U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

1200 New Jersey Avenue, SE
Washington, DC 20590

JAN - 5 2010

Mr. Wade A. Winters
Regulatory Resources, Inc.
240 Joshua Road
Kennewick, WA 99338

Ref. No. 09-0260

Dear Mr. Winters:

This responds to your November 6, 2009 letter concerning the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) classification requirements for Class 7 (radioactive) material. Specifically, you request clarification of the defining criteria for classification of Class 7 (radioactive) material as it applies to non-radioactive material that is radioactively contaminated. Your questions are paraphrased and answered as follows:

Q1: Is it permissible to be conservative and class and describe a material as Class 7 (radioactive) material even if the calculated activity per gram of the material does not meet the Class 7 defining criteria?

A1: No. Under § 171.8, the definition of a hazardous material includes material that meets defining criteria for hazard classes and divisions in Part 173 of the HMR. It is the shipper's responsibility to properly class and describe a material in accordance with the defining criteria in the HMR (see § 173.22). No person may, by marking or otherwise, represent that a hazardous material is present in a package if the hazardous material is not present (see § 171.2(k)). While the shipper may take into account uncertainties in the measurements and calculation methods, there must be a high degree of confidence that the material is properly classified.

The scenario you describe with "SCO-like" material contained in a package along with "distributed throughout" material requires the shipper to determine whether the contents meet the definitions of surface contaminated object (SCO) and low specific activity material (LSA material) (see § 173.403). The activity per gram must be calculated solely for the "distributed throughout" material to determine whether it meets the definition of LSA material and the contamination levels on the "SCO-like" material must be examined to determine whether it meets the definition of SCO. It is not permissible to simply assume that all the material is LSA material.

Q2: If the material includes both "distributed throughout" and "SCO-like" materials, is it permissible to be conservative and class and describe the material as Class 7 (radioactive) material when the calculated activity per gram (Bq/g) of the material does not meet the Class 7 defining criteria and no data is available as to the surface contamination levels?

A2: No. If there is no data available on the surface contamination levels, it is not possible to classify the material as SCO. The activity per gram must be calculated solely for the "distributed throughout" material to determine whether it meets the definition of LSA material and the contamination levels on the "SCO-like" material must be examined to determine whether it meets the definition of SCO.

Q3: Is there any means, for being conservative, to describe a radioactively contaminated non-radioactive material as Class 7 (radioactive) material if no contamination data is available for the material and the calculated activity per gram indicates the material to be exempt (in accordance with § 173.436)?

A3: No. For the situation you describe, it is necessary to obtain data on the contamination levels to determine whether the material meets the definition of SCO. It is inappropriate to classify the material as Class 7 (radioactive) material without knowledge of the contamination levels.

In your letter, you also request clarification associated with guidance provided in the document "Categorizing and Transporting Low Specific Activity Materials and Surface Contaminated Objects," (NUREG-1608; July 1998) used for the characterization and identification of a mix of LSA and SCO materials. Your additional questions are paraphrased and answered as follows:

Q4: A package contains potential LSA and SCO materials. The resulting total activity per mass does not exceed the LSA-II activity limit. However, the supporting characterization documents include the activity per gram based on the total weight of the matrix (and the "LSA-like" material weight is not separated from potential SCO materials). No data is available concerning the SCO contamination levels. As long as the total activity does not exceed one A_2, is it permissible to describe, package and ship the material as LSA material?

A4: No. Data on the contamination levels must be obtained on the potential SCO materials to determine if they meet the definition of SCO. Furthermore, the mass of the contaminated objects must not be included in the calculation of the total activity per mass for comparison with the LSA-II material activity limit.

Q5: Is there ever a situation that will allow a Class 7 (radioactive) material to be described as LSA material when the matrix in the package includes "LSA-like" and potential SCO materials and no contamination data is available for the SCO materials content?

A5: No. See A4.

I hope this information is helpful. If you have further questions, please contact this office.

Sincerely,

Charles E. Betts
Chief, Standards Development
Office of Hazardous Materials Standards

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§ 173.403
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November 6, 2009

U.S. Department of Transportation
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Mr. Charles Betts
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Dear Messrs. Betts and Conroy,

I want to thank you for the opportunity to submit these questions for formal clarification.

The defining criterion for Class 7 material is located in 49 CFR 173.403. Unfortunately in the codified definition only one of the two criteria is addressed – that is for those materials where the radioactive material is 'distributed throughout'. The second of the defining criteria applies to non-radioactive materials that are radioactively contaminated. As stated in the January 2004 Final Rule (69 FR 3631),

> "We point out that our definition of contamination is similar to our definition of radioactive material, in that the definition designates a threshold value below which the material in question is not subject to the Class 7 hazardous materials transport regulations."

The application of contamination to the definition of radioactive material was further clarified by letter (Ref. No.: 06-0274) to include both the contamination level on the material as well as the total activity of the consignment:

> "A solid object which is not radioactive that has contamination on its surface is not a "surface contaminated object (SCO)" unless it meets the definition of SCO in §173.403. In accordance with §173.403, an SCO is defined as a solid object which is not itself radioactive but which has radioactive material distributed on its surface. Therefore, if the total consignment activity does not exceed the value specified in the table in §173.436 or the value derived according to the instructions in §173.433, it would not be regulated as a Class 7 (radioactive) material in transport. (The concept of (volume) activity concentration is not applicable to a surface distribution of radionuclides.)"

Often, calculating tools such as spreadsheets and programs are used to assist in radioactive material activity determinations. In some cases, the content of the package includes both 'distributed throughout' and non-rad surface contaminated objects. Quite often the calculating tools used cannot distinguish between these two matrices; therefore, the result for activity/gram will include the mass of the SCO-like material.

Question 1: Is it permissible to be conservative and describe a material as Class 7 radioactive material even if the calculated results indicate the activity/gram of the material does not meet the Class 7 defining criteria?

Question 2: When the material includes both 'distributed throughout' and SCO-like materials, is it permissible to be conservative and describe the material as Class 7 radioactive material when the calculated Bq/g results indicate the activity of the material does not meet the Class 7 defining criteria and no data is available as to the surface contamination levels?

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Question 3: Is there any means, for the sake of being conservative, to describe a radioactively contaminated non-rad material as Class 7 radioactive material if no contamination data is available for the material and the calculated activity/gram indicates the material to be exempted?

Another area of confusion is in the application of surface contaminated objects when co-joined in a one packaging with low specific activity (LSA) material. The guidance document, NUREG-1608 (RAMREG-003), published July 1998, provides useful guidance in the characterization and identification of LSA material and SCO. Section 6.1, *Packaging and Shipping Requirements*, Question 6.1.1, identifies what description to use for packages containing these mix matrices. The material will be described as "LSA Material" if the activity in the package does not exceed one A_2. However, if the package activity exceeds one A_2, the description is to be based on the material type that contributes greatest to the A_2 fraction. In order to take advantage of this allowance, the shipper must be able to provide the necessary documentation that supports both the LSA material and SCO determinations (Question 6.6.1, Page 6-1).

> "When mixing SCO and LSA materials in a single package, both the objects and the LSA materials should meet their respective definitions before being mixed together and then, when mixed, the contents of a package should be considered to be LSA."
>
> "The method in section 3.3.1 may be used to categorize collections of small SCOs prior to mixing them with LSA material provided the combined total quantity of radioactivity, in both the LSA material and SCOs to be included in a single package, does not exceed 1 A_2."

The questions below are to clarify confusion surrounding this application.

Question 4: A package contains both candidate LSA material and candidate SCO. The resulting total activity/total mass does not exceed the LSA-II activity limit. However, the supporting characterization documents include the activity/gram based on the total weight of the matrix (LSA-like material weight is not separated from candidate SCO). No data is available concerning the SCO contamination levels. As long as the total activity does not exceed one A_2, is it permissible to describe, package and ship the material as "LSA Material"?

Question 5: Is there ever a situation that will allow a Class 7 radioactive material to be described as "LSA Material" when the matrix in the package includes both LSA-like material and candidate SCO and no contamination data is available for the candidate SCO content?

Gentlemen, thank you for your consideration of these questions and the valuable time required to provide a response. I look forward to the formal clarification.

For Regulatory Resources, Inc.,

Wade A. Winters, CET, CHMM
President

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