1200 New Jersey Avenue, SE Washington, DC 20590



#### Pipeline and Hazardous Materials Safety Administration

March 6, 2023

Mr. Kurt Colborn Compliance and Quality Assurance I.C.E. Service Group & SPS Strategic Packaging Systems 238 Moon-Clinton Road, Suite 200 Coraopolis, PA 15108-3034

Reference No. 22-0014

Dear Mr. Colborn:

This letter is in response to your February 23, 2022, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to non-radioactive solid objects with radioactive substances present on any surfaces.

We have paraphrased and answered your questions as follows:

- Q1. You ask whether a non-radioactive solid object with radioactive substances present is subject to the requirements of the HMR if the radioactive substances present on its surface are at levels less than those specified in the definition of "contamination" as provided in § 173.403.
- A1. The answer is no. Section 173.401(b)(5) excludes non-radioactive solid objects with radioactive substances present on any surface in quantities less than the levels defined in § 173.403 (See the definition of "contamination") from Subpart I (Class 7 Radioactive Materials) of Part 173 (Shippers General Requirements for Shipments and Packagings) of the HMR.
- Q2. You ask whether the presence of a radioactive substance on a non-radioactive solid is determined by the average activity of the surface of an object or the peak limit at any single point.
- A2. The definition of "contamination" as specified in § 173.403 sets thresholds on a per square centimeter basis. Section 173.443 provides additional specific requirements for contamination control and determination of non-fixed contamination levels, including averaging over a 300 cm<sup>2</sup> wipe area and ensuring sufficient measurements in appropriate locations are taken to yield a representative assessment of non-fixed contamination

levels. Averaging non-fixed or fixed contamination levels over the entire surface of an object is not permitted.

- Q3. You ask whether non-radioactive solids with radioactive contamination exceeding the limits specified in the definition of "contamination" as found in § 173.403 but do not exceed the consignment limits of § 173.436 are subject to the HMR, and whether this interpretation changes when applied to empty packages.
- A3. Non-radioactive solids with radioactive contamination present that exceed the limits specified in the definition of "contamination" found in § 173.403, but do not exceed the consignment limits of § 173.436, are excepted from the HMR because the radionuclides present do not meet the definition of "radioactive material" found in § 173.403. This interpretation does not change when determining whether packages that currently have no contents but previously contained radioactive material are subject to the provisions of the HMR. It must be noted that exemption from the provisions of the HMR is not equivalent with free release of material or packaging in the general public.
- Q4. You reference the table of exempt material activity concentrations and exempt consignment activity limits for radionuclides provided in § 173.436 and ask whether your understanding is correct that the consignment exemption limit is exceeded when the contamination limit for beta and gamma is over 300 cm<sup>2</sup>. (See § 173.403 for the definition of "Surface Contaminated Object").
- A4. The answer is yes. When the activity of radioactive substances present on a nonradioactive solid exceed the exempt consignment limits of § 173.436, the object is subject to the requirements of the HMR. It must be noted that the consignment limit of § 173.436 is based on activity present and not distribution over the surface of the nonradioactive object and can lead to large objects with very low contamination being subject to the requirements of the HMR.
- Q5. You ask whether contamination on an object, package, or conveyance must be determined by direct measurement.
- A5. The answer is no. Contamination can be determined from many different methods in addition to direct measurement. While the HMR do not specify a method for evaluation of fixed contamination, § 173.443 provides requirements for the measurement of non-fixed contamination. These include instructions on performing a wipe test, but also allow for the use of alternative methods of equal or greater efficiency as provided in § 173.443(a)(1)(ii). It must be noted that § 173.22 states it is the shipper's responsibility to properly class and describe a hazardous material. Depending on the shipment and form of material, analysis of a previous shipment may or may not be of value. It is necessary that whatever method is used be capable of detecting contamination at or below the contamination limits.

- Q6. You ask whether radioactive contamination may be present on the internal surfaces of an empty packaging recently used to ship exempt quantities of radionuclides.
- A6. While it is possible for regulated radioactive contamination to remain on the internal surface of a package after transport of an exempt quantity of radioactive material, great care must be taken when using a radioactively-contaminated package to transport exempt radioactive material as the amount and type of contamination may cause the shipment to be subject to the HMR.
- Q7. You state that determining the non-fixed contamination alone, or in combination with the dose reading, is not sufficient to ensure that an object or empty packaging is not "contaminated" as defined in § 173.403. You also state that dose readings are only useful for determining compliance if they can be shown to provide an effective representation of the total fixed and not-fixed contamination correlating to the definition's limits for the mixture of nuclides determined to be present in the contamination. You ask whether your understanding is correct.
- A7. The definition of "contamination" provided in § 173.403 establishes the threshold at which the presence of radioactive substance(s) on the surface of an object is considered contamination. For the purposes of exemption from the scope of the HMR via § 173.401(b)(5), this definition does not distinguish between fixed and non-fixed contamination and there are numerous methods to measure contamination. In other sections of the HMR, including § 173.443, Contamination Control, only non-fixed contamination limits are specified. Accordingly, § 173.22 states that it is the shipper's responsibility to properly class and describe a hazardous material.
- Q8. You ask whether an empty packaging is subject to the HMR under §§ 173.29 and 173.428 if it is free from contamination as described in § 173.403 or does not meet the definition of a Class 7 (radioactive) material under § 173.436. You also ask whether it is necessary to assume an empty package or conveyance must be shipped in accordance with § 173.428 as an empty Class 7 (radioactive) materials packaging unless it can be shown it is free from contamination in accordance with § 173.403 or is exempt in accordance with § 173.436.
- A8. Packages previously used to transport radioactive materials remain subject to the HMR unless they meet the requirements for exempt material activity concentrations and exempt consignment activity limits for radionuclides as specified in § 173.436. See A3.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

J. Alenn Poston

T. Glenn Foster Chief, Regulatory Review and Reinvention Branch Standards and Rulemaking Division

#### Pollack

22-0014

See attached request for interpretation.

Thanks,

Jonathon, HMIC

From: Kurt Colborn <kcolborn@iceservicegroup.com>
Sent: Wednesday, February 23, 2022 2:00 PM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Subject: Interpretation request, radioactive contamination

**CAUTION:** This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Please find the attached request for interpretation of the application of the definition of radioactive contamination.

Respectfully submitted,

Kurt Colborn Compliance and Quality Assurance I.C.E. Service Group & SPS Strategic Packaging Systems 238 Moon-Clinton Road, Suite 200 Moon Twp., PA 15108

Cell: 724-544-5815



Dirk Der Kinderen Chief, Standards Development Branch U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration 1200 New Jersey Avenue, SE Washington, DC 20590 Via email: infocntr@dot.gov

February 23, 2021

SUBJECT: Contamination Levels Exempt from Class 7 Requirements

### Dear Mr. Der Kinderen,

The purpose of this letter is to request confirmation of our interpretation of the requirements of 49 CFR 173.401(b)(5) and 173.403 definition of Contamination. In general, this letter seeks concurrence that contamination determinations described herein are compliant with the HMR. Specifically, we seek confirmation that a previously used packaging or conveyance that is not contaminated is not subject to any of the marking, labeling, or shipping documentation requirements of the HMR with regard to radioactive materials.

### Discussion:

173.401(b)(5) states that the requirements of Subpart I – Class 7 (Radioactive) Materials do not apply to Non-radioactive solid objects with radioactive substances present on any surfaces in quantities not exceeding the threshold limits set forth in the definition of contamination in § 173.403.

The 173.403 definition of Contamination states that *Contamination means the presence of a radioactive* substance on a surface in quantities in excess of 0.4 Bq/cm2 for beta and gamma emitters and low toxicity alpha emitters or 0.04 Bq/cm2 for all other alpha emitters. There are two categories of contamination:

(1) Fixed contamination means contamination that cannot be removed from a surface during normal conditions of transport.

(2) Non-fixed contamination means contamination that can be removed from a surface during normal conditions of transport.

Questions (Please confirm):

1) An empty packaging or conveyance, with radioactive nuclides on its surface at levels less than the levels established by the definition of contamination, is not subject to Class 7 controls.



2) The presence of contamination is correctly determined as an average activity over the surface of an object or the internal surfaces of an empty packaging (i.e. it is not a peak limit which renders the packaging contaminated if exceeded at any single point).

# Discussion:

Interpretation #18-0014 indicates that radioactively contaminated items not exceeding the consignment exemption activity limits of 173.436 are not regulated as radioactive materials.

Questions (Please confirm):

- 3) Items that are radioactively contaminated in accordance with 173.403, but not exceeding the consignment exemption limits of 173.436, are not subject to Class 7 controls; including empty packaging contaminated at these levels.
- 4) Using the 173.436 Table 8 general exemption limits for beta-gamma nuclides as an example, the consignment exemption limit is exceeded when contamination is present at the limits of the 173.403 definition over an area of just 2.5 m<sup>2</sup>. Hence, (in the absence of calculations specific to the nuclide concentrations present in contamination) the limit on contamination established by the definition is likely to be less restrictive than the consignment limit for objects or empty packagings of significant surface area (such as intermodal containers or gondola railcars).

# Discussion:

Interpretation #06-0274 held that a packaging previously used for Class 7 shipments, but more recently used for a shipment of materials exempt from Class 7 shipping requirements could, nonetheless, be a contaminated empty packaging after use for an exempt shipment.

Questions (Please confirm):

- 5) The presence or absence of contamination on an object or in an empty packaging or conveyance must be determined by direct measurement. Shipping documents from the most recent shipment are of limited usefulness to classify contamination in a packaging or conveyance that has been used for multiple Class 7 shipments of materials that may have had different A<sub>2</sub> values.
- 6) Regulated radioactive contamination may be present on the internal surfaces of an empty packaging most recently used to ship exempt quantities of radionuclides. This could occur from earlier non-removable contamination (as in #06-0274). Regulated contamination may also be present if any of the materials in previous shipments exceeded consignment exemption values but were exempt from classification as radioactive material because they were below the threshold for regulation based on average concentration.
- 7) Determining the non-fixed contamination alone, or in combination with a dose reading, is generally not sufficient to assure that an object or empty packaging is not contaminated in accordance with the definition in 173.403. Dose readings are only useful for determining compliance if they can be shown to provide an effective representation of the total fixed and non-fixed contamination correlating to the definition's limits for the mixture of nuclides determined to be present in the contamination.



8) An empty packaging or conveyance previously used for Class 7 shipments must be shipped in accordance with 173.428 as an Empty Packaging unless it can be shown to be either 1) free of contamination per the definition in 173.403; or 2) exempt from Class 7 regulation because it is shown to have contamination less than the conveyance activity limit determined by any of the methods in 173.436.

Respectfully submitted,

Kurt Colborn I.C.E. Service Group & SPS Strategic Packaging Systems 238 Moon-Clinton Road, Suite 200 Moon Twp., PA 15108 724-544-5815



Dirk Der Kinderen Chief, Standards Development Branch U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration 1200 New Jersey Avenue, SE Washington, DC 20590 Via email: infocntr@dot.gov

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