

POLICY ISSUE NOTATION VOTE

December 14, 2012

SECY-12-0167

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

SUBJECT: CLOSURE OF PETITION FOR RULEMAKING
TO REQUIRE INSTALLATION OF RADIATION ALARMS FOR
ROOMS HOUSING NEUTRON SOURCES (PRM-73-15)

PURPOSE:

To obtain Commission approval to deny a petition for rulemaking (PRM), PRM-73-15, filed by George Hamawy (the petitioner). This paper does not address any new commitments or resource implications.

BACKGROUND:

The petitioner submitted PRM-73-15 (Enclosure 1), dated September 15, 2011, requesting that the U.S. Nuclear Regulatory Commission (NRC) amend its regulations governing the security of neutron sources to require installation of radiation alarms in rooms housing neutron sources.

A notice of receipt and request for comment on the petition was published in the *Federal Register* on December 7, 2011 (76 FR 76327), with the comment period ending February 21, 2012. The NRC received four comment letters on the petition, all opposing the petition. The petition is provided as Enclosure 1.

DISCUSSION:

The petitioner requested that the NRC amend its regulations to require installation of radiation alarms in rooms housing neutron sources.

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(301) 415-8126

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The petitioner stated that the use of alarms can be effective in preventing source removal, especially when an in-house person may be taken hostage to get the intruder into the room housing the source.

The petitioner noted that the construction of the neutron sources used by universities for irradiating foils makes the source an easy target for theft. The petitioner also noted that the source is located at the end of a rod in the middle of a 55-gallon drum and that the drum has a cover that can be easily removed, facilitating the removal of the source. The petitioner stated that radiation alarms should be connected to the Public Safety Department. The alarm would be triggered when the source is removed.

The petitioner did not provide information relative to the source strength of the neutron sources or the particular radionuclides for which the petitioner is requesting additional security measures be imposed by rulemaking. It is not clear whether the petitioner is requesting rulemaking on all neutron sources or only on the americium-241/beryllium (Am-241/Be or Am/Be) and plutonium-239/beryllium (Pu-239/Be or Pu/Be) sources mentioned in the petition. The NRC staff takes the view that the petitioner is requesting rulemaking for all neutron sources regardless of source strength. The most commonly used neutron sources are Am/Be, Pu/Be, and californium-252 (Cf-252).

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

The NRC staff recommends that the petition be denied because current NRC security requirements are adequate to protect neutron sources. The Commission recently approved a final rule to establish a new Part 37 of Title 10 *Code of Federal Regulations* (10 CFR), "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material." The Commission determined that category 2 is the appropriate activity threshold that warrants additional security measures. The rule applies to material that if aggregated equals or exceeds the category 2 threshold. The new 10 CFR Part 37 rulemaking covers Am/Be, Pu/Be, and Cf-252 and the rule contains requirements for enhanced security measures that allow licensees flexibility in how they meet the requirements. For example, 10 CFR Part 37 requires licensees to monitor and detect without delay all unauthorized entries into its security zone where category 1 or category 2 quantities of radioactive material are stored. Part 37 of 10 CFR further requires licensees to assess attempted or actual unauthorized entries and respond as appropriate. However, Part 37 does not specify exactly how a particular licensee must monitor and detect such unauthorized entries. Instead, 10 CFR Part 37 allows flexibility in the methods a licensee can select. A neutron detection alarm could be an acceptable method. The petitioner has not provided sufficient reason to reconsider this decision.

Additionally, the Radiation Source Protection and Security Task Force (the Task Force), an interagency task force established by the Energy Policy Act of 2005, concluded in its 2006 report to the President and Congress (2006 Report)(Agencywide Documents Access and Management System (ADAMS) Accession Number ML062190349) that the appropriate radioactive sources (category 1 and category 2) were being protected. 2006 Report at 26.

The Task Force also concluded that the International Atomic Energy Agency Code of Conduct serves as an appropriate framework for considering which sources warrant additional protection. 2006 Report at 27. For its 2010 report to the President and Congress (2010 Report) (ADAMS Accession Number ML102230141), the Task Force conducted a reevaluation of the radionuclides that warrant additional security and protection. The Task Force found “that the Category 1 and 2 quantities remain valid for sealed and unsealed sources as the list and threshold levels of radionuclides that could result in a significant radiological exposure device (RED) or radiological dispersal device (RDD) event and therefore warrant enhanced security and protection” (2010 Report at 10).

For byproduct material below the category 2 thresholds, the security of radioactive material is covered by 10 CFR 20.1801, “Security of stored material,” and 10 CFR 20.1802, “Control of material not in storage.” The requirement to “secure, from unauthorized removal or access” and to “control and maintain constant surveillance” of category 3 and below materials provides adequate protection for these radioactive materials. These performance-based requirements allow licensees to select methods that work best for their facility to ensure that there is no unauthorized removal of the material. The NRC staff does not see benefit in requiring specific measures for all facilities.

In conclusion, no new information has been provided by the petitioner that calls into question the established thresholds (category 2) that warrant additional security measures or the performance based approach (non-prescriptive) to ensuring source security. This view has been validated by the Radiation Source Protection and Security Task Force conclusions. Existing NRC regulations provide the basis for reasonable assurance that the common defense and security and public health and safety are adequately protected. Additional rulemaking would impose an unnecessary regulatory burden on licensees possessing neutron sources and does not appear to be warranted for the adequate protection of the public health and safety and the common defense and security. For these reasons, the NRC staff finds that the arguments presented in the petition do not support rulemaking to require installation of radiation alarms for neutron sources and recommends that the Commission deny the petition.

RECOMMENDATIONS:

That the Commission:

1. Approve the denial and closure of the petition for rulemaking and publication of the *Federal Register* notice;
2. Note:
 - a) A letter is attached for the Secretary=s signature (Enclosure 3), informing the petitioner of the Commission=s decision on the petition;

- b) The appropriate congressional committees will be informed; and
- c) The NRC staff has determined that a press release is not necessary.

COORDINATION:

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

/RA Michael F. Weber for/

R. W. Borchardt
Executive Director
for Operations

Enclosures:

1. George Hamawy Petition dated
September 15, 2011
2. *Federal Register* notice
3. Letter to the Petitioner

September 15, 2011

Office of the Secretary

U.S. NRC Role making Petition

Washington, DC 20555-001

Dear Sir/ Madam:

I do have a concern regarding the security of Neutron Sources (Am-241-Be; Pu-239-Be sources). The construction of these sources (at least the ones used in colleges and universities as our for irradiating foils), make them an easy target for theft. The source is located at the end of a rod in the middle of a 55 gallon drum. The source is surrounded inside the drum by a plastic or wax shielding. The samples are lowered in holes next to the source for irradiation.

The drum has a cover that can be easily removed and the source is taken out to be placed in a smaller drum for get away. Last year GTRI came to our facility and placed wires around the drum and was attached to the wall. If someone wants to take the source they do not have to disturb the wire just remove the cover and take the source.

Unless:

We install radiation alarm connected to the Public Safety Department that can be triggered when the source is removed.

As it stands now there are no requirements for a radiation alarm. My petition is to require the installation of radiation alarms for rooms housing neutron sources. This can be effective in preventing the source removal especially in the case of hostage of in-house person that allows the intruder to the room housing the source.

I will be grateful to you if you look into this matter. Security should be our priority.

Thanks.

Sincerely,


George Hamawy

Radiation Safety for Research

Columbia University in New York City

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NUCLEAR REGULATORY COMMISSION

10 CFR Parts 73

[Docket No. PRM-73-15;

NRC-2011-0251]

Installation of Radiation Alarms for Rooms Housing Neutron Sources

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; denial.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC or the Commission) is denying a petition for rulemaking (PRM), PRM-73-15, dated September 15, 2011, which was filed with the NRC by George Hamawy (the petitioner). The petitioner requested that the NRC amend its regulations to require the installation of radiation alarms for rooms housing neutron sources.

DATES: The docket for the petition for rulemaking, PRM-73-15, is closed on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID NRC-2011-0251 when contacting the NRC about the availability of information for this petition. You may access information related to this petition, which the NRC possesses and is publicly-available, by any of the following methods:

- **Federal Rulemaking Web Site:** Go to <http://www.regulations.gov> and search for Docket ID NRC-2011-0251. Address questions about NRC dockets to Carol Gallagher; telephone: 301-492-3668; e-mail: Carol.Gallagher@nrc.gov.

- **NRC's Agencywide Documents Access and Management System (ADAMS):**
You may access publicly-available documents online in the NRC Library at <http://www.nrc.gov/reading-rm/adams.html>. To begin the search, select "[ADAMS Public Documents](#)" and then select "[Begin Web-based ADAMS Search](#)." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. The ADAMS accession number for each document referenced in this notice (if that document is available in ADAMS) is provided the first time that a document is referenced. The PRM-73-15 is available in ADAMS under Accession No. ML112700682.

- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Merri Horn, Office of Federal and State Materials and Environmental Management Programs, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-8126, e-mail: Merri.Horn@nrc.gov.

SUPPLEMENTARY INFORMATION:

The Petition

On December 7, 2011 (76 FR 76327), the NRC published a notice of receipt and request for comment of a PRM filed by George Hamawy. The petitioner requested that the NRC amend its regulations to require installation of radiation alarms in rooms housing neutron sources. The petitioner stated that the use of alarms can be effective in preventing source removal, especially when an in-house person may be taken hostage to get the intruder into the room housing the source. The petitioner noted that the construction of the neutron sources used by universities for irradiating foils makes the source an easy target for theft. The petitioner also noted that the source is located at the end of a rod in the middle of a 55-gallon drum and that the drum has a cover that can be easily removed, facilitating the removal of the source. The petitioner stated that radiation alarms should be installed that are connected to the Public Safety Department. The alarm would be triggered when the source is removed.

Public Comments on the Petition

The notice of receipt of the petition for rulemaking invited interested persons to submit comments. The comment period closed on February 21, 2012. The NRC received 2 comment letters from industry, 1 comment letter from an individual, and 1 comment letter from the Organization of Agreement States. The commenters all opposed the petition. Two of the commenters stated that the petition should not apply to the well logging industry. The commenters stated that the petition request was vague in terms of the definition of room, types of radiation alarms, connectivity to law enforcement, the isotopes included, and the threshold for

action. Two of the commenters noted that their sources are stored by methods approved by the NRC (or Agreement State) and as prescribed in national standards established by the well logging industry and that additional requirements are not necessary. One of the commenters questioned why anyone would want to steal a neutron source and asked if any neutron sources have ever been stolen. The commenter also stated that natural background may contain more radiation than the neutron sources and, therefore, a radiation detector would not detect the removal of the sources. The commenter also asked if it would be possible to shield the neutron source from the detector while stealing the source. The commenter also stated that there is no reason that any person would respond to the alarm. The commenter stated that the best solution is to put the barrel in a locked room. One of the commenters noted that that typical strength of a neutron source used in the university is less than the category 2 threshold. The commenter also stated that the regulations currently require a licensee to have security measures in place to “secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.”

Reasons for Denial

As noted by the commenters on the petition, the petitioner did not provide information relative to the source strength of the neutron sources or the particular radionuclides for which the petitioner is requesting additional security measures be imposed by rulemaking. It is not clear whether the petitioner is requesting rulemaking on all neutron sources or only on the americium-241/beryllium (Am-241/Be or Am/Be) and plutonium-239/beryllium (Pu-239/Be or Pu/Be) sources mentioned in the petition. The NRC is taking the view that the petitioner is requesting rulemaking for all neutron sources regardless of source strength.

There are a number of different sources of neutrons, ranging from radioactive sources to operating and research reactors and spallation sources. Neutron sources are used in diverse applications in areas of physics, engineering, medicine, nuclear weapons, petroleum exploration, biology, chemistry, nuclear power and other industries.

Radioactive materials used as neutron sources by NRC licensees include Am-241/Be, Pu/Be, and californium-252 (Cf-252). A licensee's decision to use a specific type of source may depend upon cost, availability, and the dependence upon historical data with which to compare current measurement results. The Am-241/Be and Pu/Be sources generate neutrons by the (α ,n) reaction in which the americium or plutonium decays and emits an alpha particle which is absorbed by the beryllium. Neutron sources that are not integrated into a specific device, regardless of type, are generally stored surrounded by paraffin wax or other similar low atomic number material as shielding.

Both Am-241/Be and Pu/Be sources have a wide range of uses. Neutron sources can be used with online elemental coal analyzers and bulk material analyzers in the coal and cement industries. Neutron penetration into materials makes these sources useful in analytical techniques such as radiography of aircraft components to detect corrosion, imperfections in welds, cracks, and trapped moisture. Moisture gauges use neutrons to find water and petroleum layers in oil wells, known as well logging. Neutron sources can be used for gold and silver prospecting for on-the-spot analysis, and to detect ground water movement for environmental surveys. Neutron sources are also used as calibration sources.

Californium-252 sources produce neutrons during spontaneous fission. The Cf-252 splits apart producing a number of neutrons in the process. Beyond the uses mentioned above for Am/Be and Pu/Be sources, the neutrons from Cf-252 are employed as a treatment of certain cervical and brain cancers where other radiation therapy is ineffective. The Cf-252 sources are also used to start up nuclear reactors.

The categorization of sources is established in International Atomic Energy Agency (IAEA) Safety Series RS-G-1.9, Categorization of Radioactive Sources. Safety Series RS-G-1.9 provides a risk-based ranking of radioactive sources in five categories in terms of their potential to cause severe deterministic effects for a range of scenarios that include both external exposure from an unshielded source and internal exposure following dispersal. The categorization system uses the 'D' values as normalizing factors. The 'D' value is the radionuclide specific activity of a source that, if not under control, could cause severe deterministic effects for a range of scenarios that include both external exposure from an unshielded source and internal exposure following dispersal of the source material. Safety Series RS-G-1.9 is available on the IAEA Web site at: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1227_web.pdf.

As previously noted, neutron sources are used for a variety of purposes and in varying source strength. Depending on the source strength (activity), the source is considered a category 1 (higher activity) to a category 5 (lower activity) source. The threshold is established for each individual radionuclide. For Am-241/Be and Pu-239/Be, a category 5 source is any source with an activity of less than 0.0006 Terabequerels (TBq) (0.016 curies (Ci)) and a category 1 source is any source with an activity of 60 TBq (1,620 Ci) or above. For Cf-252, the category 5 threshold is 0.0002 TBq (0.0054 Ci) and the category 1 threshold is 20 TBq (540 Ci).

The NRC's regulations in § 20.1801 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Security of stored material," and 10 CFR 20.1802, "Control of material not in storage," require licensees to: 1) secure, from unauthorized removal or access, licensed materials that are stored in controlled or unrestricted areas; and 2) to control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage. The NRC's regulations in 10 CFR 20.2201, "Reports of theft or loss of licensed

material,” requires licensees to report lost, stolen, or missing radioactive material. Further, throughout the NRC’s regulations for licensing byproduct material, there are educational and training requirements to ensure that individuals with access to radioactive materials have adequate knowledge and skills to safely use the radioactive material as intended. These requirements are adequate for the protection of most radioactive material that is not subject to 10 CFR part 73, “Physical Protection of Plants and Materials;” however, after the terrorist attacks of September 11, 2001, the Commission determined that certain risk-significant radioactive material should be subject to enhanced security provisions. The NRC issued several security orders to licensees that possessed category 1 and category 2 quantities of radioactive material of 16 radionuclides or combinations. Included in the list of radionuclides considered to be risk-significant are Am-241/Be, Pu-239/Be, and Cf-252. In general, the orders provided requirements for enhanced security measures for such things as license verification before transfer, intrusion detection and response, use of security zones, access control, and coordination with local law enforcement agencies (LLEAs). The orders also contain requirements for the licensee to determine the trustworthiness and reliability of individuals permitted unescorted access to category 1 or category 2 quantities of radioactive material through fingerprinting and criminal history checks and other elements of a background investigation.

The Commission recently approved a final rule ([will add citation for part 37 after publication expected in December/January](#)) that establishes the security requirements for category 1 and category 2 quantities of radioactive material (including Am-241/Be, Pu-239/Be, and Cf-252) in the regulations. Once the final rule is implemented, the security orders will be rescinded. The final rule establishes a new part to 10 CFR part 37, “Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material.” This final rule also applies to material that if aggregated equals or exceeds the category 2 threshold. Both the orders and 10

CFR part 37 contain general requirements that allow licensees flexibility in how they meet the requirements. For example, 10 CFR part 37 requires licensees to monitor and detect without delay all unauthorized entries into its security zone where category 1 or category 2 quantities of radioactive material are stored. Part 37 of 10 CFR further requires licensees to assess attempted or actual unauthorized entries and respond as appropriate. However, neither the orders nor 10 CFR part 37 specifies exactly how a particular licensee must monitor and detect such unauthorized entries. Instead, the orders and 10 CFR part 37 allow flexibility in the methods a licensee can select. A neutron detection alarm could be an acceptable method.

The NRC is denying the petition because we have determined that current NRC security requirements are adequate to protect public health and safety. The Commission has recently determined the appropriate activity threshold that warrants additional security measures in the 10 CFR part 37 rulemaking (category 2). The Commission did not find a need to change the requirements applicable to category 3 or lower. The petitioner has not provided sufficient reason to readdress this decision. Additionally, the Radiation Source Protection and Security Task Force, an interagency task force established by the Energy Policy Act of 2005, concluded in its report to Congress and the President, "Radiation Source Protection and Security Task Force Report," (ADAMS Accession No. ML062190349), dated August 2006, that the appropriate radioactive sources (category 1 and category 2 sources) were being protected. The Task Force also concluded that the IAEA Code of Conduct serves as an appropriate framework for considering which sources warrant additional protection. For its 2010 report to Congress and the President (ADAMS Accession No. ML102230141), the Task Force conducted a reevaluation of the radionuclides that warrant additional security and protection. The Task Force found "that the Category 1 and 2 quantities remain valid for sealed and unsealed sources as the list and threshold levels of radionuclides that could result in a significant radiological exposure device (RED) or radiological dispersal device (RDD) event and therefore warrant enhanced security

and protection.” The Task Force periodically reevaluates the list of radionuclides that warrant additional security and protection. If the radionuclides and/or thresholds change in the future, then the NRC would consider making changes in a future rulemaking.

For byproduct material below the category 2 thresholds, the security of radioactive material is covered by 10 CFR 20.1801 and 20.1802. The requirement to “secure, from unauthorized removal or access” and to “control and maintain constant surveillance” are considered performance-based requirements. Licensees are allowed to select methods that work best for their facility to ensure that there is no unauthorized removal of the category 3 and below neutron sources. These requirements provide adequate protection for the neutron sources, without the need to require a specific measure.

In conclusion, no new information has been provided by the petitioner that calls into question the established thresholds (category 2) that warrant additional security measures or the performance based approach (non-prescriptive) for ensuring source security. This view has been validated by the Radiation Source Protection and Security Task Force’s conclusions. Existing NRC regulations provide the basis for reasonable assurance that the 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.

The NRC appreciates the views of the petitioner and encourages public feedback through any of our NRC processes.

For the reasons cited in this document, the NRC denies this petition.

Dated at Rockville, Maryland, this _____ day of _____, 2012.

For the Nuclear Regulatory Commission.

Annette Vietti-Cook,
Secretary of the Commission.

Mr. George Hamawy
Columbia University
419 West 119th Street
New York, NY 10027

Dear Mr. Hamawy:

This letter is in reference to a petition for rulemaking (PRM) that you submitted to the U.S. Nuclear Regulatory Commission (NRC) on September 15, 2011. Your petition, which requested that the NRC initiate a rulemaking to require installation of radiation alarms for rooms housing neutron sources was docketed under § 2.802 of Title 10 of the *Code of Federal Regulations*, "Petition for rulemaking," and assigned Docket Number PRM-73-15.

A notice of receipt and request for comment was published in the *Federal Register* on December 7, 2011 (76 FR 76327). The comment period closed on February 21, 2012. Four comment letters were received.

The NRC has considered the petition, your supporting rationale, and the comments it received on the petition. For the reasons provided in the enclosed *Federal Register* notice, the Commission has denied your petition under the provisions of 10 CFR §2.803, because the NRC has determined that current requirements provide reasonable assurance that the common defense and security and public health and safety are adequately protected.

The NRC appreciates your views and encourages public feedback through any of our NRC processes.

The *Federal Register* notice 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