U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

December 4, 2024

Richard Bonomo
Engineer and Laboratory Manager
Clandestine Materials Detection Inc.
2555 Industrial Dr.
Monona, WI 53713

Reference No. 24-0029

Dear Mr. Bonomo:

This letter is in response to your May 16, 2024, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the classification of an explosive detection system utilizing deuterium. Specifically, you state that you are seeking clarification on the classification of a device designed to detect explosives using deuterium (UN1957, Division 2.1 flammable gas) at a pressure of approximately 50 mTorr (0.0000658 atmosphere).

PHMSA regulates the transportation in commerce of materials it determines are hazardous in that "the amount and form [of the material] may pose an unreasonable risk to health and safety or property." 49 U.S.C 5103, as delegated to PHMSA in 49 C.F.R 1.53(b). Based on the information provided in your email, even in the event of a release, the low quantity of deuterium in your device, calculated based on the pressure and size of the container, would not support combustion due to the ratio of air to deuterium. Based on the information you provided, the deuterium is not in a quantity and form that pose an unreasonable risk to health, safety or property during transportation and, therefore, are not subject to regulation under the HMR.

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

Sincerely,

Alexander Wolcott
Acting Chief, Regulatory Review and Reinvention Branch
Standards and Rulemaking Division

Larson

24-0029

From: Andrews, Steven (PHMSA)
To: Dodd, Alice (PHMSA); Jones, Jessie Jane CTR (PHMSA)
Cc: Sears, Craig (PHMSA); DerKinderen, Dirk (PHMSA)
Subject: FW: Formal Letter of Interpretation
Date: Thursday, May 16, 2024 6:19:00 PM
Attachments: 07547.pdf

Alice/Jessie,

Please log this email below in as a formal letter of interpretation and assign as appropriate.

Thanks
Steven

From: Sears, Craig (PHMSA) <craig.sears@dot.gov>
Sent: Thursday, May 16, 2024 5:53 PM
To: Andrews, Steven (PHMSA) <steven.andrews@dot.gov>
Subject: Fwd: Formal Letter of Interpretation

Good afternoon Steven,
Here's the information and request that Mr. Bonomo put together as discussed. If a more direct conversation than email is requested, you can reach him at, telephone number 608-640-4001 extension 305.

Please let me know if you have any questions or if there's anything I can do to help.

Thanks!
Craig

Craig Sears
Compliance Investigator, Central Region
United States Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Office of Hazardous Materials Safety, Field Operations
901 Locust St., Suite 480 (PHH-43)
Kansas City, MO 64106
Mobile:202.308.8816

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Image

From: Richard Bonomo <bonomo@cmdworldwide.com>
Sent: Thursday, May 16, 2024 3:56 PM
To: Sears, Craig (PHMSA) <craig.sears@dot.gov>
Subject: Re: Formal Letter of Interpretation

Dear Craig,

Thank you for getting back to me.

Here is our situation:

Clandestine Materials Detection Inc. is seeking to design, develop, construct, and field test a device that we hope will successfully be used to detect landmines and other hidden explosives.

The system is going to involve gaseous discharge tubes that will contain deuterium, and only deuterium, at very low fill pressures, most likely 50mTorr (0.0000658 atmosphere) or less.
These gaseous discharge tubes will be carried by mobile (aerial or ground) platforms as part of the detection system.

One of the regulatory challenges we face is that deuterium, being an isotope of hydrogen — albeit and stable one — is classified as an explosive gas, which it would be at more conventional
pressures and when it is mixed with oxygen or some other suitable oxidizer. However, in this case, as there is NO chance of explosion or combustion of the deuterium, the device simply does
not represent a fire or explosion hazard.

We are working with the FAA to deal with regulatory matters over in that section, and we have been asked to get the Hazardous Materials section of the US-DoT to supply a letter of interpretation
to the effect that these devices, though they will contain deuterium, are simply not hazardous materials as the amount of deuterium involved is miniscule.

I will note that the US-DoT has made a determination of this sort in connection with deuterium lamps. Our devices are in a similar situation.

I have attached to this document a simple drawing intended to convey the likely size ranges and shapes of the devices we intend to develop, and a copy of the US-DoT's

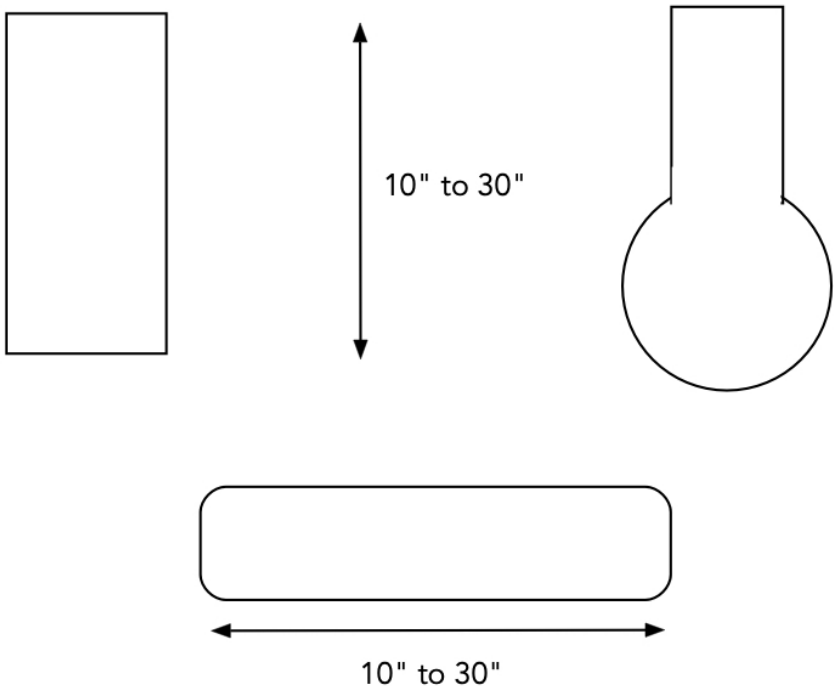
letter of interpretation
declaring that deuterium lamps are not a hazardous material.

Thank you.

Rich
(Richard Bonomo)
Engineer & Laboratory Manager
Clandestine Materials Detection Inc.
Monona, Wisconsin

Conceptual Sketch
Deuterium-Containing Device Intended for Mine-Detection Systems

Clandestine Materials Detection Inc., Monona, Wisconsin / RLRB



This is a vacuum device that is filled with D2 gas to a pressure of approximately 50mTorr or less. In the event of a rupture, atmospheric gas would rush and dilute the deuterium to such an extent that combustion is impossible.
The final device may take any number of forms, but this diagram gives some idea of the shapes and general size range it would likely take. The vessel will be made of titanium or a titanium alloy. It would be suspended from a flying drone, a balloon, or be mounted on a ground cart.

16 May 2024

On May 16, 2024, at 8:22 AM, Sears, Craig (PHMSA) <craig.sears@dot.gov> wrote:

Good Morning Mr. Bonomo,

I'd love to hear your question to see if I may be able to assist, but to submit a formal letter of interpretation, you can simply write your question with any relevant/pertinent information that may be necessary in making the determination as well as your contact information and reply to me. I'll than forward your question and info to the interpretations division directly. Please let me know if you have any questions.

Thanks

Craig

Craig Sears
Compliance Investigator, Central Region
United States Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Office of Hazardous Materials Safety, Field Operations
901 Locust St., Suite 480 (PHH-43)
Kansas City, MO 64106
Mobile:202.308.8816

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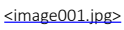 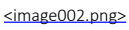

U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

NOV - 9 1994

Ms. Nancy D. Roby
Traffic Administrator
Imaging & Sensing Tech. Corp.
300 Westinghouse Circle
Horseheads, NY 14845

Dear Ms. Roby:

This is in response to your letter of August 9, 1994, requesting information on whether the deuterium lamps manufactured by your company are subject to this Department's Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

Based on the technical report enclosed with your letter, it is the opinion of this Office that the deuterium lamps described do not meet the definition of a flammable gas and are not subject to the HMR. As competent authority for the United States of America, it is our determination that the deuterium lamps described also would not be subject to the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air or the International Maritime Dangerous Goods Code.

I hope this information is helpful.

Sincerely,

/s/ J. Suzanne Hedgepeth

Alan I. Roberts
Associate Administrator for
Hazardous Materials Safety

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Ap 1 of 1

VB 1
F: 173.22
SC: 174, 518

IMAGING & SENSING TECHNOLOGY

Westinghouse Circle
Horseheads, NY 14845
607-796-3400

August 9, 1994

Mr. Edward Mazzulo, Director
Office of Hazardous Materials Standards
U.S. Department of Transportation
Research and Special Programs Administration
400 Seventh Street, S.W.
Washington, DC 20590-0001

AUG 15 1994
A.L.

Dear Mr. Mazzulo:

Imaging & Sensing Technology Corporation formed in 1988, (formerly part of Westinghouse Electric Corporation) currently manufactures and ships deuterium lamps to domestic and international customers. We ship from two locations, Horseheads, New York and Cayey, Puerto Rico.

Recently, an international customer was concerned about shipping deuterium lamps and requested information. Our Engineer, Dr. Dale Brabham, who has direct responsibility for the engineering aspects of these deuterium lamps prepared the attached technical report. Based on this report, it was concluded that these lamps do not present a hazard. If you wish to discuss any of the details of this report, Dr. Brabham can be contacted at (607) 796-4353.

I then discussed this report with Dr. George Cushmac, in your Sciences Group, and he agreed with our findings and instructed me to submit a letter and this report to your office for review.

Hdt!

Your review of this report and the issuance of a written determination for domestic transportation and as competent authority for international transportation would be appreciated.

Very truly yours,

Nancy D. Roby

Nancy D. Roby
Traffic Administrator
Imaging & Sensing Tech. Corp.
300 Westinghouse Circle
Horseheads, NY 14845

Phone: 607-796-4330

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Qp 2 of 1

Enc.

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