

RULEMAKING ISSUE NOTATION VOTE

July 19, 2011

SECY-11-0097

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

SUBJECT: DENIAL OF PETITION FOR RULEMAKING (PRM-32-6),
ASSOCIATION OF STATE AND TERRITORIAL SOLID WASTE
MANAGEMENT OFFICIALS

PURPOSE:

To obtain Commission approval to deny a petition for rulemaking (PRM) submitted by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO or the petitioner).

BACKGROUND:

By letter dated November 6, 2009, the ASTSWMO submitted PRM-32-6 requesting the U.S. Nuclear Regulatory Commission (NRC) amend its regulations to improve the labeling and accountability of tritium exit signs ([Enclosure 1](#)). The petitioner requested that the NRC revise its regulations and/or guidance to require that: the labeling be in several locations on the sign and printed with larger font; an expiration date should be distinctly legible to a fire or building inspector without taking down the sign; and the radiation trefoil should be displayed on the front and back of advertisements. The petitioner, after an evaluation of a case history of landfill leachate sampling, made the assertion that most unaccounted for tritium exit signs are disposed of in solid waste landfills where they become potential sources of groundwater and surface water contamination. The petitioner claimed that a minority of tritium exit signs are returned to the manufacturer for recycling or disposed of as low-level radioactive waste.

CONTACTS: Gregory Trussell, FSME/DILR
301-415-6445

Adam Schwartzman, FSME/DWMEP
301-415-8172

SECY NOTE: THIS SECY PAPER TO BE RELEASED TO THE PUBLIC 5 WORKING DAYS AFTER DISPATCH OF THE LETTER TO THE PETITIONER.

A notice of receipt of the petition was published in the *Federal Register* on January 12, 2010 (75 FR 1559), with the comment period ending March 29, 2010. The NRC received responses from 13 commenters including 2 manufacturers, 6 Agreement States, 1 Federal agency, and other industry representatives. The majority of commenters agreed that labeling should be improved and no commenter specifically disagreed with this request. Three commenters disagreed with the petitioner's assertions that unaccounted for tritium exit signs disposed of in solid waste landfills are a potential source of groundwater and surface water contamination. One commenter stated it did not believe that the inadvertent disposal of tritium exit signs poses a significant public health and safety issue, even if the relatively large numbers suggested by ASTSWMO were accurate. Another commenter stated that while it is true that relatively recent sampling of raw, untreated leachate from landfills in Pennsylvania and California resulted in the discovery of above background levels of tritium, it has been determined that, considering the treatment, dilution, and discharge processes to which this leachate is subjected, there is currently no risk to drinking water supplies or possible human exposure.

Additionally, ASTSWMO requested NRC take the following actions: 1) replacement of tritium exit signs with an alternative technology; 2) a national collection effort with distinct milestones and goals on all expired and disused tritium exit signs; and 3) organization of a meeting with ASTSWMO and interested stakeholders. Because these requests are outside the scope of rulemaking, and in some cases are outside the scope of NRC's statutory authority and mission, they were not considered in the context of resolving this petition. Currently, staff has not allocated resources for a public meeting with ASTSWMO and interested stakeholders and does not plan to do so unless the Commission directs otherwise.

DISCUSSION:

The staff has considered the petition and its supporting rationale. For the reasons set forth in a draft *Federal Register* notice addressing the petitioner's requested actions ([Enclosure 2](#)), the staff recommends denial of the petition for rulemaking.

In reaching this decision, the NRC reevaluated the radiological risks presented by tritium exit signs in general and from the levels of tritium reported in landfill leachate and determined that there is a lack of significant radiological risk to the public health and safety related to the petitioner's assertions. The NRC believes that even if the petitioner's assertions are credible, the NRC already has specific regulations in place that address the rulemaking requests contained in the petition. The NRC believes that the existing regulations adequately direct the proper methods of disposal, labeling, and information disclosure for tritium exit signs and provide reasonable assurance that common defense and security and public health and safety are adequately protected.

Users of tritium exit signs are regulated under the general license provisions in Title 10 of the *Code of Federal Regulations* (10 CFR) 31.5, along with users of many other types of devices containing byproduct material. The general license in 10 CFR 31.5 requires users of tritium exit signs: to not remove the labeling from the sign; to follow instructions and precautions on the label; to not abandon a sign; to properly dispose of signs by transferring them to a distributor or radioactive waste broker specifically licensed by the NRC or an Agreement State; to report any lost, stolen or broken sign(s) to the NRC; and to not give away or sell the sign to another individual, company, or institution unless it is to remain in use at a particular location, e.g., in a transfer of ownership of a building. In this latter case, under 10 CFR 31.5(c)(9)(i), the user of a

tritium exit sign is obligated to provide a copy of the regulatory requirements governing the use of such signs to the new general licensee and must notify the NRC of the transfer.

The petitioner raised questions about the requirements placed on distributors related to whether users and others who come into contact with the sign are properly informed of the fact that the sign contains radioactive material and is subject to certain controls, in particular those for disposal. These requirements are primarily addressed by 10 CFR 32.51(a)(3), which includes requirements for labeling and providing safety instructions, and 10 CFR 32.51a(a)–(c), which requires certain information that must be provided to customers prior to transfer of the signs, including copies of applicable regulations and information on options for and estimated costs of disposal. The petitioner stated that there needs to be multiple labels in several locations and that the labels need to be printed in larger font. The current 10 CFR 32.51(a)(3) requires the applicant for a license to distribute tritium exit signs to ensure that the label on the signs be durable, legible, clearly visible, and include certain information including a statement that use of the sign is generally licensed by the NRC or an Agreement State and that the label must be maintained in legible condition. The NRC must approve the applicant's plans for labeling when authorizing distribution to users, at which time the NRC can address the appropriateness of fonts and proper placement on the sign.

The petitioner requested that the expiration date be distinctly legible to a fire or building inspector without taking down the sign. The expiration date (i.e., the date the sign should be replaced in order to meet fire safety standards because as the tritium decays the brightness of the sign is reduced), is not a matter of NRC regulation because it focuses on visibility of the sign, not the safe use of the signs, and is more appropriately in the jurisdiction of other agencies responsible for fire safety.

The petitioner also requested that the radiation trefoil be displayed on the front and back of advertisements. The staff agrees with some of the commenters that the use of the trefoil on advertisements is not appropriate. In an earlier action related to misleading advertising, the staff issued Information Notice (IN) 99-26, "Safety and Economic Consequences of Misleading Marketing Information," dated August 24, 1999. The IN 99-26 alerted addressees to the fact that misleading marketing information and inadequate explanation of end-user regulatory requirements can lead to mishandling of generally licensed devices, and encouraged manufacturers and distributors to market generally licensed devices in such a way that the radioactive nature of the product is clearly understood and the regulatory requirements associated with the product are clearly explained.

With respect to tritium exit sign disposal, under 10 CFR 32.51a(a)–(c) or equivalent Agreement State regulation, distributors are required to supply customers prior to the actual transfer of the sign(s): with copies of relevant regulations, information on acceptable disposal options including estimated costs of disposal, and indication of the NRC's policy of issuing high civil penalties for improper disposal. Although disposal by transfer to a properly authorized specific licensee was always required, the previous regulatory framework did not require NRC or Agreement State notification of the transfer and disposal of tritium exit signs. Under the current regulatory framework, the NRC now receives many reports demonstrating proper transfer to a distributor. Because of the long useful lifetime of the signs and the more limited reporting requirements prior to 2001 (and later for those in Agreement States), it is not possible to determine exactly what fraction of signs may have been improperly disposed of by general licensees.

The petitioner asserted that “the majority” of unaccounted for tritium exit signs are disposed of in solid waste landfills where they may become potential sources of groundwater and surface water contamination. The staff concludes that the petitioner did not demonstrate that the excess tritium being found in landfill leachate, even if resulting from improper disposal of tritium exit signs, could result in hazardous levels of tritium in drinking water. Published reports such as “Radiological Investigation Results for Pennsylvania Landfill Leachate: 2009 Tritium Update,” by Safety and Ecology Corporation, Knoxville, TN, March 31, 2010, support this conclusion. More information is in [Enclosure 2](#) with respect to staff’s conclusion that tritium concentrations associated with the possible improper disposal of exit signs into landfills would pose minimal risk to the health and safety of workers and the general public.

In January 2009, the staff received a final report from Wal-Mart indicating they could not account for a large number of tritium exit signs. The Wal-Mart report indicated that Wal-Mart did not adequately understand their status as a general licensee with associated responsibilities to account for their tritium exit signs. Subsequently, the staff issued a Demand for Information (DFI) to general licensees believed to possess at least 500 tritium exit signs. The purpose of the DFI was to ascertain whether other general licensees adequately understood their general licensee status, and had adequate control of their tritium exit signs.

As mentioned previously in this paper, the staff issued IN 99-26, to encourage manufacturers to be forthright with their customers concerning the radioactive nature of generally-licensed devices, and the associated responsibility that comes with owning them. Similarly, the staff issued Regulatory Issue Summary (RIS) 2006-25, “Requirements for the Distribution and Possession of Tritium Exit Signs and the Requirements in 10 CFR 31.5 and 32.51a,” to both remind distributors of generally-licensed devices of their regulatory responsibilities, and to remind general licensees of their responsibility to properly account for generally-licensed devices (which include tritium exit signs). Because of the staff’s experience with Wal-Mart and the results of the DFI, the accountability of tritium exit signs continues to be a challenge. General licensees’ accountability may be strengthened through enhancing regulatory guidance, as well as more effective communications between the NRC (and Agreement States) and manufacturers. The staff has analyzed issues identified by the petitioner and concluded that the issues raised in the petition do not result in a demonstrable safety impact to the general public that would justify additional requirements in the form of rulemaking. The staff will continue efforts to ensure that general licensees better understand the need to comply with existing requirements.

For these reasons, the staff finds that the arguments presented in the petition do not support rulemaking to revise the labeling and accountability of tritium exit signs.

RECOMMENDATIONS:

That the Commission:

1. Approve the denial of the petition for rulemaking and publication of the *Federal Register* notice announcing the closure;
2. Inform appropriate Congressional committees; and

The Commissioners

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3. Note that a letter is enclosed for the Secretary's signature ([Enclosure 3](#)), informing the petitioner of the Commission's decision on the petition.

COORDINATION:

The Office of the General Counsel has no legal objection to the denial of this petition.

/RA Martin Virgilio for/

R. W. Borchardt
Executive Director
for Operations

Enclosures:

1. [Petitioner Petition, dated 11/06/09](#)
2. [Federal Register Notice](#)
3. [Letter to the Petitioner](#)

Association of State and Territorial
ASTSWMO
Solid Waste Management Officials

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November 6, 2009

Chairman Gregory B. Jaczko
U.S. Nuclear Regulatory Commission
Mail Stop O-16G4
Washington, DC 20555-0001

Dear Chairman Jaczko,

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) is an organization representing the managers of solid waste, hazardous waste, remediation, and underground storage tank programs of the states and territories. The ASTSWMO Radiation Focus Group is tasked with identifying national level radiation issues of concern and promoting partnerships between states and federal agencies to address these issues.

On behalf of ASTSWMO's Board of Directors and the Radiation Focus Group, I am writing to formally express our concern about the fate of self-luminescent tritium-containing exit signs, and to formally petition for revisions to your regulations. After an evaluation of the case history (see enclosure), ASTSWMO has found that the majority of unaccounted for tritium exit signs are disposed in solid waste landfills where they become potential sources of groundwater and surface water contamination. A minority of tritium exit signs are returned to the manufacturer for recycling, or disposed of as low-level radioactive waste (LLRW). As solid waste management officials, we request that the U.S. Nuclear Regulatory Commission (NRC) revise regulations and/or guidance to improve the labeling and accountability of tritium exit signs. Ideally, we would desire that tritium exit sign technology be immediately replaced by alternative technologies.

From the standpoint of the existing market, specific changes to new tritium exit signs will improve recognition and thus accountability. Most importantly, the labeling should be in several locations on the sign, with larger font, and an expiration date should be distinctly legible to a fire or building inspector without taking the sign down. Furthermore, manufacturers do not always demonstrate accountability in dispensing exit signs to the proper recipients, and recipients are not informed of proper ownership and regulatory requirements provided in NUREG-1556, Vol. 16, Appendix L, and 10 Code of Federal Regulations, Part 31.5. Online vendors do not always highlight that tritium is radioactive and that it has special "general licensing" requirements. The radiation trefoil should be displayed on the front and back of advertisements. Given the recent Walmart experience with these signs, clearly general licensing is successful only when the user understands these devices are radioactive and subject to controls. In light of the current general lack of controls, specific licensee manufacturers should be responsible for informing customers of the proper disposal of expired and used tritium exit signs. Again, from the standpoint of solid waste management officials, the NRC should exercise their full regulatory authority to prevent the disposal of tritium exit signs in landfills.

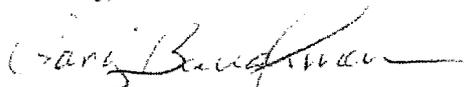
Though not in NRC's purview, advances in photo-luminescent technology over the past decade have demonstrated effective alternate technology for places without electricity. Efficient Light Emitting Diodes (LEDs) with backup batteries are being used where electricity is available. These technologies together replace the need for tritium self-luminescent exit signs. Also, we recommend a national collection effort with distinct milestones and goals should be done to consolidate all expired and disused tritium exit signs. Solid waste management officials simply want to stop tritium exit sign disposal in landfills.

11/17...To EDO for Appropriate Action..Cpy to: RF....09-0569

The ASTSWMO Radiation Focus Group has been working with the U.S. Environmental Protection Agency since 2002 to improve public information about existing tritium exit signs. We also welcome the opportunity to work with NRC and other stakeholders, and provide input from State solid waste management officials concerning tritium-containing exit signs and how to keep them out of solid waste landfills. We further request that NRC organize a meeting with ASTSWMO and all interested stakeholders to set a new path forward on this important issue.

We would like to thank you for your attention to this matter. If you would like to discuss this issue further, please contact Dale Rector, TN, ASTSWMO Radiation Focus Group Chair, at (865) 481-0995 or Dale.Rector@tn.gov.

Sincerely,



Gary Baughman, CO
ASTSWMO President

Enclosure

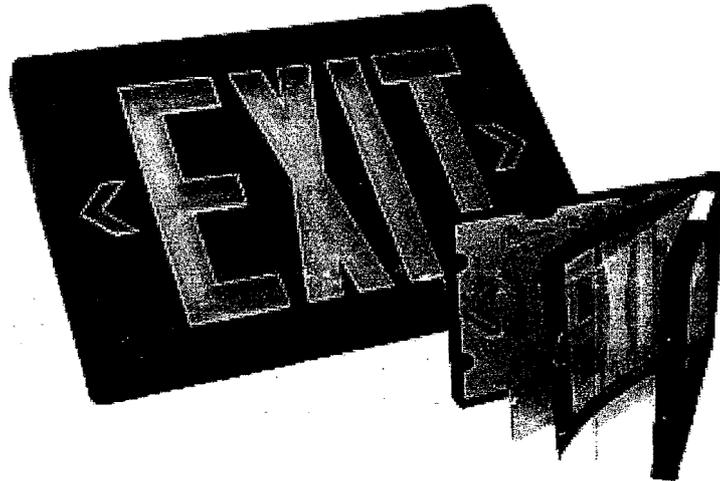
CC: ASTSWMO Radiation Focus Group
Helen Burnett, U.S. Environmental Protection Agency
Christian Einberg, U.S. Nuclear Regulatory Commission

Association of State and Territorial

ASTSWMO

Solid Waste Management Officials

**Lack of Tritium Exit Signs Control and
Contamination of Landfill Leachate**



**FINAL
JULY 2009**

**ASTSWMO Radiation Focus Group
Federal Facilities Research Center**

**Association of State and Territorial Solid Waste Management Officials
444 North Capitol Street, N.W. Suite 315
Washington, D.C. 20001**

Acknowledgements

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) is an organization supporting the environmental agencies of the States and Territories (States).

This document was prepared by the ASTSWMO Federal Facilities Research Center's Radiation Focus Group. The mission of the Radiation Focus Group is to identify national level radiation issues, coordinate State input, encourage improved partnership between State and Federal Agencies; and produce issue papers and other products as necessary to promote State interests on national radiation issues involving site cleanup and health and safety at federal facilities and other sites. The group acts as a resource to States in researching issues regarding radiation, providing information to States, and assisting in building State radiation program capacities, as requested by members.

ASTSWMO thanks the following members for their participation in development of this report:

Dale Rector, Focus Group Chair, TN
Jeff Deckler, Past-Focus Group Chair, CO
David Allard, PA
David Jones, ID
Jay Hyland, ME
Bobby Lopez, NM
John Mitchell, NY
Brian Nickel, OH
Jennifer Opila, CO
Mohinder Sandhu, CA
David Whitfill, KS

Lack of Tritium Exit Signs Control and Contamination of Landfill Leachate

Introduction

The Radiation Focus Group of ASTSWMO's Federal Facilities Research Center began researching tritium issues in 2003. At the same time, the U.S. Environmental Protection Agency (EPA) began conducting product stewardship activities concerning tritium containing devices; specifically self-luminescent tritium exit signs.

In 2003, the California Water Board evaluated 50 landfills for the presence of radioactive materials in landfill leachate. Above-background levels of tritium were found in leachate at 10 of these facilities.¹ In 2004, the Commonwealth of Pennsylvania began conducting a comprehensive two-year evaluation of 54 landfills that tested for the presence of radioactive materials in landfill leachate.² The study was conducted as a follow up to Pennsylvania's new requirements for radiation monitoring at solid waste management facilities and to confirm findings of the 2003 California study. In the Pennsylvania evaluation, above-background levels of tritium were noted in leachate at most facilities. Pennsylvania has done quarterly sampling for the past two years with similar findings. Studies in New York and New Jersey also have shown similar results.³ The source of higher-than-background levels of tritium found in landfill leachate samples is presumed to originate from the improper disposal of self-luminescent tritium exit signs found in construction and demolition (C&D) waste and other solid waste streams, as there are no other known sources of tritium in industrial or consumer products that would cause elevated levels of tritium in landfill leachate.

This paper is intended to serve as a source of information to assist State and Territorial program managers tasked with assessing tritium and solid waste disposal. Additional information on tritium can be located at the following:

- **Pennsylvania Department of Environmental Protection – Bureau of Radiation Protection**
http://www.dep.state.pa.us/brp/Radiation_Control_Division/Tritium.htm
- **Product Stewardship Institute (PSI)**
<http://www.productstewardship.us/displaycommon.cfm?an=1&subarticlenbr=191>
- **U.S. EPA – RadTown USA – Discarded Tritium Exit Signs**
<http://www.epa.gov/radtown/exit-signs.html>
- **U.S. Nuclear Regulatory Commission (NRC)**
<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tritium-radiation-fs.html>

¹ <http://www1.ciwmb.ca.gov/LEAMemo/2003/RadSurvey/WaterSample.pdf>.

² http://www.dep.state.pa.us/brp/Radiation_Control_Division/SolidWasteMonitoring/SolidWasteRadMonitoringReports.htm

³ http://www.hydroqual.com/publications/rdm_07_01_a.htm

information summary (RIS 2006-25) in 2006 reiterating their requirements in 10 CFR 31 and 10 CFR 32 related to distribution, disposal, and appointment of a responsible individual. The NRC has also issued a request for information (RIF) from those organizations with over 500 tritium exit signs.¹²

As noted above, only a few States have documented landfill leachate with similar tritium concentrations. From 2005 to 2007, in a related aspect to tritium in landfill leachate, the NRC and the nuclear power industry expended thousands of manhours and millions of dollars evaluating similar tritium concentrations in groundwater around nuclear power plants.

In 2007, the Conference of Radiation Control Program Directors (CRCPD) expressed their growing concern with the ineffective regulatory control, inadequate labeling and improper disposal of tritium exit signs. Through discussion at their annual meeting and via an official Resolution, the CRCPD members commended the EPA for their efforts to mitigate the improper disposal of tritium exit signs and the NRC for issuing RIS 2006-25. However, CRCPD recommended that NRC and all States begin a national effort to actively alert general licensees with tritium exit signs of their regulatory obligations for control and disposal and to check expiration dates. Similarly, according to the CRCPD Resolution, States and NRC should continue to actively alert solid waste facilities, and the fire safety and building construction industries, as to the concerns related to tritium exit signs.¹³

While there is a growing concern in States over the regulation and disposal of tritium exit signs, several groups have developed guidance and training on how to safely handle and dispose of tritium exit signs, and how to respond to tritium releases. These include:

- **Kansas Department of Health and Environment – Gas Tritium Light Sources**
Provides guidance for the recovery of and response to damaged and/or broken tritium exit signs. This resource may be used as a guide for other States in responding to tritium releases. <http://www.kdheks.gov/radiation/radnews/9804.html#gtls>
- **Product Stewardship Institute (PSI) – Tritium Exit Sign Stewardship**
In collaboration with EPA and other stakeholders, PSI has produced informational products pertaining to the proper handling and disposal of exit signs, including details on how and where to dispose of and recycle exit signs.
<http://www.productstewardship.us/displaycommon.cfm?an=1&subarticlenbr=191>
- **U.S. EPA - Responsible Management of Tritium EXIT Signs**
The U.S. EPA has developed an online and CD based training program to educate tritium exit sign users regarding proper handling and disposal. EPA's training program provides information on a number of topics, including an introduction to tritium and tritium exit signs, an overview of potential risks and health affects, and resources for proper regulation, handling and disposal of exit signs.
http://www.trainex.org/web_courses/tritium/index.htm

¹² <http://www.nrc.gov/reading-rm/doc-collections/news/2009/09-011.html>

¹³ http://www.crcpd.org/positions_resolutions/Waste_Mgmt/waste_20071114.html

Recommendations

The ASTSWMO Radiation Focus Group believes that the NRC should formally evaluate the submitted safety assessments for GL tritium exit signs with respect to disposal scenarios in solid waste transfer facilities, landfills and incinerators. The scope of an inappropriate disposal may range from a single sign to tens of signs, thus potential exposures need to be bounded. These safety assessments for GL tritium exit signs should fully assess tritium exposure scenarios via airborne and ingestion pathways.

The Focus Group recommends that NRC evaluate their regulations pertaining to generally licensed tritium exit signs, in particular, with respect to the size of labels alerting a user the exit sign contains radioactive tritium, the replacement date, and their proper transfer or disposal obligations. The Focus Group also recommends that NRC evaluate the need for a national and/or individual State-level tracking or registration program for tritium exit signs.

NUCLEAR REGULATORY COMMISSION

10 CFR Part 32

Docket No. PRM-32-6

[NRC-2009-0547]

Association of State and Territorial Solid Waste Management Officials

Denial of Petition for Rulemaking

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking: denial.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM-32-6) submitted by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) or the petitioner. The ASTSWMO requested that the NRC amend its regulations to improve the labeling and accountability of tritium exit signs. The ASTSWMO believes the majority of unaccounted tritium exit signs are disposed of in solid waste landfills where they become potential sources of groundwater and surface water contamination. The ASTSWMO requested that the NRC revise its regulations or guidance to require that: the labeling be in several locations on the sign and printed with larger font; an expiration date should be distinctly legible to a fire or building inspector without taking down the sign; and the radiation trefoil should be displayed on the front and back of advertisements.

Also, the petitioner recommends that a national collection effort with distinct milestones and goals be undertaken to consolidate all expired and disused tritium exit signs. The petitioner requested that the NRC organize a meeting with ASTSWMO and all interested stakeholders to set a new path forward on this issue. The NRC is denying PRM-32-6 for the reasons stated in this document.

DATES: The docket for PRM-32-6 is closed as of [insert date of publication].

ADDRESSES: You can access publicly available documents related to this petition for rulemaking using the following methods:

- **NRC'S Public Document Room (PDR):** The public may examine and have copied, for a fee, publicly available documents at the NRC's PDR, Room O-1F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.
- **NRC's Agencywide Document Access and Management System (ADAMS):** Publicly available documents created or received at the NRC are available online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC's PDR reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov.
- **Federal Rulemaking Web Site:** Public comments and supporting materials related to this document can be found at <http://www.regulations.gov> by searching on Docket

ID NRC-2009-0547. Address questions about NRC dockets to Carol Gallagher, telephone: 301-492-3668; e-mail: Carol.Gallagher@nrc.gov.

FOR FURTHER INFORMATION CONTACT: Gregory Trussell, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: 301-415-6445, e-mail: Gregory.Trussell@nrc.gov.

SUPPLEMENTARY INFORMATION:

The Petition

More than 2 million tritium exit signs are estimated to have been sold in the United States. Tritium powered self luminous exit signs do not require electricity or batteries, and are commonly installed in areas where electrical power is not conveniently accessible or its use may be hazardous. They serve a safety function by remaining lit during power outages and thus serve their intended purposes in emergencies. As tritium exit signs age, they do not glow as brightly and at some point will not meet the luminosity requirement of applicable building or fire safety codes. When this happens, the exit signs should be replaced. The tritium gas in the exit sign is contained in sealed glass tubes. The insides of the tubes are lined with a phosphor. Low-energy beta radiation emitted by the tritium bombard the phosphor, causing it to glow. This low-energy beta radiation cannot penetrate the glass tube. If the tubes in the exit signs are severely damaged, the tritium might escape into the immediate surrounding area, but most likely will quickly disperse by diffusion in the air. Tritium gas is odorless, colorless, and tasteless, and is lighter than air.

On January 12, 2010 (75 FR 1559), the NRC published a notice of receipt of a petition for rulemaking filed by ASTSWMO. The ASTSWMO requested that the NRC amend its regulations to improve the labeling and accountability of tritium exit signs.

The ASTSWMO believes the majority of unaccounted for tritium exit signs are disposed of in solid waste landfills where they become potential sources of groundwater and surface water contamination. The ASTSWMO specifically requested that the NRC revise its regulations or guidance to state that: the labeling should be in several locations on the sign and printed with larger font; an expiration date should be distinctly legible to a fire or building inspector without taking down the sign; and the radiation trefoil should be displayed on the front and back of advertisements. Also, the petitioner recommended that a national collection effort with distinct milestones and goals should be undertaken to consolidate all expired and disused tritium exit signs. The petitioner requested that the NRC organize a meeting with ASTSWMO and all interested stakeholders to set a new path forward on this issue. The petitioner stated that it would ideally like to see tritium exit sign technology immediately replaced by alternative technologies.

The ASTSWMO, after an evaluation of a case history of landfill leachate sampling, asserted that the majority of unaccounted for tritium exit signs are disposed in solid waste landfills where they become potential sources of groundwater and surface water contamination. The petitioner also claimed that a minority of tritium exit signs are returned to the manufacturer for recycling or disposed of as low-level radioactive waste.

The ASTSWMO also made the assertion that advances in photo-luminescent technology over the past decade have demonstrated that effective alternate technology exists for places without electricity, replacing the need for tritium self-luminescent exit signs.

Petitioner's Requests

The petitioner made several requests for rulemaking that would require revision to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 32, as well as requests that are outside the rulemaking process. The petitioner requested that NRC regulations be amended as follows:

(1) Labeling should be in several locations on the sign with larger font. The basis for this request is the petitioner's belief that an increased number of labels on tritium exit signs will improve the ability to recognize the signs, which in turn will improve the accountability of the signs.

(2) An expiration date should be distinctly legible to a fire or building inspector without taking down the sign. As with adding labels in several locations on the sign, the basis for this request is the petitioner's belief that an expiration date that is legible without the need to remove the sign from where it is installed will improve the ability to recognize tritium exit signs, which in turn, will improve the accountability of the signs.

(3) The radiation trefoil should be displayed on the front and back of advertisements. The petitioner communicated several concerns as the basis for this request. These concerns include the petitioner's belief that: a) manufacturers do not always demonstrate accountability in distributing tritium exit signs to the proper recipients; b) recipients of signs are not informed of the proper ownership and regulatory requirements provided in NRC guidance documents and regulations (i.e., NUREG-1556, Vol. 16, Appendix L, and 10 CFR 31.5); and c) online vendors do not always highlight the fact that tritium is radioactive and has special general licensing

requirements. Thus, the petitioner believes that requiring the display of the radiation trefoil in advertisements is a way to make potential customers fully aware that tritium exit signs contain radioactive material. Ostensibly, the petitioner believes trefoils in advertisements would act as a safeguard against customers unknowingly acquiring exit signs that require special regulatory controls.

Additional requests that go beyond NRC's authority or the rulemaking process include:

(1) Replacement of tritium exit signs with an alternative technology. The basis for this request is the petitioner's belief that non-radioactive self-luminescent technology (i.e., photo-luminescent technology) is a viable alternative to the use of radioactive self-luminescent technology. The petitioner believes that photo-luminescent technology and other alternatives can effectively replace tritium exit signs. NRC authority does not include the ability to require alternative technologies.

(2) National collection effort. The petitioner asserts that tritium exit signs are improperly disposed in landfills. On the basis of the petitioner's belief that a national collection effort is a way to cease this improper disposal, the petitioner requested the formation of a national collection effort with distinct milestones and goals on all expired and disused tritium exit signs. Conducting such an effort exceeds NRC's authority.

(3) Organization of a meeting with ASTSWMO and interested stakeholders. On the basis of the petitioner's belief that tritium exit signs are improperly disposed in landfills, the petitioner communicated a desire to allow solid waste management officials to provide input to the NRC on ways to cease this improper disposal. The petitioner further suggested that the NRC organize a meeting with ASTSWMO and all interested stakeholders to set a new path forward on this important issue. Because this request is not related to a specific proposed change in the regulations, it is not being addressed in the context of closure of this Petition.

Because these three requests are outside the scope of rulemaking or are outside the scope of NRC's statutory authority and mission, comments related to those requests and the proposal themselves are not being more specifically addressed in the response to this petition.

Public Comments on the Petition

The notice of receipt of the petition for rulemaking (75 FR 1559) invited interested persons to submit comments. The petition was also shared with 37 Agreement States that regulate the manufacture and use of tritium exit signs within their States, under agreement with the NRC. The comment period closed on March 29, 2010. The NRC received responses from 13 commenters including 2 manufacturers, 6 Agreement States, 1 Federal agency, and other industry representatives. The following provides a summary of the comments received on the petition.

Public Comments on Petitioner Requests Involving Rulemaking

The petitioner's first request is improving the labeling of tritium exit signs by requiring the placement of labels in several locations on the sign, in larger font. The rationale is that larger font would improve recognition, and thus accountability. The majority of commenters agreed that labeling should be improved and no commenter specifically disagreed with this request.

The petitioner's second request is requiring the placement of an expiration date on

tritium exit signs, and making the date distinctly legible to a fire or building inspector without the need to take down the sign. The rationale is that the fire or building inspector will be aware of an expired sign and request the replacement. Four commenters agreed. However, two manufacturers commented that their exit signs already clearly show the expiration date and further noted this issue does not fall under the jurisdiction of the NRC.

The petitioner's third request is the placement of the radiation trefoil prominently on the front and back of advertisements for the exit signs. The rationale is that such placement would ensure that general licensees understand that these signs contain radioactive byproduct material and are subject to regulatory controls. Five commenters agreed with this request.

One commenter who disagreed questioned, in a general sense, the effectiveness of this action. Another commenter stated that the assertion that customers are not properly sensitized to the fact that the signs are radioactive is "completely unwarranted." Furthermore, given that NRC regulations provide for the use of the trefoil where radioactive material is actually present or where radiation doses may be received, the placement of the trefoil in advertisements is inappropriate. Similarly, another commenter stated that placing the radiation trefoil on advertisements is not appropriate as advertisements do not contain radioactive material (i.e., putting the trefoil in advertisements may imply that the advertisement itself contains radioactive material).

Public Comments on Petitioner's Claims Concerning Tritium Exit Signs in Landfills

Three commenters disagreed with the petitioner's assertion that unaccounted for tritium exit signs disposed of in solid waste landfills are a potential source of groundwater and surface water contamination. One commenter stated it did not believe that the inadvertent disposal of

tritium exit signs poses a significant public health and safety issue, even if the relatively large numbers suggested by ASTSWMO are accurate.

Another commenter stated that while it is true that relatively recent sampling of raw, untreated leachate from landfills in Pennsylvania and California confirmed above background levels of tritium, it has been determined that, considering the treatment, dilution, and discharge processes to which this leachate is subjected, there is currently no risk to drinking water supplies or possible human exposure.

Reasons for Denial

After reviewing the information provided in the petition, and the comments received in response to the petition, the NRC has decided to deny PRM-32-6. In reaching this decision, the NRC reevaluated the radiological risks presented by tritium exit signs in general and from the levels of tritium reported in landfill leachate and determined that there is a lack of significant radiological risk to the public health and safety related to the petitioner's assertions. The NRC believes that even if the petitioner's assertions are credible, the NRC already has specific regulations in place that address the rulemaking requests contained in the petition. The NRC believes that the existing NRC regulations adequately direct the proper methods of disposal, labeling, and information disclosure for tritium exit signs.

Users of tritium exit signs are regulated under the general license provisions in 10 CFR 31.5, along with users of many other types of devices containing byproduct material. The general license in 10 CFR 31.5 requires users of tritium exit signs: to not remove the

labeling from the sign; to follow instructions and precautions on the label; to not abandon a sign; to properly dispose of signs by transferring them to a distributor or radioactive waste broker specifically licensed by the NRC or an Agreement State; to report any lost, stolen or broken sign(s) to the NRC; and to not give away or sell the sign to another individual, company, or institution unless it is to remain in use at a particular location, e.g., in a transfer of ownership of a building. In this latter case, under 10 CFR 31.5(c)(9)(i), the user of a tritium exit sign is obligated to provide a copy of the regulatory requirements governing the use of such signs to the new general licensee and must notify the NRC of the transfer. The user is also required to inform the NRC of a company name change or change of address; and to make certain other reports to the NRC.

The petition raised questions about the requirements placed on distributors related to whether users and others who come into contact with the sign are properly informed of the fact that the sign contains radioactive material and is subject to certain controls, in particular controls for disposal. These requirements are primarily addressed by 10 CFR 32.51(a)(3), which includes addresses requirements for labeling and providing safety instructions, and 10 CFR 32.51a(a)–(c), which requires certain information that must be provided to customers prior to transfer of the signs, including copies of applicable regulations and information on options for and estimated costs of disposal.

The petitioner stated that there needs to be multiple labels in several locations and that the labels need to be printed in larger font. The petitioner also requested that the expiration date be distinctly legible to a fire or building inspector without taking down the sign. To obtain a license to distribute tritium exit signs, an applicant must submit sufficient information related to its labeling of the exit signs. Specifically, under 10 CFR 32.51(a)(3), the applicant for a license

to distribute tritium exit signs must ensure that the label on the signs be durable, legible, clearly visible, and include certain information including that use of the sign is generally licensed by the NRC or an Agreement State and that the label must be maintained in legible condition. The NRC must approve the applicant's plans for labeling when authorizing distribution to users, at which time the NRC can address the appropriateness of fonts and proper placement on the sign. The expiration date (i.e., the date the sign should be replaced in order to meet fire safety standards, because as the tritium decays the brightness of the sign is reduced), is not a matter of NRC regulation because it focuses on the visibility of the sign, not safe use of the signs and is more appropriately in the jurisdiction of other agencies responsible for fire safety.

The petitioner also requested that the radiation trefoil be displayed on the front and back of advertisements. The NRC agrees with some of the commenters that the use of the trefoil on advertisements is not appropriate. In an earlier action related to misleading advertising, the staff issued Information Notice (IN) 99-26, "Safety and Economic Consequences of Misleading Marketing Information," dated August 24, 1999. The IN 99-26 highlighted that misleading marketing information and inadequate explanation of end-user regulatory requirements can lead to mishandling of generally licensed devices, and encouraged manufacturers and distributors to market generally licensed devices in such a way that the radioactive nature of the product is clearly understood and the regulatory requirements associated with the product are clearly explained. Under 10 CFR 32.51a(a)–(c) or equivalent Agreement State regulation, distributors are required to supply to customers prior to the actual transfer of the sign(s), copies of relevant regulations, information on acceptable disposal options including estimated costs of disposal, and indication of the NRC's policy of issuing high civil penalties for improper disposal.

Prior to NRC receiving this petition, the State of Pennsylvania, now an Agreement State, contacted the NRC in 2006, relaying its concerns regarding possible improper disposal of tritium

exit signs. The Conference of Radiation Control Program Directors also brought this issue to the attention of the NRC, via a 2007 resolution.

The NRC has previously implemented several measures to address this issue: The NRC implemented regulations to improve accountability of generally licensed devices (65 FR 79162; December 18, 2000, as amended at 65 FR 80991; December 22, 2000), which has been in effect in non-Agreement States since February 2001. Although disposal by transfer to a properly authorized specific licensee was always required, the previous regulatory framework did not require NRC or Agreement State notification of the transfer and disposal of tritium exit signs. Under the current regulatory framework, the NRC now receives many reports demonstrating proper transfer to a distributor. Because of the long useful lifetime of the signs and the more limited reporting requirements prior to 2001 (and later for those in Agreement States), it is not possible to determine exactly what fraction of signs may have been improperly disposed of by general licensees.

The NRC, in an effort to improve compliance with the regulatory requirements for tritium exit signs, issued Regulatory Issue Summary (RIS) 2006-25, "Requirements for the Distribution and Possession of Tritium Exit Signs and the Requirements in 10 CFR 31.5 and 32.51a," dated December 7, 2006, which reiterated the requirements in 10 CFR 32.51a that distributors of tritium exit signs must follow when transferring them to general licensees. These requirements deal primarily with information which must be provided to customers. In addition, the RIS 2006-25 reiterated the requirements in 10 CFR 31.5 for general licensees regarding transfer and disposal of the tritium exit signs, with the intent of minimizing the chance that tritium exit signs will be disposed of incorrectly.

In addition, the NRC issued a Demand for Information (DFI) on January 16, 2009, which required that general licensees who possessed at least 500 tritium exit signs perform an

inventory and report the results to the NRC. The results of the DFI demonstrated there is still some lack of awareness among users of tritium exit signs concerning their regulatory responsibilities which could result in the improper disposal of tritium exit signs.

In response to the DFI findings, the NRC has contacted the distributors of tritium exit signs in an effort to improve compliance with the reporting requirements of 10 CFR 32.52 and equivalent Agreement State provisions. The NRC initiated this contact with the goal of assisting distributors in their efforts to consistently provide the NRC with information that satisfies the reporting requirements in 10 CFR 32.52. This information reported under 10 CFR 32.52 pertains to the general licensees to whom distributors have transferred signs.

The petitioner asserted that “the majority” of unaccounted for tritium exit signs are disposed in solid waste landfills where they may become potential sources of groundwater and surface water contamination. The NRC concludes that the petitioner did not demonstrate that the excess tritium being found in landfill leachate, even if resulting from improper disposal of tritium exit signs, could result in hazardous levels of tritium in drinking water. Published reports such as “Radiological Investigation Results for Pennsylvania Landfill Leachate: 2009 Tritium Update,” Safety and Ecology Corporation, Knoxville, TN, March 31, 2010, support this conclusion. This study incorporates the use of site-specific dilution factors based on factors such as discharge rates and known distances between leachate effluent release points and downstream water supply intakes to convert observed leachate tritium concentrations into diluted tritium concentrations assumed to be available for human consumption. This report concluded not only that the resulting concentrations of tritium were well below the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 20,000 pCi/L for

tritium in drinking water, but that “average drinking water intake tritium concentrations...were more than 200 times less than the EPA 20,000 pCi/L MCL, ranging from 0 – 99 pCi/L.”

The petitioner also expressed concern that samples collected from leachate collection systems exceeded 20,000 pCi/L. It should be noted that 20,000 pCi/L is the EPA's MCL for tritium in drinking water and not leachate. Landfill monitoring reports show that despite high tritium concentrations in leachate, drinking water samples collected downstream of landfills maintain tritium concentrations well below the EPA's MCL. For example, the “Radiological Investigation Results for Pennsylvania Landfill Leachate: 2009 Tritium Update” report, referenced above, shows that “maximum drinking water [tritium] intake concentrations were over 100 times less than the EPA 20,000 pCi/L MCL ranging from 0 to 146 pCi/L.”

While the NRC does not regulate solid waste landfills, the NRC staff also concluded that current landfill practices would mitigate the impacts from tritium released from any exit signs that may be disposed in landfills. These include: cover systems that minimize rainfall penetration and limit the migration of tritium due to erosion or interaction with animals; cell liners that prevent leachate from leaking into the groundwater; gaseous extraction wells that remove gases building up within the landfill; and leachate collection systems that collect, process, and treat leachate, as appropriate.

In addition to reviewing these previously published reports and comparing tritium concentrations measured in leachate and drinking water to regulatory standards, the NRC performed an independent analysis of possible risks to landfill workers and the general public from exposure to tritium associated with landfill disposals. This analysis was based on the disposal scenario for gun sights containing tritium discussed in NUREG-1717, “Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials,” dated June 2001.

The NUREG-1717 describes the dose a landfill worker would be expected to receive from a hypothetical disposal of 3,000 curies (i.e., 111 terabecquerels) of tritium from 100,000 gun sights, equally disposed among 3,500 operating landfills. If such a disposal were to occur, approximately 29 gun sights would be disposed at each of the 3,500 landfills, depositing a total of 0.9 curies (i.e., 33 gigabecquerels) into each landfill. The expected dose to the landfill worker at each landfill would be less than 0.001 millirem (i.e., 0.00001 millisievert). This can be compared to the NRC's regulatory public dose limit of 100 millirem (i.e., 1 millisievert) per year.

Using the same methodology as described in NUREG-1717, the NRC estimated the dose from improperly disposing 7,000 curies (i.e., 259 terabecquerels) of tritium into a single landfill. This activity is equivalent to the disposal of 1,000 exit signs that each contain 7 curies (i.e., 259 gigabecquerels) at a single landfill. The NRC concluded that the calculated dose to the landfill workers would be no more than 8 millirem (i.e., 0.08 millisieverts). Again, this is compared to the NRC's regulatory limit of 100 millirem (i.e., 1 millisievert) to members of the public. Under this conservative, hypothetical scenario, this is the expected dose to landfill workers. Any dose to members of the general public would be expected to be lower because of their lack of proximity to the landfill and exposure to the waste.

Conclusion

The NRC is denying the petition for rulemaking because the NRC's current regulations in this area are adequate to protect public health and safety. In conclusion, the petitioner has not submitted any new information that warrants rulemaking or calls into question the existing regulatory requirements. Existing NRC regulations provide reasonable assurance that common defense and security and public health and safety are adequately protected. Additional rulemaking would impose unnecessary regulatory burden and is not warranted for the adequate

protection of the public health and safety and the common defense and security. For the reasons cited in this document, the NRC denies this petition.

Dated at Rockville, Maryland, this day of , 2011.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

protection of the public health and safety and the common defense and security. For the reasons cited in this document, the NRC denies this petition.

Dated at Rockville, Maryland, this day of , 2011.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

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Mr. Gary Baughman
Association of State and Territorial
Solid Waste Management Officials
444 North Capitol Street, NW, Suite 315
Washington, DC 20010

Dear Mr. Baughman:

I am responding to the petition for rulemaking (PRM), dated November 6, 2009, that you submitted to the U.S. Nuclear Regulatory Commission (NRC) on behalf of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). Your petition was assigned Docket No. PRM-32-6. In your petition, you requested that the NRC amend its regulations regarding the labeling and accountability of tritium exit signs. The petition states that ideally you would like to see tritium exit sign technology replaced by alternative technologies. The petition requests that the NRC revise its regulations and/or guidance to require or recommend that: 1) labeling be in several locations on the sign, with larger font; 2) the sign's expiration date be distinctly legible to a fire or building inspector without taking down the sign; and 3) the radiation trefoil be displayed on the front and back of product advertisements.

Also, the petition states that a national collection effort with distinct milestones and goals should be undertaken to consolidate all expired and disused tritium exit signs. Finally, the petition requests that the NRC organize a meeting with ASTSWMO and all interested stakeholders to set a new path forward on this issue.

The notice of receipt of the PRM was published in the *Federal Register* on January 12, 2010 (75 FR 1559). The comment period for the PRM closed on March 29, 2010. Thirteen comment letters were received.

The NRC has considered the petition, and the arguments raised therein, as well as the comments received in response to the petition. For the reasons stated in the enclosed *Federal Register* Notice (FRN), your petition for rulemaking is denied. In summary, the petition is being denied because the NRC's current regulations are adequate in this area. If you would like to meet with the staff to discuss possible enhancements to existing guidance that implements the current regulations, please contact Jack Foster at 301-415-6250, or email at Jack.Foster@nrc.gov.

G. Baughman

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The FRN denying the petition is being transmitted to the Office of the Federal Register for publication.

Sincerely,

Annette Vietti-Cook
Secretary of the Commission

Enclosure:
Federal Register Notice

G. Baughman

2

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Sincerely,

Annette Vietti-Cook
Secretary of the Commission

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