




Hazardous Materials Guidance

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Summary:

The purpose of this Hazardous Materials Guidance is to highlight key changes from the Research and Special Programs Administration's (RSPA) final rule "Hazardous Materials Regulations; Compatibility With the Regulations of the International Atomic Energy Agency;" HM-230.

Discussion:

On January 26, 2004, RSPA issued a final rule to align U.S. requirements for packaging and transport of radioactive materials with the "IAEA Safety Standards Series: Regulations for the Safe Transport of Radioactive Material" 1996 Edition, No. TS-R-1. The effective date of this rule is October 1, 2004. RSPA authorized voluntary compliance beginning February 25, 2004.

Nuclide Specific Exemption Values and NORM

Prior to this rule, all material with a specific activity that exceeded 70 Becquerels per gram (Bq/g) was by definition radioactive material, Class 7, for transport. A significant aspect of this final rule is a change in the definition of radioactive material for transport to a nuclide-specific and consignment-based activity threshold. These values are contained in 49 CFR 173.436 "Exempt material activity concentrations and exempt consignment activity limits for radionuclides." This change will be relatively transparent once the material is in transit; however, it may result in some materials which were unregulated under the previous 70 Bq/g definition becoming regulated as Class 7 material for transport. Conversely, some small consignments of low activity materials may no longer meet the definition of Class 7.

The following is a simplified example of the new activity concentration and consignment threshold definition. For Americium-241 (Am-241), the following threshold limits define what material is regulated as Class 7: Activity Concentration exceeding 1 Bq/g; and total Consignment Activity exceeding 10,000 Bq. If you consider a consignment of 1000 kg of soil contaminated with 2000 kBq (2,000,000 Bq) of Am-241 uniformly distributed throughout, the activity concentration is 2000 kBq/1000 kg (2 Bq/g). Under the previous 70 Bq/g definition, this is not regulated as Class 7 material for transport. However under the new definition, this

consignment is regulated as Class 7 material for transport. It exceeds both the 1 Bq/g activity concentration limit and the 10,000 Bq total consignment limit for Am-241. Material must exceed both the activity concentration and the consignment activity thresholds to meet the new definition.

The final rule does note that it is not the intent of the Hazardous Materials Regulations (HMR) to apply to natural material and ores containing naturally occurring radioactive material (NORM) which are not intended to be processed for use of the radionuclides. Examples of such materials include cement, fertilizers, gypsum, and mining and smelting process residues. The final rule incorporates an exception for these materials such that they are not subject to the HMR provided the activity concentration of the material and the consignment activity do not exceed ten times the corresponding exemption values.

Communication Changes

The most visible changes of this final rule are to hazard communication. Older, domestic-only shipping descriptions are removed from the regulations. This guidance contains a complete listing of all authorized shipping names and UN numbers [Figure 1]. Since 2001, there has been a transitional period when either the old description or the new international description could be used. Effective October 1, 2004, the new international descriptions are mandatory. Shipping descriptions not included in Table 1 are no longer authorized for use on shipping papers or package markings after October 1, 2004.

Additional communication changes include a requirement to mark the UN identification number on excepted packages. There is no size requirement for the UN number marking on excepted packages. This marking requirement replaces the excepted package certification statement previously required by 49 CFR 173.422; however, there is no prohibition against continued use of the certification statement.

Effective October 1, 2004, all Type A packages must be marked with the international vehicle registration code ("USA" for the U.S.) and the packaging manufacturer's name and address or symbol. These must be marked in association with the package type marking (DOT 7A Type A). Industrial packaging must also be marked with the package type (Type IP-1, Type IP-2, or Type IP-3) and the international vehicle registration code.

The definition of fissile material has been revised in the final rule, removing Pu-238 from the list of fissile radionuclides. For fissile materials, those containing Pu-239, Pu-241, U-233, or U-235, a new fissile label (Figure 2) is required in addition to the Radioactive White-I, Yellow-II or Yellow-III labels. The fissile label must be affixed to two opposite sides of the package or overpack adjacent to the Radioactive label. In association with the new fissile label, a criticality safety index (CSI) has been introduced to replace the former criticality control transport index. This change separates the criticality control limit (CSI) and the radiation hazard limit (Transport Index) and provides them both to assist transport planning, package grouping and separation

distance determinations. The Transport Index (TI) is now restricted to the maximum radiation level at one meter from the package.

Low-Specific Activity (LSA) and Surface Contaminated Objects (SCO)

The definition of LSA-I material is revised to incorporate a new category of LSA-I in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the activity concentration exemption values as specified in 49 CFR 173.436. Though the definition no longer specifically identifies mill tailings, contaminated earth, concrete, and rubble, much of the material previously identified as LSA-I may continue to be shipped as LSA-I as long as it meets the new definition.

Several new packaging options have been added for LSA and SCO shipments. LSA-I and SCO-I materials may be transported unpackaged under the following conditions: there will be no escape of the radioactive contents from the conveyance or loss of shielding during normal conditions of transport; and the shipment must be "Exclusive Use" or for certain SCO-I materials, the inaccessible surface contamination is limited to no greater than 4.0 Bq/cm². The list of Industrial Packagings (IP) authorized by 49 CFR 173.411 is expanded to include: tank containers; freight containers; and metal intermediate bulk containers. The design of the tank containers and metal intermediate bulk containers must conform to the applicable UN Recommendations on the Transport of Dangerous Goods. The design of the freight containers must conform to the standards prescribed in ISO 1496-1 "Series 1 Freight Containers – Specifications and Testing – Part 1: General Cargo Containers."

Packaging Transitions

The current IAEA regulation, TS-R-1, does not provide transitional provisions for packages approved under the 1967 edition. To harmonize with this standard, the final rule removes specifications for manufacturing DOT Type B packages 6M, 6L, 20WC, and 21WC from the regulations in 49 CFR 178. Effective October 1, 2004, new packages may no longer be built to these specifications. These packages may continue to be used until October 1, 2008.

Uranium Hexafluoride

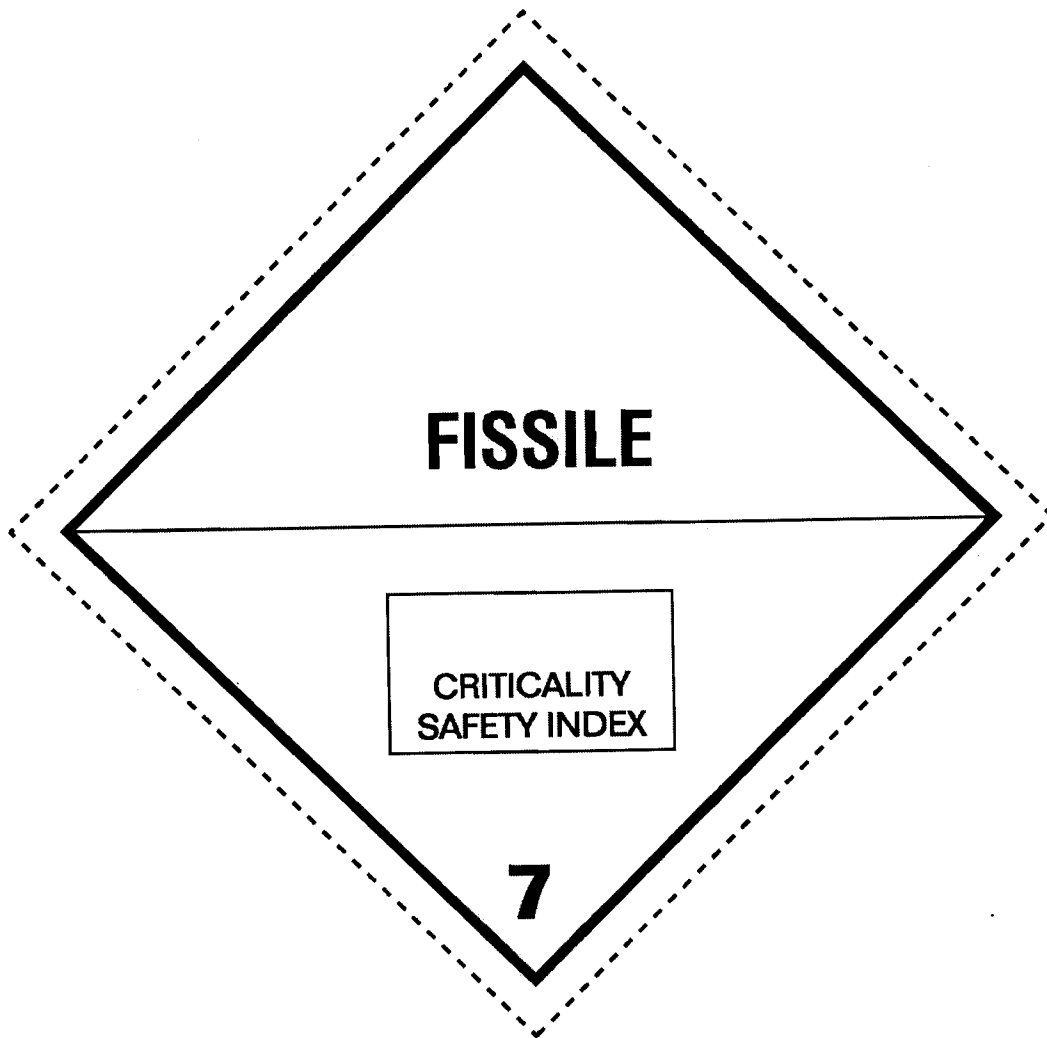
The final rule incorporates significant changes for uranium hexafluoride (UF₆) packaging. For packages containing more than 0.1 kg of non-fissile or fissile-excepted UF₆, effective October 1, 2004, the packages must meet pressure, drop and thermal tests. The ANSI N14.1 standard cylinders which have traditionally been used for these shipments have not been conclusively shown to fully comply with the new tests. The industry has taken a variety of approaches to ensure continued shipping. For domestic shipment, RSPA is reviewing some exemption requests to continue shipping campaigns of the bare cylinders. For international shipment, the U.K. has issued Certificates of Competent Authority for both a composite thermal protection (CTP) system and a blanket thermal protection (BTP) system. These certificates have been revalidated for use in the U.S., and both CTP and BTP systems have been obtained by U.S. shippers.

Authorized Proper Shipping Names and UN Identification Numbers
(Figure 1)

Radioactive Material, excepted package – articles manufactured from natural uranium <i>or</i> depleted uranium <i>or</i> natural thorium	UN2909
Radioactive Material, excepted package – empty packaging	UN2908
Radioactive Material, excepted package – instruments <i>or</i> articles	UN2911
Radioactive Material, excepted package – limited quantity of material	UN2910
Radioactive Material, low specific activity (LSA-I) <i>non-fissile or fissile-excepted</i> *	UN2912
Radioactive Material, low specific activity (LSA-II) <i>non-fissile or fissile-excepted</i> *	UN3321
Radioactive Material, low specific activity (LSA-III) <i>non-fissile or fissile-excepted</i>	UN3322
Radioactive Material, surface contaminated objects (SCO-I <i>or</i> SCO-II) <i>non-fissile or fissile-excepted</i> *	UN2913
Radioactive Material, transported under special arrangement, fissile	UN3331
Radioactive Material, transported under special arrangement, <i>non-fissile or fissile-excepted</i>	UN2919
Radioactive Material, Type A package, fissile <i>non-special form</i>	UN3327
Radioactive Material, Type A package, <i>non-special form, non-fissile or fissile-excepted</i> *	UN2915
Radioactive Material, Type A package, special form, <i>non-fissile or fissile-excepted</i>	UN3332
Radioactive Material, Type A package, special form, fissile	UN3333
Radioactive Material, Type B(M) package, fissile	UN3329
Radioactive Material, Type B(M) package. <i>non-fissile or fissile-excepted</i>	UN2917
Radioactive Material, Type B(U) package, fissile	UN3328
Radioactive Material, Type B(U) package, <i>non-fissile or fissile-excepted</i> *	UN2916
Radioactive material, uranium hexafluoride, fissile	UN2977
Radioactive material, uranium hexafluoride, <i>non-fissile or fissile-excepted</i>	UN2978

* Bold font highlights the most commonly used shipping descriptions.

Fissile Label
(Figure 2)



The Fissile label must meet the general design requirements of 49 CFR 172.407 "Label Specifications" and the background color must be white.