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

1200 New Jersey Ave., S.E.
Washington, DC 20590

OCT 19 2011

Mr. Michael W. Enghauser
Sandia National Laboratories
P.O. Box 5800 MS 1151
Albuquerque, NM 87185

Ref. No. 11-0126

Dear Mr. Enghauser:

This responds to your May 19, 2011 request for clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to characterization of material containing depleted uranium. In your letter, you provide the activity concentration and consignment activity values for each radionuclide contained in the mixture. You provide two methods for determining whether the material in question meets the definition of a Class 7 (Radioactive) material under the HMR. The two methods of characterization, your questions, and PHMSA's response are summarized as follows:

Method 1: The actual activity concentration and consignment activity of the material using the parent radionuclides (U-238, U-235, U-234; see Table 2 of incoming letter) were compared to the activity concentration for exempt material and the activity limit for exempt consignment values in § 173.436. The result of the calculation showed that both the activity concentration and the consignment activity of the material in question are below the exempt thresholds specified in § 173.436.

Method 2: The actual activity concentration and consignment activity of the material using the value for depleted uranium (see Table 3 of incoming letter) were compared to the activity concentration for exempt material and the activity limit for exempt consignment values in § 173.436. The result of the calculation showed that the material in question exceeds the thresholds specified in § 173.436 for depleted uranium.

Q1: Should the material in question be regulated as a Class 7 material based on the calculation methods summarized above and outlined in the incoming letter?

A1: The shipper may ship the material in accordance with the result of either characterization method under the HMR. Method 2 is the more conservative method and results in the material meeting the definition of a Class 7 material. Method 1 is a more detailed calculation that results in the material being exempt from Class 7 regulations.

Q2: Is it correct to sum the parent isotopic uranium values as shown in Table 3 of the incoming letter for comparison to the depleted uranium limits specified in § 173.436?

A2: Yes.

I hope this answers your inquiry. If you need additional assistance, please contact this office at (202) 366-8553.

Sincerely,

Ben Supko
Acting Chief, Standards Development
Standards and Rulemaking Division

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Eichenlaub
§173.403
§173.436
RAM
11-0126

May 19, 2011

U.S. DOT
**PHMSA Office of Hazardous** Materials Standards
**Attn: PHH–10**
**East Building**
1200 New Jersey Avenue, SE.
Washington, DC 20590–0001

**Subject: Activity Concentration Limit for Exempt Material (ACEM) and Activity Limit for Exempt Consignment (ALEC) Fraction Determinations for Depleted Uranium**

Dear Sir or Madam,

For material containing depleted uranium (DU), meeting the 49 CFR 173.403 definition of DU, with the activity concentrations and activities in consignment presented in Table 1, is it necessary to regulate the material as radioactive material? Please review Table 2 and Table 3 which provide different determinations.

In addition, is it correct to sum the parent isotopic uranium values as shown in Table 3 for comparison to the DU limits presented in 49 CFR 173.436?

Table 1. Activity concentrations and activities in consignment.

| Nuclide | Activity Conc (Bq/g) | Consignment Activity (Bq) |
|---|---|---|
| U-238 | 2.383 | 2383 |
| Th-234 | 2.383 | 2383 |
| Pa-234m | 2.383 | 2383 |
| U-235 | 0.031 | 30.6 |
| Th-231 | 0.031 | 30.6 |
| U-234 | 0.423 | 423 |
| Summation | 7.634 | 7634 |

Table 2. Method showing not regulated as radioactive material.

| Nuclide | Activity Conc (Bq/g) | Consignment Activity (Bq) | ACEM (Bq/g) | ALEC (Bq) | ACEM Fraction | ALEC Fraction |
|---|---|---|---|---|---|---|
| U-238 | 2.383 | 2383 | 10 | 10000 | 0.238 | 0.238 |
| U-235 | 0.031 | 31 | 10 | 10000 | 0.003 | 0.003 |
| U-234 | 0.423 | 423 | 10 | 10000 | 0.042 | 0.042 |
| Summation | 2.837 | 2837 | | | 0.284 | 0.284 |

U-234 ACEM and ALEC conservatively set to minimum values.
Parent nuclides and their progeny included in secular equilibrium per 49 CFR 173.436 are listed below:
U-238 Th-234, Pa-234m
U-235 Th-231

Table 3. Method showing regulated as radioactive material.

| Nuclide | Activity Conc (Bq/g) | Consignment Activity (Bq) | ACEM (Bq/g) | ALEC (Bq) | ACEM Fraction | ALEC Fraction |
|---|---|---|---|---|---|---|
| DU | 2.837 | 2837 | 1 | 1000 | 2.84 | 2.84 |

Please feel free to contact me at (505) 284-6116 if you have any questions.

Sincerely,

Michael W. Enghauser

CC:
MS-1151 Jeff Jarry, 04139
MS-1149 Howard Seeley, 04139
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