. 173.435 or may be derived in accordance with the procedures prescribed in Sec. 173.433.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>
	<p align="center">71.004.17</p> <p>Licensed material means byproduct, source, or special nuclear material received, possessed, used, or transferred under a general or specific license issued by the Commission pursuant to the regulations in this chapter.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>This is a domestic-only regulation.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p align="center">71.047 (d)</p> <p>(d) The written instructions required for exclusive use shipments must be sufficient so that, when followed, they will cause the carrier to avoid actions that will unnecessarily delay delivery or unnecessarily result in increased radiation levels or radiation exposures to transport workers or members of the general public.</p>	<p align="center">173.441 (c)</p> <p>(c) For shipments made under the provisions of paragraph (b) of this section, the offeror shall provide specific written instructions for maintenance of the exclusive use shipment controls to the carrier. The instructions must be included with the shipping paper information. The instructions must be sufficient so that, when followed, they will cause the carrier to avoid actions that will unnecessarily delay delivery or unnecessarily result in increased radiation levels or radiation exposures to transport workers or members of the general public.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 Paragraph 554 requires instructions for all shipments but does not address delay.</p>

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.105 (d)

(d) The licensee, certificate holder, and applicant for a CoC shall provide for indoctrination and training of personnel performing activities affecting quality, as necessary to assure that suitable proficiency is achieved and maintained. The licensee, certificate holder, and applicant for a CoC shall review the status and adequacy of the quality assurance program at established intervals. Management of other organizations participating in the quality assurance program shall review regularly the status and adequacy of that part of the quality assurance program they are executing.

This section addresses domestic licensing, applications, and QA.

71.039

Requirement for additional information.
 The Commission may at any time require additional information in order to enable it to determine whether a license, certificate of compliance, or other approval should be granted, renewed, denied, modified, suspended, or revoked.

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SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

71.103

Quality assurance organization.

(a) The licensee, certificate holder, and applicant for a CoC shall be responsible for the establishment and execution of the quality assurance program. The licensee, certificate holder, and applicant for a CoC may delegate to others, such as contractors, agents, or consultants, the work of establishing and executing the quality assurance program, or any part of the quality assurance program, but shall retain responsibility for the program. These activities include performing the functions associated with attaining quality objectives and the quality assurance functions.

(b) The quality assurance functions are—

(1) Assuring that an appropriate quality assurance program is established and effectively executed; and

(2) Verifying, by procedures such as checking, auditing, and inspection, that activities affecting the functions that are important to safety have been correctly performed.

(c) The persons and

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SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

organizations performing quality assurance functions must have sufficient authority and organizational freedom to—

- (1) Identify quality problems;
- (2) Initiate, recommend, or provide solutions; and
- (3) Verify implementation of solutions.

(d) The persons and organizations performing quality assurance functions shall report to a management level that assures that the required authority and organizational freedom, including sufficient independence from cost and schedule, when opposed to safety considerations, are provided.

(e) Because of the many variables involved, such as the number of personnel, the type of activity being performed, and the location or locations where activities are performed, the organizational structure for executing the quality assurance program may take various forms, provided that the persons and organizations assigned the quality assurance functions have the required authority and organizational freedom.

(f) Irrespective of the

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	

organizational structure, the individual(s) assigned the responsibility for assuring effective execution of any portion of the quality assurance program, at any location where activities subject to this section are being performed, must have direct access to the levels of management necessary to perform this function.

SSR-6	10CRF71	49CFR	Differences			Regulation Comparison
Citation Text	Citation Text	Citation Text	VS	S	N	
	<p style="text-align: center;">71.105 (a)</p> <p>Quality assurance program. (a) The licensee, certificate holder, and applicant for a CoC shall establish, at the earliest practicable time consistent with the schedule for accomplishing the activities, a quality assurance program that complies with the requirements of Sec. 71.101 through 71.137. The licensee, certificate holder, and applicant for a CoC shall document the quality assurance program by written procedures or instructions and shall carry out the program in accordance with those procedures throughout the period during which the packaging is used. The licensee, certificate holder, and applicant for a CoC shall identify the material and components to be covered by the quality assurance program, the major organizations participating in the program, and the designated functions of these organizations.</p>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>SSR-6 defines "management system" (306) but leaves specific requirements of the program to each competent authority.</p>