



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

AUG 07 2018

Linda Bray
Senior Health Physicist
Occupational Services Inc.
6397 Nancy Ridge Drive
San Diego, CA 92121

Reference No. 18-0033

Dear Ms. Bray:

This letter is in response to your March 2, 2018, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to custom optical instruments that use Thorium-232 (Th-232) as a filter. You note the following:

- The Th-232 is an integral part of the lens and is deposited as a fixed coating over the lens surface through a physical heating process.
- The Th-232 is not a removable (nonfixed) contaminant; it is designed as a part of the finished optical instrument fixed to the surface under normal conditions of transport.
- The level of distributed activity on the lens typically exceeds the exemption in § 173.401 based on the size of the lens, and for contamination limits in § 173.403.
- These lenses do not meet the definition of a sealed source, as the material is not completely encased by an enclosure.

You explain that while it is easy to determine the amount of Th-232 deposited on the lens, it is difficult to determine what is meant by concentration. You state that you would like to weigh each lens individually without any support structures such as holders, rings, or finished devices and then determine the concentration by dividing the Th-232 activity by the weight of the lens. When performing this calculation, the concentration is below the exempt values in § 173.436. Specifically, you ask whether a thin coating containing Th-232 applied to the surface of a lens could use the weight of the lens to determine activity concentration in accordance with the values in § 173.436.

The answer is no. Because the lens is a solid object with a radioactive substance on its surface, it would be more appropriate to consider the lens from a Surface Contaminated Object (SCO) perspective for Class 7 determination using the contamination limits in § 173.403. However, if you were to attempt to determine whether the TH-232 coating meets the definition of radioactive

material, then only the mass of the layer of Th-232 coating, not including the mass of the glass lens it is applied to, could be used for the activity concentration calculation as a Class 7 (radioactive material).

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

Sincerely,

A handwritten signature in black ink, appearing to read "T. Glenn Foster". The signature is written in a cursive style with a long horizontal flourish extending to the left.

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

Andrews
§173.436
Exemption
18-0033

Dodd, Alice (PHMSA)

From: INFOCNTR (PHMSA)
Sent: Monday, March 05, 2018 8:45 AM
To: Hazmat Interps
Subject: FW: Question on Interpretation of Class 7 Exemption for Thorium Lenses

Hello all,

Please see the below request for interpretation.

Regards,

-Breanna

From: Delcambre, Gordon (PHMSA)
Sent: Friday, March 02, 2018 3:20 PM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>; Kelley, Shane (PHMSA) <shane.kelley@dot.gov>; Foster, Glenn (PHMSA) <Glenn.Foster@dot.gov>
Cc: PHMSA Public Affairs <PHMSAPublicAffairs@dot.gov>
Subject: FW: Question on Interpretation of Class 7 Exemption for Thorium Lenses

HM Info Center & Standards,

Passing this one to you for direct response.

Joe

From: Linda Bray [<mailto:Linda@occserv.com>]
Sent: Friday, March 02, 2018 1:42 PM
To: PHMSA Public Affairs <PHMSAPublicAffairs@dot.gov>
Subject: Question on Interpretation of Class 7 Exemption for Thorium Lenses

I am hoping to obtain assistance on the interpretation of how to apply the exempt concentration limits in 49 CFR 173.436. We have a company manufacturing custom optical instruments (lens) that use Th-232 as a filter. They have the appropriate NRC and state licenses to possess and distribute the material as exempt from licensing. The lens are distributed to individuals who do not require a state or NRC license to possess the items. The lenses are made to order and contain varying levels of Th-232. The Th-232 is an integral part of the lens and is deposited as a fixed coating over the lens surface through a physical heating process. So the Th-232 is not a removable (nonfixed) contaminant, it is designed as part of the finished optical instrument fixed to the surface under normal conditions of transport.

The level of distributed activity on the lens do typically exceed the exemption in 173.401 based on the size of the lens, for contamination limits in 173.403. However, the activity levels are still very low which is why they qualify for the NRC exempt distribution license

These lens do not meet the definition of a sealed source or an article as the material is not completely incased by an enclosure around the Th.

It is easy to determine how much Th-232 is deposited on the lens. The difficult part is to determine what is meant by concentration. We would like to weigh each lens individually without any other support structures such as holders, rings

or finished devices and then determine the concentration by dividing the Th-232 activity by the weight of the lens. When we perform this calculation the concentration is below the exempt values in 173.436. However, the guidance available in the interpretations is not clear on this issue. They do indicate for sealed sources like little H-3 vials on glow in the dark watches to use the volume of the source without any additional support structures (i.e. the watch). This makes sense so that people cannot abuse or dilute the requirements by adding nonessential weight to get below the exempt limits. However, this is not a sealed source which can be considered a separate item. The material is an integral part of the lens, and the material cannot be readily separated from the lens to represent a volume. We also don't want to have to try to estimate an infinitely small volume of space to represent the source and way overestimate the hazard for transport of these items which are used in a wide variety of common optical instruments.

We want to ensure we are performing the assessment correctly. Please advise on how the regulations for the exempt concentration are to be applied in this situation as it impacts our shipping and also may impact customers who use the lens on a daily basis in devices which may also be moved over a public route.

Sincerely,

Linda Bray

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