



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 6, 2020

ALL AGREEMENT STATES

AVAILABILITY OF SECY-20-0005, "RULEMAKING PLAN FOR TRAINING AND EXPERIENCE REQUIREMENTS FOR UNSEALED BYPRODUCT MATERIAL (10 CFR PART 35)" (STC-20-008)

Purpose: To inform the Agreement States that the U.S. Nuclear Regulatory Commission (NRC) has published SECY-20-0005, "Rulemaking Plan for Training and Experience Requirements for Unsealed Byproduct Material (10 CFR Part 35)."

Background: In August 2017, the Commission directed NRC staff to evaluate its regulations for training and experience (T&E) required for a physician to become an authorized user (AU) for medical uses under Subpart E, "Unsealed Byproduct Material—Written Directive Required," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 35, "Medical Use of Byproduct Material." Specifically, the Commission directed the staff to determine whether it makes sense to establish tailored T&E requirements for different categories of radiopharmaceuticals; (2) how those categories should be determined; (3) what the appropriate T&E requirements would be for each category; and (4) whether those requirements should be based on hours of training and experience, or focused more on competency.

The staff's initial evaluation of the T&E requirements is documented in [SECY-18-0084](#), "Staff Evaluation of Training and Experience Requirements for Administering Different Categories of Radiopharmaceuticals in Response to SRM-M170817" (Agencywide Documents Access Management System (ADAMS) Accession No. ML18135A276). In SECY-18-0084 the staff determined that while it may be feasible to develop tailored T&E requirements for certain categories of radiopharmaceuticals, more extensive outreach to the medical community was needed. Subsequently, the staff conducted two public comment periods and coordinated with the Agreement States and the Advisory Committee on the Medical Uses of Isotopes (ACMUI) to further inform their evaluation of the T&E requirements and develop their recommendation to the Commission.

Discussion: [SECY-20-0005](#), "Rulemaking Plan for Training and Experience Requirements for Unsealed Byproduct Material (10 CFR Part 35)" (ADAMS Accession No. ML19217A318) documents the staff's policy considerations, outreach efforts, coordination with the Agreement States and the ACMUI, information gathering activities, and proposed options for the Commission's consideration regarding the T&E requirements for radiopharmaceuticals. The staff is recommending the Commission approve initiation of a rulemaking option that would require that physicians be certified by an NRC-recognized or Agreement State-recognized medical specialty board to become AUs. As part of this recommended rulemaking, the NRC, in coordination with the Agreement States and the ACMUI, would revise its board recognition criteria so that certification by specialty boards other than the existing nuclear medicine and radiation oncology boards would be an acceptable T&E pathway for the use of radiopharmaceuticals.

SECY-20-0005 was delivered to the Commission for its consideration on January 14, 2020. The NRC will notify the Agreement States of any future updates regarding the Commission's review of the rulemaking plan. If the Commission directs initiation of a rulemaking, the staff will continue to coordinate with the Agreement States on rulemaking activities in accordance with [SA-801A](#), "Agreement State Participation in Rulemaking Working Groups," dated January 16, 2019 (ADAMS Accession No. ML18263A239), throughout all stages of rule development.

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Enclosure:

SECY-20-0005, "Rulemaking Plan for
Training and Experience Requirements
for Unsealed Byproduct Materials
(10 CFR Part 35)"



POLICY ISSUE **(Notation Vote)**

January 13, 2020

SECY-20-0005

FOR: The Commissioners

FROM: Margaret M. Doane
Executive Director for Operations

SUBJECT: RULEMAKING PLAN FOR TRAINING AND EXPERIENCE
REQUIREMENTS FOR UNSEALED BYPRODUCT MATERIAL
(10 CFR PART 35)

PURPOSE:

The purpose of this paper is to request Commission approval to initiate a rulemaking that would revise the training and experience (T&E) requirements for use of unsealed byproduct material in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 35, "Medical Use of Byproduct Material."

SUMMARY:

This paper provides rulemaking options and the U.S. Nuclear Regulatory Commission (NRC) staff's recommendation to initiate a rulemaking to remove prescriptive T&E requirements and to eliminate the need for NRC review and approval of authorized users (AUs). The staff's recommended option would require that physicians be certified by an NRC-recognized or Agreement State-recognized medical specialty board to become AUs. As part of this recommended rulemaking, the NRC would revise its board recognition criteria so that certification by specialty boards other than the existing nuclear medicine and radiation oncology boards would be an acceptable T&E pathway for the use of radiopharmaceuticals. The staff's recommended rulemaking option would continue to protect public health and safety, better align

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the NRC's T&E requirements with the Medical Policy Statement,¹ and position the agency for more effective and efficient regulatory decision making with respect to the expected increase in the number and complexity of emerging radiopharmaceuticals. The recommended option would also alleviate regulatory burden for the NRC, Agreement States, and licensees, resulting in an estimated cost savings of \$2.4 million per year.

BACKGROUND:

The NRC's regulations require that physicians complete T&E criteria to be authorized for medical use of byproduct material and to independently fulfill the radiation safety-related duties of an AU. The current regulatory T&E criteria are prescriptive (viz., set forth a defined number of training hours and patient casework for the range of medical modalities, irrespective of licensee practices; and emerging technologies). In addition, successful completion of the T&E requirements to become an AU does not reflect on a physician's medical competency related to radiopharmaceutical administrations. The regulations in 10 CFR 35.390, "Training for Use of Unsealed Byproduct Material for Which a Written Directive Is Required," provide two pathways² for a physician to satisfy the T&E requirements and be initially approved as an AU for radiopharmaceuticals requiring a written directive:

- (1) approval of a physician who is certified by a medical specialty board that has a certification process recognized by the NRC or an Agreement State as meeting the NRC's requirements for T&E, also known as the "board certification pathway"³
- (2) approval based on an evaluation of a physician's T&E—completion of 200 hours of classroom and laboratory training and 500 hours of supervised work experience (including patient casework) for a total of 700 hours of T&E, plus preceptor⁴ attestation, also known as the "alternate pathway"

The NRC issued T&E requirements for the alternate pathway in 2002.⁵ Since that time, some pharmaceutical industry stakeholders and physicians that do not traditionally use radioactive material in their practice of medicine⁶ (referred to in this document as nonnuclear medicine and nonradiation oncology physicians) have asserted that the current 700-hour T&E requirement in the alternate pathway is overly burdensome for physicians who are not eligible for the board certification pathway, preventing these physicians from becoming AUs, thereby affecting patient access to certain therapeutic radiopharmaceuticals. These stakeholders have suggested that the NRC could address these concerns by providing additional tailored pathways for nonnuclear

¹ "Medical Use of Byproduct Material; Policy Statement, Revision" (65 FR 47654; August 3, 2000).

² In accordance with the regulations in 10 CFR 35.2, "Definitions," section (b)(4) of 35.13, "License Amendments," and section (a) of 35.14, "Notifications," physicians can also satisfy the T&E requirements to be approved as an AU if they have been previously approved and listed as an AU on an existing NRC or Agreement State license or a permit.

³ The procedures for recognizing medical specialty board certifications are available at <https://www.nrc.gov/materials/miau/med-use-toolkit/certif-process-boards.html>. Currently, specialty boards must show that they meet the requirements of the alternate pathway (10 CFR 35.390(b)(1)) to be recognized by the NRC or an Agreement State. Specialty board certifications currently recognized by the NRC under 10 CFR Part 35 are available at <https://www.nrc.gov/materials/miau/med-use-toolkit/spec-board-cert.html>.

⁴ As defined in 10 CFR 35.2 and for the discussion in this paper, "preceptor" means an individual who provides, directs, or verifies T&E required for a physician to become an AU. Per 10 CFR 35.392(b)(2), a preceptor must attest in writing that the physician to serve as an AU has satisfactorily completed the appropriate T&E requirements and has achieved a level of competency or a level of radiation safety knowledge sufficient to function independently.

⁵ "10 CFR 20, 32, and 35, Medical Use of Byproduct Material; Final Rule" (67 FR 20249; April 24, 2002).

⁶ Typically, physicians who complete the T&E requirements under 10 CFR 35.390 are trained in nuclear medicine or radiation oncology and are certified by one of the NRC-recognized specialty boards (American Board of Nuclear Medicine, American Board of Radiology, or American Osteopathic Board of Radiology).

medicine and nonradiation oncology physicians to be authorized to use specific types of radiopharmaceuticals.

In Staff Requirements Memorandum (SRM)-M170817,⁷ the Commission directed the staff to evaluate (1) whether it makes sense to establish tailored T&E requirements for different categories of radiopharmaceuticals, (2) how those categories should be determined (such as based on the risks posed by groups of radionuclides or by delivery method), (3) the appropriate T&E requirements for each category, and (4) whether those requirements should be based on hours of T&E or focused more on competency. The staff's initial response to the Commission's direction was to analyze the radiation safety knowledge topics needed for safe administration of radiopharmaceuticals. In SECY-18-0084,⁸ the staff concluded that, while it may be feasible to establish tailored T&E requirements for different categories of radiopharmaceuticals, additional and more extensive outreach to the medical community was needed to determine whether and how to tailor the T&E requirements. Enclosure 1 provides additional background information, including past stakeholder feedback and a summary of prior T&E activities by the NRC and the Advisory Committee on the Medical Uses of Isotopes (ACMUI).

To support this rulemaking plan, the staff continued its evaluation of tailored T&E requirements by seeking additional feedback from a broad range of medical and regulatory stakeholders through two public comment periods and coordination with the Agreement States and the ACMUI. Enclosure 2 provides additional detail on these two public comment periods and summarizes the results of these efforts. Additionally, the staff evaluated the NRC's regulatory framework for T&E more broadly, including whether: (1) the T&E requirements for radiopharmaceuticals could be better aligned with the NRC's Medical Policy Statement, (2) the current requirements are inappropriately affecting patient access to radiopharmaceuticals, (3) changes are needed to position the NRC to more efficiently regulate emerging and future radiopharmaceuticals, and (4) the requirements could be more risk-informed while continuing to ensure the safe and secure medical use of byproduct material. The staff also considered the regulatory approaches of international counterparts and evaluated medical event data to determine whether T&E requirements have resulted in medical events. Enclosure 3 discusses the staff's evaluation of the current T&E regulatory framework. Further, during these two public comment periods, in response to the Commission's direction in SRM-M170817, the staff also evaluated maintaining the status quo and several rulemaking options. Four options (the status quo, tailored requirements, National Materials Program-recognized specialty board credentialing, and maintaining the alternate pathway with National Materials Program-recognized specialty board credentialing) are discussed below.

DISCUSSION:

In the SRM for SECY-15-0129, "Commission Involvement in Early Stages of Rulemaking," dated February 3, 2016 (ADAMS Accession No. ML16034A441), the Commission directed the staff to provide a streamlined rulemaking plan in the form of a SECY paper that would request Commission approval to initiate all rulemakings not already explicitly delegated to the staff.

⁷ SRM-M170817, "Staff Requirements—Affirmation Session, 10:30 A.M., Thursday, August 17, 2017, Commissioners' Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance)," dated August 17, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17229B283).

⁸ SECY-18-0084, "Staff Evaluation of Training and Experience Requirements for Administering Different Categories of Radiopharmaceuticals in Response to SRM-M170817," dated August 28, 2018 (ADAMS Accession No. ML18135A276).

Accordingly, a rulemaking plan that follows the Commission-approved template (ADAMS Accession No. ML19032A609, nonpublic) is presented below.

Title

"Training and Experience Requirements for Unsealed Byproduct Material."

Regulation

10 CFR Part 35.

Regulatory Issue

In response to SRM-M170817, the NRC staff evaluated stakeholder concerns regarding the perceived burden of the T&E requirements in 10 CFR 35.390 and whether to address those concerns by tailoring the T&E requirements to create limited AU pathways for different categories of radiopharmaceuticals. While the staff does not recommend tailoring the T&E requirements, the staff did identify areas for transformation in the existing T&E regulatory framework that could also address stakeholder concerns.

The NRC's Medical Policy Statement says, in part, that the NRC will not intrude into medical judgments affecting patients except as necessary to provide for the radiation safety of workers and the general public; the NRC will regulate the radiation safety of patients to assure that medical uses are in accordance with physician directions; and, when developing regulatory approaches, the NRC will consider industry and professional standards that define acceptable approaches for achieving radiation safety. The NRC staff, some members of the medical community, the Organization of Agreement States (OAS) Executive Board, and some Agreement States have questioned whether the T&E regulatory framework could be better aligned with these policies. Specifically, the existing prescriptive T&E criteria and the requirement that the NRC and Agreement States review and approve physician T&E before a physician can prescribe radiopharmaceuticals is viewed by some as encroaching on the practice of medicine.

The staff's proposed rulemaking would revise the current prescriptive T&E regulations under 10 CFR Part 35, Subpart D, "Unsealed Byproduct Material—Written Directive Not Required," and Subpart E, "Unsealed Byproduct Material—Written Directive Required," to require that AUs be physicians certified by a medical specialty board whose certification process has been recognized by the NRC or an Agreement State as having met certain high-level, performance-based radiation safety training requirements. This proposed rulemaking would better align the T&E regulatory framework with the Medical Policy Statement by increasing the medical community's involvement in setting specific T&E requirements in accordance with the NRC and Agreement State criteria and in credentialing physicians as AUs. Additionally, the high-level radiation safety training criteria would better prepare the NRC for the expected increase in the number and complexity of emerging and future radiopharmaceuticals, and better address nonnuclear medicine and nonradiation oncology physicians wishing to use radiopharmaceuticals.

Another regulatory issue identified by NRC staff, the OAS Executive Board, and several Agreement States is AU supervision of individuals responsible for the day-to-day handling and administration of radiopharmaceuticals, e.g., nuclear medicine technologists. Some Agreement States questioned whether the T&E requirements should focus on these non-AU individuals.

Because AUs are ultimately responsible for ensuring that radiopharmaceuticals they prescribe are administered in accordance with their signed written directive, the staff does not recommend revising the T&E requirements to focus on non-AU individuals at this time. However, the proposed rulemaking would consider revisions to the NRC's regulations at 10 CFR 35.27, "Supervision," which address the receipt, possession, use, or transfer of byproduct material by an individual under the supervision of an AU.

Existing Regulatory Framework

Regulations

The current regulations in 10 CFR 35.190, "Training for Uptake, Dilution, and Excretion Studies," 10 CFR 35.290, "Training for Imaging and Localization Studies," and 10 CFR 35.390 require that physicians complete a certain amount of radiation safety training before their certification as an AU for the medical use of unsealed byproduct material. For each modality, this training can be approved through the board certification pathway or the alternate pathway.

Guidance

The primary guidance document for medical uses of byproduct material is NUREG-1556, Volume 9, Revision 3, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Medical Use Licenses, Final Report," issued September 2019 (ADAMS Accession No. ML19256C219). A list of applicable guidance documents and inspection procedures is included as Enclosure 4.

Additionally, the list of medical specialty boards recognized by the NRC and the Agreement States, procedures to apply for board recognition, and the NRC 313A series of forms and guidance on T&E for authorized individuals⁹ are all maintained on the NRC's Medical Uses Licensee Toolkit.¹⁰

Explanation of Why Rulemaking Is the Preferred Solution

In its evaluation of the current T&E requirements, the staff considered maintaining the status quo and several rulemaking options. Four options are discussed below, and other options the staff evaluated but does not recommend for Commission consideration are documented in Enclosure 5.

All rulemaking options could include variations that the staff would finalize with stakeholder input during the early stages of rulemaking. For example, these variations could include incorporation of a formal radiation safety competency evaluation (e.g., preceptor attestation, examination), changes to written directive requirements, or additional oversight of the specialty board recognition process. Additionally, as discussed above in the "Regulatory Issue" section, each rulemaking option would consider revisions to the NRC's supervision regulations (10 CFR 35.27) to address potential issues regarding supervision by AUs.

⁹ The NRC 313A series of forms provide a suitable format for licensees to document required T&E for authorized individuals (AUs, authorized medical physicists, ophthalmic physicists, authorized nuclear pharmacists, Radiation Safety Officers, and Associate Radiation Safety Officers). The NRC and Agreement States review the information provided in the 313A to determine whether the applicant meets the required T&E to be authorized and listed on a license.

¹⁰ The NRC's Medical Uses Licensee Toolkit is available at <https://www.nrc.gov/materials/miau/med-use-toolkit.html>.

Option 1, "Status Quo," would make no changes to the NRC's T&E requirements.

Pros:

- Since their promulgation in 2002, the current T&E requirements have proven to protect radiation safety for the general public, workers, and patients.
- The NRC, Agreement States, and licensees have experience applying the existing T&E regulations and accompanying guidance, and the medical community has a good understanding of the existing regulations and guidance.
- Radionuclide categories in 10 CFR 35.300 can accommodate most emerging and future radiopharmaceuticals, and 10 CFR 35.1000, "Other Medical Uses of Byproduct Material or Radiation from Byproduct Material," would be available for radiopharmaceuticals that do not fit under 10 CFR 35.300.
- This is the only option that would not require rulemaking resources.
- The ACMUI, some Agreement States, and the nuclear medicine and radiation oncology medical communities support maintaining the status quo, stating that the current requirements are protective of public health and safety, there is no evidence of an AU shortage, and the radionuclide categories in 10 CFR 35.300 are inclusive of emerging radiopharmaceuticals.

Cons:

- The prescriptive knowledge topics and supervised work experience requirements in the current T&E regulations may be unnecessary for certain radiopharmaceuticals, or conversely, they may not adequately address safety-related characteristics of more complex, future radiopharmaceuticals.
- The prescriptive nature of the current T&E regulatory framework and the required role of the NRC and Agreement States in approving AUs to practice nuclear medicine (i.e., physicians must be credentialed as AUs by the NRC or an Agreement State in order to prescribe radiopharmaceuticals) are viewed by some as encroaching on the practice of medicine.
- The OAS Executive Board and some Agreement States do not support the status quo, contending that it may not ensure adequate supervision of radiopharmaceutical administration, and regulatory focus may be better placed on the non-AU individuals who most often handle and administer radiopharmaceuticals.

Option 2, "Tailored Requirements," would tailor and likely reduce T&E requirements to create additional AU pathways for administration of specific categories of radiopharmaceuticals. The existing AU pathways would remain unchanged. Examples of tailored T&E categories could include patient-specific, unit-dose, nonradioligand¹¹ alpha emitters (e.g., radium-223 dichloride); *any* patient-specific, unit-dose radiopharmaceutical; or *any one* parenteral radiopharmaceutical.

Pros:

- This option would risk-inform the T&E requirements for certain radiopharmaceuticals while continuing to protect radiation safety for the general public, workers, and patients.
- This option would provide additional, more flexible pathways for nonnuclear medicine and nonradiation oncology physicians to become AUs for specific radiopharmaceuticals.

¹¹ Radioligand therapies involve attaching a radioactive isotope to a ligand-signaling molecule that binds only to a specific cancer-related molecule on a tumor cell to deliver therapeutic radiation doses (additional information available at <https://endocyte.com/pipeline/advanced-prostate-cancer-treatment/>).

Cons:

- Definitive categories may entirely exclude emerging and future radiopharmaceuticals, or may not adequately capture safety-related characteristics of future radiopharmaceuticals (such as energy level, dose, half-lives, or administration protocol).
- This option may require rulemakings or exemption requests if additional radiopharmaceuticals merited tailored T&E in the future, would add complexity to already complicated T&E regulations with multiple AU pathways, could increase AU documentation errors, and would require additional licensing resources.
- The ACMUI, Agreement States, the OAS Executive Board, and the nuclear medicine and radiation oncology medical communities oppose tailored requirements, citing concerns about the safety of limited-trained AUs and increasing regulatory complexity.

Option 3, “National Materials Program-Recognized Specialty Board Credentialing,” is a performance-based approach that would remove the NRC and Agreement States from review and approval of T&E for AUs, and instead would require that physicians be certified by a medical specialty board recognized by the NRC or an Agreement State. During the rulemaking process, the NRC, in coordination with the ACMUI and the Agreement States and with input from the medical community, would evaluate the board recognition criteria and determine if less prescriptive criteria could provide equivalent radiation safety competency as the current criteria, while also being more encompassing of the safety-related characteristics of emerging radiopharmaceuticals. The specialty board criteria could ensure appropriate didactic education and hands-on T&E to provide reasonable assurance of adequate protection of public health and safety. This option provides an opportunity to critically assess the specific requirements in 10 CFR 35.390. Medical specialty boards seeking NRC or Agreement State recognition would develop radiation safety training programs specific to their medical program objectives and in accordance with the board recognition criteria. Certification by a recognized medical specialty board would credential a physician to be an AU for the medical uses authorized to the specialty board, and ongoing AU status would be tied to the physician's maintenance of board certification. The NRC and Agreement States would periodically audit recognized boards to ensure their continued compliance with the radiation safety training criteria.

AUs would continue to be responsible for ensuring that the radiopharmaceuticals they prescribe are administered in accordance with their signed written directive, and regulatory emphasis would continue to be on performance-based inspection of a licensee's radiation safety program to ensure safe and secure handling, storage, and use of radiopharmaceuticals. To allow time for physicians planning on using the alternate pathway to become AUs, the staff would first implement the new board recognition criteria, followed by later removal of the alternate pathway.

Pros:

- This option would continue to protect radiation safety for the general public, workers, and patients.
- This option would better align with the Medical Policy Statement than the existing T&E framework: the less prescriptive nature of the board recognition criteria and increased medical community involvement in setting T&E requirements and credentialing AUs would encroach less on the practice of medicine and better consider industry and professional standards.
- The NRC, Agreement States, and licensees would require fewer licensing resources because the NRC and Agreement States would no longer review and approve T&E for AUs, licensees would no longer submit those licensing documents, and AUs would no longer be listed on licenses.

- This option could provide a pathway for additional medical specialty boards—more knowledgeable of the medical expertise of their community—to seek NRC or Agreement State recognition, which would allow more physicians to become AUs. Based on NRC performance-based requirements, medical specialty boards could develop radiation safety training programs tailored to their practice of medicine and specific use of radiopharmaceuticals.
- This option is agile and transformative in that it offers the flexibility needed to accommodate emerging and future radiopharmaceuticals—medical specialty boards could revise their T&E requirements as new radiopharmaceuticals are developed, while continuing to meet the radiation safety training criteria required by the NRC and the Agreement States.
- This option would tie ongoing AU status to maintenance of board certification, and AUs may be subject to continuing education requirements by their board, both of which could provide institutional checks on AU status.
- The OAS Executive Board and some Agreement States support the NRC and the Agreement States no longer reviewing and approving T&E for AUs; the OAS Executive Board specifically supports this option.¹²

Cons:

- This option would remove the alternate pathway, leaving only the board certification pathway. Until they are board certified, new physicians who have not been certified would need to work under the supervision of another AU and would be unable to sign written directives.
- Newly recognized board programs would need to address whether and how to provide a pathway for their existing certified physicians (i.e., board diplomates) who are not AUs to become AUs.
- This option relies on nonnuclear medicine and nonradiation oncology medical specialty boards to apply to the NRC or an Agreement State for recognition in order for new AU pathways to be realized.
- The nuclear medicine and radiation oncology medical communities oppose any changes to the current T&E requirements, including this option. Without specific information for new board criteria, the ACMUI supports the current T&E requirements. The ACMUI acknowledges there is room for a comprehensive review of the specific requirements in 10 CFR 35.390 and welcomes the opportunity to critically assess these details.

Option 4, “Alternate Pathway with National Materials Program-Recognized Specialty Board Credentialing,” would implement Option 3 while maintaining the alternate pathway. The alternate pathway would remain prescriptive to ensure consistency in the review and approval of T&E by regulators across the National Materials Program.

Pros:

- This option features pros similar to Option 3.
- In addition, this option would maintain the alternate pathway, which would continue to allow physicians to obtain AU status without specialty board certification.
- This option offers flexibility to support timely certification of new AUs.

¹² Comment submissions from the OAS Executive Board and the States of North Carolina, Wisconsin, and Colorado are available at ADAMS (ADAMS Accession Nos. ML19184A590, ML19290H493, ML19170A073, ML19184A593, and ML19177A330, respectively).

Cons:

- This option features cons similar to Option 3 (with exception of the con associated with removal of the alternate pathway).
- This option requires continued review and approval of T&E by the NRC and Agreement States and does not address issues associated with the prescriptive nature of the alternate pathway, making it less transformative than Option 3 and resulting in a smaller reduction in licensing resources for the NRC, Agreement States, and licensees.
- AUs credentialed by medical specialty boards would be subject to institutional checks on their AU status by maintenance of board certification and continuing education requirements; there will continue to be no checks on AUs approved using the alternate pathway.
- Maintaining the prescriptive alternate pathway requirements alongside high-level board recognition criteria would reduce clarity, efficiency, and reliability of the T&E requirements, and may result in differing standards for credentialing between the two pathways.

Description of Rulemaking: Scope

The staff is recommending the Option 3 rulemaking, which would revise the T&E requirements under Subparts D and E of 10 CFR Part 35 to include one pathway for a physician to become an AU: certification by a medical specialty board whose certification process has been recognized by the NRC or an Agreement State as meeting the NRC and Agreement State requirements for T&E. The alternate T&E pathways under these subparts would be removed from the regulations some years after implementation of the rule and the new board recognition criteria. To support this regulatory framework of relying solely on certification by medical specialty boards, the NRC would revise the board recognition criteria under these subparts to be less prescriptive, focused on radiation safety competency, and more encompassing of emerging radiopharmaceuticals. The criteria would also require training on written directives, medical event reporting, and patient release criteria. The NRC and Agreement States would periodically audit recognized boards to ensure their continued compliance with the radiation safety training criteria.

The rulemaking would require physicians seeking AU status to be certified by a National Materials Program-recognized medical specialty board—there would be no alternate pathways. Therefore, physicians awaiting board certification would need to work under the supervision of an existing AU until they are board certified. After an AU is initially credentialed, ongoing AU status would be tied to the physician's maintenance of board certification.

Medical specialty boards seeking NRC or Agreement State recognition would need to demonstrate that their training programs meet the revised radiation safety training criteria that would be determined by the NRC (in coordination with the ACMUI and the Agreement States and with input from external stakeholders) during the rulemaking. As part of the rulemaking, the NRC would publish guidance to assist medical specialty boards in developing radiation safety programs that meet the revised board recognition criteria. Because the board certification pathway addresses future physicians, the NRC plans to develop guidance assisting newly recognized specialty board programs in determining whether and how to provide a pathway for their existing board diplomates to become AUs. Existing AUs and recognized medical specialty boards would be grandfathered.

The NRC would no longer review and approve T&E for AUs, and AUs would no longer be listed on licenses. Licensees would no longer submit license amendments regarding AUs; instead, they would be required to maintain a list of their credentialed AUs, a list of the authorized uses by these AUs, and copies of medical specialty board certificates. These items could be subject to review during routine inspections of licensees.

For the Option 3 rulemaking, the NRC would revise the following regulations: 10 CFR 35.190; 35.290; 35.390; 35.392, "Training for the Oral Administration of Sodium Iodide I-131 Requiring a Written Directive in Quantities Less Than or Equal to 1.22 Gigabecquerels (33 Millicuries)"; 35.394, "Training for the Oral Administration of Sodium Iodide I-131 Requiring a Written Directive in Quantities Greater Than 1.22 Gigabecquerels (33 Millicuries)"; and 35.396, "Training for the Parenteral Administration of Unsealed Byproduct Material Requiring a Written Directive."

Stakeholder feedback during the early stages of rulemaking will determine whether enhancements are needed to 10 CFR 35.27; 35.40, "Written Directives"; 35.41, "Procedures for Administrations Requiring a Written Directive"; and 35.59, "Recentness of Training."

Administrative changes would likely be required for 10 CFR 35.2, "Definitions"; 35.8, "Information Collection Requirements: OMB Approval"; 35.12, "Application for License, Amendment, or Renewal"; 35.13, "License Amendments"; 35.14, "Notifications"; 35.57, "Training for Experienced Radiation Safety Officer, Teletherapy or Medical Physicist, Authorized Medical Physicist, Authorized User, Nuclear Pharmacist, and Authorized Nuclear Pharmacist"; and 10 CFR Part 35, Subpart L, "Records."

Conforming changes would likely be required for 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," and 10 CFR Part 32, "Specific Domestic Licenses To Manufacture or Transfer Certain Items Containing Byproduct Material."

Description of Rulemaking: Preliminary Backfitting and Issue Finality Analysis

The Commission's backfitting provisions in 10 CFR Parts 50, 70, 72, and 76 and issue finality provisions in 10 CFR Part 52 do not apply to the licensees or proposed AUs that would be affected by this rulemaking amending 10 CFR Part 35. However, under the NRC's Principles of Good Regulation,¹³ the proposed rulemaking change would further promote efficiency, clarity, reliability, and openness. The staff would consider the costs and benefits of the rule as part of the regulatory analysis associated with the rulemaking, as further discussed in the "Description of Rulemaking: Estimate of Resources" section below.

Description of Rulemaking: Estimated Schedule

- Publish advance notice of proposed rulemaking (ANPR)—3 months after decision to initiate rulemaking.
- Publish regulatory basis for comment—12 months after ANPR.
- Publish proposed rule (considering comments on regulatory basis)—12 months after regulatory basis comment period closes.
- Publish final rule—12 months after proposed rule comment period closes.

¹³ The NRC's Principles of Good Regulation are available at <https://www.nrc.gov/about-nrc/values.html#principles>.

All schedules include time to coordinate reviews with the Agreement States and the ACMUI.¹⁴ The staff will continue to look for opportunities to compress these schedules as the work proceeds.

The staff would publish an ANPR to solicit early stakeholder input on certain regulatory issues, such as the high-level board recognition criteria and removal of the alternate pathway, or retention of the current specialty board recognition criteria. While the proposed and final rule would come to the Commission for approval, the staff is recommending that the Commission specifically delegate signature authority for the ANPR to the Executive Director for Operations.

Description of Rulemaking: Preliminary Recommendation on Priority

Based on the Common Prioritization of Rulemaking methodology, updated September 2018 (ADAMS Accession No. ML18263A070), the preliminary priority for the Option 3 rulemaking is medium. The staff determined that the rulemaking will (1) be a moderate contributor towards attaining the NRC's Safety Strategic Goal of ensuring the safe use of radioactive materials, (2) significantly support the NRC's Principles of Good Regulation by increasing efficiency, clarity, reliability, and openness, (3) provide a future regulatory benefit and consider Commission and congressional interest in patient access to radiopharmaceuticals, (4) reduce regulatory burden for licensees and Agreement States, and (5) consider substantial public interest and participation to date in the staff's evaluation of the T&E requirements for radiopharmaceuticals.

Description of Rulemaking: Estimate of Resources

Option 3, as recommended in this paper, is estimated to achieve substantial savings. The savings (averted costs) would be approximately \$2.4 million per year to Agreement States, the NRC, and licensees. The staff estimates that implementation of this rulemaking, including updates to guidance and inspection procedures, recognition of new medical specialty boards, and auditing medical specialty boards, would cost the NRC, the Agreement States, licensees, and medical specialty boards approximately \$7.8 million over several years. The costs for this rulemaking would be significantly offset by the savings (averted costs) to the licensees, Agreement States, and the NRC. Based on this early estimate (subject to further evaluation in the regulatory analysis for the rulemaking), Option 3 is cost-justified.

The rulemaking action is estimated to provide the following benefits:

- *Protection of Public Health and Safety:* Rulemaking would continue to provide for the radiation safety of the general public, workers, and patients in accordance with the NRC's Medical Policy Statement. Requiring AUs to be certified by recognized medical specialty boards and periodic auditing of the boards' radiation safety training programs would continue to ensure appropriate T&E for the safe and secure use of radiopharmaceuticals.
- *Licensing Reviews of AU T&E:* Rulemaking would relieve the NRC and Agreement States of the time and effort required to perform licensing reviews of AU T&E. Using NRC licensee data from the Web-Based Licensing system, it is estimated that the NRC receives about 240 amendment requests related to AU T&E for unsealed byproduct

¹⁴ The Agreement States typically receive 30-90 days to review the draft regulatory basis, proposed rule, and final rule; the ACMUI receives 90 days to review the proposed rule and final rule.

modalities per year, and spends 10 to 100 hours per amendment request (staff used an estimated average of 15 hours per amendment for this early analysis). Because the T&E regulations are Compatibility Category B,¹⁵ the Agreement States' regulatory actions related to T&E likely mirror the NRC's actions. Considering that the NRC regulates 9.5 percent of all medical licensees and Agreement States regulate the remaining 90.5 percent,¹⁶ savings by Agreement States would be significant.

- *Potential New AU Pathways:* Rulemaking would revise the medical specialty board recognition criteria to broaden the radiation safety training topics and better align them with the current practice of diagnostic and therapeutic nuclear medicine, including emerging radiopharmaceuticals. It is expected that revising the board recognition criteria would result in boards outside the fields of nuclear medicine and radiation oncology applying for NRC or Agreement State recognition, providing additional pathways for new types of physicians to become AUs upon completion of their board certificate programs. To date, medical specialties that have expressed interest in radiopharmaceutical therapies targeted to their practice of medicine include urology, hematology, and medical oncology. Recognition of new medical specialty boards could expand the number of AUs and potentially increase the availability of radiopharmaceuticals.
- *Reduction of Regulatory Burden for Licensees:* Rulemaking would relieve 10 CFR 35.100, "Use of Unsealed Byproduct Material for Uptake, Dilution, and Excretion Studies for Which a Written Directive Is Not Required," 35.200, "Use of Unsealed Byproduct Material for Imaging and Localization Studies for Which a Written Directive Is Not Required," and 35.300 licensees of the time and effort required to develop and submit license amendment requests related to AUs. Using NRC licensee data from the Web-Based Licensing system, the staff estimated that these licensees submit an average of 2,500 AU-related amendments for 10 CFR 35.100, 35.200, and 35.300 materials per year. The staff estimated 4.5 hours per amendment to calculate the savings to licensees.

One-time costs associated with Option 3 include notice-and-comment rulemaking and updates to guidance (see Enclosure 6 for estimates); Agreement State implementation of compatible regulations and corresponding NRC regulatory review; licensee implementation of new or updated licensing guidance; medical specialty boards development of radiation safety training programs and application for NRC or Agreement State recognition; and NRC and Agreement State review of new medical specialty boards for recognition. One smaller, ongoing cost for the NRC, Agreement States, and medical specialty boards includes periodic auditing of the specialty boards. The staff also expects that the rulemaking would result in small changes to inspection procedures for nuclear medicine licensees, but these changes would have a marginal impact on NRC and Agreement State inspection resources.

¹⁵ Compatibility Category B— Program elements in Compatibility Category B are those that apply to activities that cross jurisdictional boundaries. These program elements have a particular impact on public health and safety and need to be adopted in an essentially identical manner to ensure uniformity of regulation on a nationwide basis. (Management Directive 5.9, "Adequacy and Compatibility of Program Elements for Agreement State Programs," dated April 26, 2018 (ADAMS Accession No. ML18081A070)).

¹⁶ NRC and Agreement State licensee count data obtained from "Annual Count of Active Radioactive Materials Licenses in the National Materials Program (STC-19-069)," dated October 21, 2019 (ADAMS Accession No. ML19290E330).

The staff also considered the costs and benefits associated with the other options identified in this paper. Option 1, status quo, would have no costs and no savings (averted costs). Option 2, tailored requirements, would entail an additional burden of approximately \$7.5 million to licensees, Agreement States, and the NRC relative to the status quo. There are no savings (averted costs) associated with tailored requirements. Option 4, which is similar to Option 3 but would maintain the alternate pathway, would result in approximately \$500,000 per year in savings (averted costs) to Agreement States, the NRC, and licensees.

Cumulative Effects of Regulation

The staff's preliminary assessment of the cumulative effects of regulation concludes that (1) the rulemaking will reduce regulatory burden for Agreement States and licensees, (2) there are no known activities or affected entities that will significantly impact the implementation of the proposed changes, and (3) the staff will build on the extensive stakeholder engagement conducted as part of the T&E evaluation conducted in response to SRM-M170817 and plans to hold additional public meetings at each step in the rulemaking process.

The staff is currently developing a rulemaking plan for another 10 CFR Part 35 rulemaking effort, "Updates for Emerging Medical Technologies" (Docket ID NRC-2018-0297, which is likely to be proposed to the Commission as a high-priority rulemaking). These efforts are being coordinated, and if the Commission authorizes both rulemaking activities, the staff will evaluate areas of overlap and will optimize application of staff resources and opportunities for stakeholder participation. Combination of the rulemaking activities will be considered, but narrowly scoped rulemakings conducted separately may be more timely, efficient, and effective.

Agreement State Considerations

The staff expects that regulations revised through this rulemaking will be classified as Compatibility Category B. The staff has coordinated with the Agreement States throughout its evaluation of the T&E requirements (see Enclosures 1 and 2), and the staff will continue to work closely with the Agreement States in accordance with SA-801A, "Agreement State Participation in Rulemaking Working Groups," dated January 16, 2019 (ADAMS Accession No. ML18263A239), throughout all stages of rule development.

Guidance

The staff expects that the following documents will be updated in parallel with the rulemaking: (1) NUREG-1556, Volume 9, Revision 3; (2) NRC Form 313A, "Authorized User Training, Experience, and Preceptor Attestation"; (3) Inspection Procedures 87130 and 87131;¹⁷ and (4) guidance available through the NRC's Medical Uses Licensee Toolkit for medical specialty board recognition criteria and procedures for applying for NRC recognition.

Advisory Committee on Reactor Safeguards Review

This review is not required for medical rulemakings.

¹⁷ Inspection Procedure 87130, "Nuclear Medicine Programs, Written Directive Not Required," dated October 24, 2002 (ADAMS Accession No. ML023370121); and "Inspection Procedure 87131, "Nuclear Medicine Programs, Written Directive Required," dated August 24, 2011 (ADAMS Accession No. ML111610509).

Committee to Review Generic Requirements Review

This review is not necessary because the backfit regulations do not apply, as described in the "Backfitting and Issue Finality" section of this rulemaking plan.

Advisory Committee on the Medical Use of Isotopes Review

The staff will continue to coordinate with the ACMUI on this rulemaking. Enclosures 1 and 2 document the ACMUI's engagement and input to date on the staff's evaluation of T&E for radiopharmaceuticals. The ACMUI will review and comment on the staff's regulatory basis, draft proposed rule, and draft final rule. A series of public meetings will be held to discuss the ACMUI's comments and recommendations.

Analysis of Legal Matters

The Office of the General Counsel has reviewed this rulemaking plan and has not identified any issues necessitating a separate legal analysis at this time.

COMMITMENT:

If the Commission approves initiation of the proposed rulemaking, in accordance with SECY-16-0042, "Recommended Improvements for Rulemaking Tracking and Reporting," dated April 4, 2016 (ADAMS Accession No. ML16075A070), the staff will add the rulemaking activity to the agency's rulemaking tracking tool. The staff may include this rulemaking in the fiscal year 2022 common prioritization of rulemaking for planning and tracking purposes only—resources would not be applied to this rule until Commission direction is received.

This paper serves as the periodic Commissioners' Assistant note on the T&E evaluation that is due February 28, 2020, per SRM-M170817.

RECOMMENDATION:

For the reasons provided above, the staff recommends that the Commission approve rulemaking to amend 10 CFR Part 35. Specifically, the staff recommends **Option 3, "National Materials Program-Recognized Specialty Board Credentialing."**

The staff also recommends that the Commission approve its recommendation to delegate signature authority for the ANPR to the Executive Director for Operations.

RESOURCES:

Enclosure 6 includes an estimate of the NRC resources needed to complete this rulemaking. Resource estimates in Enclosure 6 are not publicly available.

COORDINATION:

The Office of the General Counsel has no legal objection to this action. The Office of the Chief Financial Officer has reviewed this paper and has no concerns with the estimated resources in Enclosure 6.



Margaret M. Doane
Executive Director
for Operations

Enclosures:

1. Background Information
2. Summary of Outreach
and Coordination
3. Staff Evaluation
4. Guidance Documents and
Procedures
5. Other Options Considered
6. Estimated Rulemaking
Resources (not publicly available)

RULEMAKING PLAN FOR TRAINING AND EXPERIENCE REQUIREMENTS FOR UNSEALED BYPRODUCT MATERIAL DATED

Ticket Number: OEDO-20-00003

ADAMS Package Accession No.: ML19217A318 *Via e-mail SECY-20-0XX

OFFICE	MSST/MSEB:PM	REFS/RASB:PM*	MSST/MSEB:PM*	MSST/MSEB:TL*
NAME	SLopas	MAnderson	MAyoade	LDimmick
DATE	11/17/2019	11/21/19	11/21/19	12/5/19
OFFICE	MSST/MSEB:BC*	NMSS/RASB:BC*	NMSS/MRPB:BC*	NMSS/MSST:D*
NAME	CEinberg	CBladey	JCai	KWilliams
DATE	11/26/19	11/22/19	11/22/19	11/22/19
OFFICE	NMSS/REFS:D*	QTE*	Region I/DNMS*	Region III/DNMS*
NAME	TClark	KAzariah-Kribbs	JTrapp	CLipa
DATE	11/22/19	12/6/19	12/4/19	12/10/19
OFFICE	Region IV/DNMS*	OCFO*	OCIO*	OGC*
NAME	MHay	JJohnson	DCullison	Irvin
DATE	12/6/19	12/4/19	12/6/19	12/27/2019
OFFICE	NMSS*	EDO		
NAME	JLubinski	MDoane		
DATE	12/19/2019	1/13/20		

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**TRAINING AND EXPERIENCE REQUIREMENTS FOR
UNSEALED BYPRODUCT MATERIAL: BACKGROUND INFORMATION**

Introduction

The U.S. Nuclear Regulatory Commission's (NRC's) training and experience (T&E) requirements in Title 10 of the *Code of Federal Regulations* (CFR) Part 35, "Medical Use of Byproduct Material," Subpart E, "Unsealed Byproduct Material—Written Directive Required," cover the following four uses of radiopharmaceuticals:

- (1) the use of unsealed byproduct material for which a written directive is required (10 CFR 35.390)
- (2) the oral administration of sodium iodide I-131 requiring a written directive in quantities less than or equal to 1.22 gigabecquerels (33 millicuries) (10 CFR 35.392)
- (3) the oral administration of sodium iodide I-131 requiring a written directive in quantities greater than 1.22 gigabecquerels (33 millicuries) (10 CFR 35.394)
- (4) the parenteral administration of unsealed byproduct material requiring a written directive (10 CFR 35.396)

Table 1 provides a summary of the different pathways for a physician to become an authorized user (AU) for radiopharmaceuticals under 10 CFR 35.300, "Use of unsealed byproduct material for which a written directive is required."

Table 1. AU Pathways in 10 CFR 35.300

10 CFR 35.390	10 CFR 35.392	10 CFR 35.394	10 CFR 35.396
Certified by a medical specialty board whose certification process has been recognized by the NRC or an Agreement State			Recognized medical specialty board + 80 hours of classroom and laboratory training + work experience (including casework) under the supervision of an AU + preceptor attestation
OR			
	Is an AU under 10 CFR 35.390 or 10 CFR 35.394	Is an AU under 10 CFR 35.390	Is an AU under 10 CFR 35.390
OR			
700 hours of T&E, including a minimum of 200 hours of classroom and laboratory training + work experience (including casework) under the supervision of an AU + preceptor attestation	80 hours of classroom and laboratory training + work experience (including casework) under the supervision of an AU + preceptor attestation	80 hours of classroom and laboratory training + work experience (including casework) under the supervision of an AU + preceptor attestation	Is an AU under 10 CFR 35.490 or 10 CFR 35.690 + 80 hours of classroom and laboratory training + work experience (including casework) under the supervision of an AU + preceptor attestation

Over the years, the NRC has received feedback from stakeholders on its T&E requirements for radiopharmaceuticals under 10 CFR 35.300, and both the staff and the Advisory Committee on the Medical Uses of Isotopes (ACMUI) have undertaken several efforts looking at the T&E requirements. The staff summarizes this feedback and those efforts below to add context to the discussions in the rulemaking plan SECY.

Stakeholder Feedback on the Alternate Pathway

Since the NRC amended the T&E requirements in 2002 (67 FR 20250; April 24, 2002) and subsequently in 2005 (70 FR 16336; March 30, 2005),¹ stakeholders have raised concerns about the effects of the T&E requirements in 10 CFR 35.390, “Training for use of unsealed byproduct material for which a written directive is required,” on patient access to certain therapeutic radiopharmaceuticals.² Specifically, some stakeholders have asserted that the 700-hour requirement is overly burdensome for physicians who are not certified by an NRC-recognized medical specialty board and that the extensive requirements have resulted in a shortage of AUs for 10 CFR 35.300 materials.³

In a letter to the ACMUI dated October 28, 2015,⁴ Spectrum Pharmaceuticals (Spectrum), requested that the NRC reevaluate the 700-hour requirement in the alternate pathway because “it is impacting patient and healthcare access to effective treatment options.” Spectrum is the manufacturer of Zevalin[®] (rituximab + yttrium-90), a beta emitter radioimmunotherapy for treatment of non-Hodgkin’s lymphoma. Spectrum’s letter went on to state:

...[W]e believe 80 hours is the upper limit of the appropriate level of training for a limited license to administer pre-filled self-contained radiopharmaceuticals like Zevalin. Such an approach would eliminate the unnecessary regulatory barriers currently limiting cancer patient access to effective treatment options, while maintaining training requirements commensurate with the risks of handling Zevalin. ... It is important to note that Zevalin involves limited physician preparation and handling. Zevalin is delivered to the AU as a patient-ready dose requiring only an acrylic shield and standard radiation precautions. A “hot lab” is not required and patients do not need to be assessed for radiation exposure. Due to the preparation of the patient-ready dose by the radiopharmacy before

¹ From the inception of the Atomic Energy Commission’s medical regulations in 1956 until about 1979, the T&E requirements for therapeutic radiopharmaceuticals were general and performance based—there were no hours-based requirements. Guidance issued in January 1979 (Regulatory Guide 10.8, “Guide for the Preparation of Applications for Medical Programs” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13350A208)), recommended 80 hours of training in basic radioisotope handling techniques plus clinical experience that included a specified number of therapy procedures; these recommendations were codified in a 1987 rulemaking (51 FR 36932; October 16, 1986). The 700-hour requirement went into effect on October 24, 2002, as part of a broad rulemaking for 10 CFR Part 35 (67 FR 20250; April 24, 2002). The staff provides more detailed information on the historical timeline of the T&E requirements for radiopharmaceuticals in “Historical Background of the U.S. Nuclear Regulatory Commission’s Training and Experience Requirements for Radiopharmaceuticals Requiring a Written Directive” (ADAMS Accession No. ML19176A455).

² Stakeholders raised concerns in the petition for rulemaking submitted by William Stein III, M.D. (PRM-35-19) (71 FR 34285; June 14, 2006), and in comments on the proposed rule to amend the regulations related to the medical use of byproduct material (79 FR 42410; July 21, 2014). The NRC responded to those comments in the denial of the petition for rulemaking (72 FR 60285; October 24, 2007), and in the final rule (83 FR 33046; July 16, 2018), respectively.

³ Stakeholders raised these concerns during the ACMUI meetings held on March 10, 2016 (ADAMS Accession No. ML16109A042), and October 7, 2016 (ADAMS Accession No. ML16357A688).

⁴ The letter from Spectrum dated October 28, 2015, can be found on page 77 of the transcript of the ACMUI public teleconference meeting on March 10, 2016 (ADAMS Accession No. ML16109A042).

reaching the administering physician, training requirements for the physician on dose preparation and the safe handling of radiopharmaceuticals can be more limited. Board certified Hematologists/Oncologists are accustomed to using cytotoxic agents that require specific handling tailored to their risks, and are customarily trained on standard radiation precautions. Limited additional training on the proper handling and disposal of Zevalin should enable them to safely use this product.

Spectrum noted that an 80-hour T&E requirement would mirror the T&E requirements for administering sodium iodide I-131 in 10 CFR 35.392 and 35.394 and that Zevalin[®] had a comparable, or even more favorable, safety profile than I-131. Spectrum stated that doctors wishing to offer Zevalin[®] to their patients were having a difficult time finding AUs who administer Zevalin[®] and who are located within a reasonable commuting distance for their patients. Specifically, in 2010, the number of AUs offering Zevalin[®] was greater than 400, but by 2015, that number had decreased to about 145. During its public teleconference on October 8, 2015,⁵ the ACMUI discussed that the decrease in AUs offering Zevalin[®] could be attributed to an increase in competing therapies and not to a lack of AUs authorized to administer the radiopharmaceutical.

Around this time, other stakeholders echoed similar concerns about patient access to alpha and beta emitters, including patients, patient advocacy organizations (American Society of Hematology, Patients Against Lymphoma, Lymphoma Research Foundation, Community Oncology Alliance), healthcare administrators, hematologists and medical oncologists, and former Nevada Congressman Joe Heck.⁶ In July 2018, Bayer Healthcare submitted a letter⁷ to the ACMUI requesting that the NRC consider a proposal to enable medical oncologists and urologists to attain AU status for administration of its radiopharmaceutical, Xofigo[®] (radium-223 dichloride)—an alpha emitter approved for treatment of prostate cancer with symptomatic bone metastases—with 80 hours of T&E. Bayer HealthCare pointed to Xofigo's[®] “unit-dose and patient-ready form, uncomplicated administration, and minimal administered activity that enables patient release without instructions” as the justification for reduced T&E. In its letter, Bayer HealthCare also provided market data to illustrate that “diminishing numbers of AUs” and the geographic distribution of AUs were factors that contributed to patients not receiving Xofigo[®] treatment.

Past NRC Efforts

In response to the alternate pathway feedback, in 2015 and 2016 the staff reviewed the T&E requirements under 10 CFR 35.300. The staff reviewed the regulatory basis and comments received on all past rulemakings related to the medical use of byproduct material and did not identify any new information that would call into question the basis of the existing requirements.⁸ As a result, the staff did not propose any changes to the regulations at the time.

⁵ The discussion of competing therapies can be found on page 70 of the transcript of the ACMUI public teleconference meeting on October 8, 2015 (ADAMS Accession No. ML15294A421).

⁶ Congressman Heck's letter dated January 5, 2016, can be found on page 89 of the transcript for the ACMUI public teleconference meeting on March 10, 2016 (ADAMS Accession No. ML16109A042).

⁷ The letter dated July 11, 2018, from Bayer HealthCare can be found on page 58 of the transcript of the ACMUI public teleconference meeting on July 16, 2018 (ADAMS Accession No. ML18221A170).

⁸ The NRC amended the T&E requirements in 10 CFR Part 35 related to radiopharmaceutical therapies in 1998 (63 FR 43516; August 13, 1998), 2002 (67 FR 20249; April 24, 2002), and 2005 (70 FR 16336; March 30, 2005). The staff received and reviewed comments in response to these rulemaking efforts.

In the August 17, 2017, staff requirements memorandum (SRM) approving the final rule for medical use of byproduct material,⁹ the Commission directed the staff to evaluate tailored T&E requirements for different categories of radiopharmaceuticals. In response to the SRM, the staff conducted initial outreach with various medical and regulatory stakeholders in April 2018. The outreach consisted of a questionnaire (ADAMS Accession No. ML18108A266) that covered four main areas: (1) the fundamental knowledge necessary for administering any radiopharmaceutical under 10 CFR 35.390, (2) the additional specific knowledge necessary for administering particular types of radiopharmaceuticals, (3) how best to acquire this knowledge, and (4) how this knowledge and ability to function independently should best be evaluated. The staff sent this questionnaire to a small sample of non-Federal stakeholders and Federal licensees in the medical community.

Stakeholder views varied widely, but, regarding the fundamental and specific knowledge for administering radiopharmaceuticals, most stakeholders responded that the list of knowledge topics included in the questionnaire was appropriate and that most of these topics are covered in sufficient depth during a physician's residency program for a specialty board certification.¹⁰ With regard to how to best acquire this knowledge, stakeholder responses were more varied. Some stakeholders indicated that the knowledge would mostly be acquired in a physician's residency or fellowship program or through a combination of classroom and laboratory training and hands-on experience. Other stakeholders suggested eliminating the alternate pathway, while one stakeholder stated that the alternate pathway should be maintained to provide flexibility given the length of the board certification process. Stakeholder responses also varied with regard to how knowledge, skills, and abilities should be evaluated. Some stakeholders suggested that the medical specialty boards create and administer an examination to test competency, while another stakeholder was not sure whether a written examination was a reliable evaluation by itself. One stakeholder suggested that the professional medical societies may be able to administer an examination, while another stakeholder suggested that the NRC could administer such an examination. The overarching comment made by most of the stakeholders was that the NRC should collaborate with knowledgeable external entities to determine how the knowledge and ability to function independently as an AU should best be evaluated.

In addition to the stakeholder questionnaire, the staff received feedback from the Agreement States and the Organization of Agreement States (OAS) Executive Board. The OAS Executive Board and a majority of Agreement States that provided feedback to the NRC did not support the idea of creating another subcategory of AUs because this would likely add another layer of complication when approving AUs. OAS and the Agreement States also indicated that, as regulators, the NRC and Agreement States should focus on radiation safety and protection and that the regulatory agencies should not allow their oversight approach to impinge on the practice of medicine.

The staff documented the initial results, status, and next steps of the evaluation of tailored T&E in SECY-18-0084, "Staff Evaluation of Training and Experience Requirements for Administering

⁹ SRM-M170817, "Staff Requirements—Affirmation Session, 10:30 A.M., Thursday, August 17, 2017, Commissioners' Conference Room, One White Flint North, Rockville, Maryland (Open to Public Attendance)," dated August 17, 2017 (ADAMS Accession No. ML17229B283).

¹⁰ The general knowledge topics included radiation physics, instrumentation, radiation protection, mathematics pertaining to the use and measurement of radioactivity, general patient release determination, chemistry of byproduct material for medical use, radiation biology, medical events, and NRC requirements. The subtopics and additional topics based on specific categories of radiopharmaceuticals can be found in the questionnaire (ADAMS Accession No. ML18108A266).

Different Categories of Radiopharmaceuticals in Response to SRM-M170817," dated August 28, 2018 (ADAMS Accession No. ML18135A276). The staff concluded that it may be feasible to establish tailored T&E requirements for different categories of radiopharmaceuticals and to create a means of authorizing the administration of these categories (i.e., a limited AU status); however, more extensive outreach with the medical community was needed to move forward with these efforts. This rulemaking plan SECY documents the staff's additional outreach efforts and evaluation of T&E for radiopharmaceuticals requiring a written directive.

Past Evaluations by the Advisory Committee on the Medical Uses of Isotopes

Separate from the staff's review in 2015 and 2016, the ACMUI independently reviewed the T&E requirements for the medical uses authorized under 10 CFR 35.300. In the "ACMUI Sub-Committee Final Report on Training & Experience for Authorized Users of Alpha and Beta Emitters under 10 CFR 35.390," dated March 16, 2016 (ADAMS Accession No. ML16089A271), the ACMUI concluded that no change to the T&E requirements was warranted and that the current requirement of 700 hours for AUs does not adversely affect patient access to therapeutic radiopharmaceuticals. Moreover, the ACMUI noted in that report that certain therapeutic radiopharmaceuticals were used infrequently even in large metropolitan areas and at large medical centers, both of which have large numbers of AUs, indicating that factors other than the availability of AUs were dictating choices of treatment. In that report, the ACMUI recommended forming a subcommittee with the specific charge of periodically reviewing the T&E requirements currently in effect and making recommendations for changes as warranted.

In 2016, the ACMUI formed a subcommittee to periodically review the T&E requirements for all medical modalities (unsealed and sealed byproduct material) in 10 CFR Part 35, beginning with the review of 10 CFR 35.300, and to determine whether changes are needed. As noted in its status report dated September 16, 2016 (ADAMS Accession No. ML17066A442), this subcommittee was formed in response to (1) continued concerns raised by stakeholders about patient access to radiopharmaceuticals, (2) development of new radiopharmaceuticals since the current T&E requirements went into effect in 2002, and (3) a shift in the educational paradigm in the medical specialty training infrastructure from hours and experience to one that is more competency based.

The ACMUI subcommittee provided the staff with its draft interim report dated February 19, 2018 (ADAMS Accession No. ML18051A725), and discussed the report with the full committee in a public teleconference on March 1, 2018 (ADAMS Accession No. ML18092B615). In its report, the subcommittee expressed concerns about the decrease in the number of nuclear medicine physicians in recent years,¹¹ noting that this could be a problem in the future. The subcommittee also indicated that while it is difficult to judge the effect of this decline on patient access, there are no data to suggest that "there is a surplus [of AUs], nor have future needs been addressed." Therefore, the subcommittee concluded that the creation of a new alternative approach for AUs under 10 CFR 35.390 should be reconsidered, and the subcommittee committed to continue its work in this area.

¹¹ The American Board of Nuclear Medicine (ABNM) provided a comment letter (page 74 of ADAMS Accession No. ML18221A170) in response to the ACMUI public meeting on March 1, 2018. In that letter, the ABNM indicated that the number of certificates issued each year had been relatively constant from 1977 to 2015, with an annual average of 72 during that time (range 50–107). The ABNM noted that it had issued 43 initial certificates in 2016 and 49 certificates in 2017.

The ACMUI reviewed the staff's preliminary evaluation of T&E requirements and, in its final report, "Comments on the Draft NRC SECY Paper Entitled 'Staff Evaluation of Training and Experience Requirements for Administering Radiopharmaceuticals,'" dated July 16, 2018 (ADAMS Accession No. ML18201A417), agreed with the staff's conclusion that was later documented in SECY-18-0084. This conclusion was that a limited AU status for radionuclide therapy is possible, but that there must be a clear outline for the physician's scope of practice. The ACMUI also agreed that additional stakeholder outreach was needed. The ACMUI also recommended that the staff conduct ongoing monitoring for the potential incidence of an AU shortage for the medical uses authorized under 10 CFR 35.300.

**TRAINING AND EXPERIENCE REQUIREMENTS FOR
UNSEALED BYPRODUCT MATERIAL:
SUMMARY OF OUTREACH AND COORDINATION**

This enclosure summarizes external stakeholder input and the U.S. Nuclear Regulatory Commission (NRC) staff's coordination with the Advisory Committee on the Medical Uses of Isotopes (ACMUI) and the Agreement States during its evaluation of the training and experience (T&E) requirements for administration of radiopharmaceuticals under Title 10 of the *Code of Federal Regulations* (10 CFR) 35.300, "Use of Unsealed Byproduct Material for Which a Written Directive Is Required." In summary, stakeholder views on T&E for radiopharmaceuticals vary widely and primarily align with each stakeholder's interests in either maintaining the status quo or revising the requirements in some manner.

Complete documentation of the staff's outreach efforts, which also included letters and e-mails, newsletter submissions, and conference attendance, detailed comment summaries, and commenter tables, is available in "Summary of Outreach and Comments" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19176A454).

Medical Community Feedback

The staff arranged for two public comment periods, including six public meetings, to gather stakeholder feedback. The first *Federal Register* notice (83 FR 54380; October 29, 2018) asked whether and how the NRC should tailor T&E, the appropriate content of tailored T&E requirements, and whether the NRC should consider other changes to the agency's T&E requirements. The second notice (84 FR 18874; May 2, 2019) asked for feedback on draft regulatory approaches. In total, the staff received approximately 197 written comment submissions, and 46 individuals provided oral comments during the public meetings.

Primarily citing the adequacy of the current regulations in protecting public health and safety, most comments expressed support for maintaining the NRC's existing T&E requirements (i.e., the status quo) and stated there was no evidence of a shortage of authorized users (AUs). These commenters represented the nuclear medicine and radiation oncology communities and their related medical specialty boards and professional societies, including the American College of Radiology, Society of Nuclear Medicine and Molecular Imaging, American College of Nuclear Medicine, American College of Radiation Oncology, American Osteopathic Board of Radiology, American Society for Radiation Oncology, American Association of Physicists in Medicine, American Brachytherapy Society, Health Physics Society, American Society of Radiologic Technologists, U.S. Oncology Network, and World Association of Radiopharmaceutical and Molecular Therapy. These groups were equally adamant in their opposition to any changes to the T&E requirements, primarily citing concerns about radiation safety, as well as the "dilution" and diminishment of the field of nuclear medicine.

The American Medical Association also submitted comments supporting the status quo and suggesting that the NRC work with interested medical specialty boards to integrate radiation safety training into their residency programs (ADAMS Accession No. ML19183A338). In a similar comment, a small group of nuclear medicine physicians suggested that the NRC should rely on the nuclear medicine specialty board to credential AUs and the agency should provide only "general guidance" on radiation safety requirements (ADAMS Accession Nos. ML19190A195 and ML19157A195).

The NRC received a smaller number of comments expressing support for tailoring the T&E requirements for certain radiopharmaceuticals. These comments came from the pharmaceutical industry,¹ the American Society of Hematology, urology and medical oncology physicians, and healthcare administrators. These groups advocated for a risk-informed approach to T&E based on drug safety profile and complexity of administration, and they recommended 80 hours of T&E for “unitized, patient-ready” doses of alpha or beta emitters. In their desire to use certain radiopharmaceuticals with less complex administration protocols, urology and medical oncology physicians stressed their expertise in treating the diseases for which these radiopharmaceuticals were developed as well as the importance of continuity and ease of care for patients. United Pharmacy Partners, Inc., and the National Rural Healthcare Association advocated partnering authorized nuclear pharmacists with tailored pathway AUs to increase both safety and patient access. Georgia Congressman Buddy Carter advocated for improving rural access to radiopharmaceuticals by considering authorized nuclear pharmacists for AU status (ADAMS Accession No. ML19018A194).

Agreement State Coordination

The NRC engaged the Agreement States through several letters informing them of the public comment periods and meetings, two government-to-government webinars, e-mails and teleconference coordination with the Organization of Agreement States (OAS) Executive Board, and updates to the States during the NRC/OAS/Conference of Radiation Control Program Directors (CRCPD) monthly teleconference. The staff also placed an article soliciting comments on the T&E evaluation in the CRCPD’s monthly online newsletter (ADAMS Accession No. ML19177A101) and made a presentation on the NRC staff’s T&E evaluation at the CRCPD’s National Conference on Radiation Control in May 2019 and the OAS Annual Meeting in August 2019.

Generally, the Agreement States oppose any option that would create additional AU pathways or would otherwise complicate what are viewed as “already complex” T&E regulations. Most Agreement States find the existing AU pathways reasonable and accessible for physicians, and they do not see evidence of an AU shortage in their states. The CRCPD opposes any changes to the existing regulations and endorsed comments made by several of the nuclear medicine, medical physics, and radiology professional societies noted above (ADAMS Accession No. ML19031C710).

However, some Agreement States and the OAS Executive Board indicated that the NRC’s regulation of T&E for AUs encroaches on the practice of medicine and that the NRC and the Agreement States could more effectively regulate medical use under 10 CFR 35.300 by focusing only on licensees’ radiation safety programs and their procedures for ensuring that radiopharmaceuticals are administered in accordance with the written directive.² In its submission for the second comment period (ADAMS Accession No. ML19184A590), the OAS Executive Board commented that the NRC and Agreement States should no longer review and approve T&E for AUs; instead, licensees should rely on certification by medical specialty boards that physicians are medically competent to use radiopharmaceuticals.

¹ These industry commenters included the Council on Radionuclides and Radiopharmaceuticals, Bayer HealthCare, and Spectrum Pharmaceuticals.

² Comment submissions from the OAS and the States of Colorado, North Carolina, and Wisconsin are available in ADAMS (ADAMS Accession Nos. ML19030B764, ML19177A330, ML19170A073, and ML19184A593, respectively).

In its comments on the NRC staff's draft T&E Commission paper,³ the OAS Executive Board restated its opposition to options that would require additional licensing resources or would further complicate the T&E regulations. The OAS expressed support for relying on NRC or Agreement State-recognized medical specialty boards to credential AUs (the staff's recommended rulemaking Option 3). The OAS stated the following:

The Board's emphasis is on how the drug is being administered in accordance with a physician's prescription, and in accordance with radiation safety practices, not whether the physician is competent to make decisions on what drug to administer. That should be left to the medical specialty boards.

The OAS Executive Board also cited concerns about the status quo, including the administrative and technical reviewer burden of approving AUs with little evidence of safety value added and inappropriate supervision of non-AU individuals using radiopharmaceuticals,⁴ suggesting that training requirements should emphasize handling, storage, and disposal by those who are actually administering the material.

Coordination with the Advisory Committee on the Medical Uses of Isotopes

In its draft report dated February 7, 2019 (ADAMS Accession No. ML19039A113), the ACMUI Subcommittee on T&E for All Modalities concluded the following: (1) there are no objective data to confirm a shortage of AUs for uses under 10 CFR 35.300, (2) the Subcommittee does not recommend creation of a new tailored AU pathway, and (3) if the NRC does pursue a new tailored AU pathway, candidates for this pathway must acquire all the basic knowledge topics contained in 10 CFR 35.390, "Training for Use of Unsealed Byproduct Material for which a Written Directive Is Required," satisfactorily complete an initial formal competency assessment, and complete formal periodic radiation safety competency reassessments to maintain tailored AU status. The ACMUI approved the Subcommittee's report, with one dissenting vote, during its public teleconference meeting on February 26, 2019.⁵ The Subcommittee issued its final report on T&E for 10 CFR 35.300 uses on February 27, 2019 (ADAMS Accession No. ML19058A598). Enclosure 1 to the rulemaking plan SECY (ADAMS Accession No. ML19321E362) discusses the ACMUI's past efforts related to T&E for radiopharmaceuticals.

On October 6, 2019, the Subcommittee provided comments (ADAMS Accession No. ML19280D163) on the NRC staff's draft SECY paper, concluding that (1) the Subcommittee recommends maintaining the status quo, (2) if the NRC proceeds to grant AU status through NRC-recognized medical specialty board certification, the board certification recognition criteria should be equivalent to the requirements in 10 CFR 35.390, and (3) the Subcommittee recognizes the value of the alternate pathway and is willing to comprehensively review its requirements. The Subcommittee comments contained the dissenting view of one Subcommittee member, which stated that the NRC should shift its T&E regulatory framework towards the non-AU individuals most directly responsible for radiation safety (i.e., nuclear medicine technologists and radiation safety officers). The ACMUI approved the Subcommittee's

³ The draft T&E Commission paper was sent to the Agreement States for comment on August 12, 2019 (RCPD-19-011, nonpublic (ADAMS Accession No. ML19183A364)); OAS comments on the draft Commission paper are available in ADAMS (ADAMS Accession No. ML19290H493).

⁴ Regulations for the receipt, possession, use, or transfer of byproduct material under the supervision of an AU are contained in 10 CFR 35.27, "Supervision."

⁵ The meeting summary and transcript for the ACMUI's February 26, 2019, public teleconference are available (ADAMS Accession Nos. ML19072A259 and ML19308C362, respectively).

draft report with no changes during its public teleconference meeting on October 17, 2019.⁶ The Subcommittee's final report is available (ADAMS Accession No. ML19296D256).

⁶ The meeting summary and transcript for the ACMUI's October 17, 2019, public teleconference are available (ADAMS Accession Nos. ML19303A686 and ML19303A814), respectively.

TRAINING AND EXPERIENCE REQUIREMENTS FOR UNSEALED BYPRODUCT MATERIAL: STAFF EVALUATION

In addition to gathering stakeholder feedback and coordinating with the Agreement States and the Advisory Committee on the Medical Uses of Isotopes (ACMUI), the staff evaluated the U.S. Nuclear Regulatory Commission's (NRC's) regulatory framework for training and experience (T&E) requirements more broadly to inform its consideration of the available options. The discussion below summarizes the staff's considerations.

The NRC's Medical Policy Statement

The Medical Policy Statement¹ says that the NRC will regulate the medical uses of radionuclides as necessary to provide for the radiation safety of workers and the general public; the NRC will not intrude into medical judgments affecting patients, except as necessary to provide for the radiation safety of workers and the general public; when justified by the risk to patients, the NRC will regulate the radiation safety of patients primarily to assure that the use of radionuclides is in accordance with the physician's directions; and, in developing a specific regulatory approach, will consider industry and professional standards that define acceptable approaches of achieving radiation safety.

The NRC staff, some members of the medical community, the Organization of Agreement States Executive Board, and some Agreement States have questioned whether the requirement that the NRC and Agreement States review and approve T&E for physicians to become authorized users (AUs)—thus acting as the final arbiters on whether a physician can prescribe radiopharmaceuticals—is aligned with the Medical Policy Statement. Some view this AU gatekeeper role and the prescriptive hourly and patient casework requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) 35.390, "Training for Use of Unsealed Byproduct Material for Which a Written Directive Is Required," as encroaching on the practice of medicine, and public comments on the T&E evaluation often conflated AU status with a physician's medical competency. From the NRC's regulatory standpoint, the responsibilities of AUs involved in medical use include:² (1) radiation safety commensurate with use of byproduct material, (2) administration of a radiation dose or dosage and how it is prescribed, (3) direction of individuals under the AU's supervision in the preparation of byproduct material for medical use and in the medical use of byproduct material, and (4) preparation of written directive, if required. Revising the existing T&E regulatory framework to increase medical community involvement in setting T&E requirements and credentialing AUs would better align the T&E requirements with the Medical Policy Statement and the radiation safety-related responsibilities of AUs.

Patient Access to Radiopharmaceuticals

Despite the concerns about patient access raised by some pharmaceutical and medical stakeholders, the ACMUI³ and the nuclear medicine and radiation oncology communities have

¹ "Medical Use of Byproduct Material; Policy Statement, Revision" (65 FR 47654; August 3, 2000).

² NUREG-1556, Volume 9, Revision 3, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Medical Use Licenses, Final Report," page 8-26, issued September 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19256C219).

³ "Advisory Committee on the Medical Uses of Isotopes (ACMUI) Training and Experience (T&E) for All Modalities Subcommittee Final Report," page 2, dated February 27, 2019 (ADAMS Accession No. ML19058A598), includes a table depicting the current and average numbers of resident physicians who are eligible to become AUs under 10 CFR 35.300 through the board certification and alternate pathways.

concluded that the number of existing AUs and medical residents eligible for medical specialty boards recognized by the NRC is sufficient to meet current and future demand for radiopharmaceuticals under 10 CFR 35.300, “Use of Unsealed Byproduct Material for Which a Written Directive Is Required.”

The staff mapped the locations of medical licensees authorized to use 10 CFR 35.300 materials with at least one AU listed on the license who would be permitted to use any radiopharmaceutical, along with population density data obtained from the 2010 U.S. Census. The maps affirm that most 10 CFR 35.300 licensees are located in more populous areas; however, the need to travel for specialized health care is a fact of life in rural areas and is not limited to radiopharmaceutical procedures. The staff did not draw any conclusions about whether the number and location of licensees are sufficient to satisfy patient demand for radiopharmaceuticals, as such a determination would require detailed health care market data and analyses outside the NRC’s purview. The NRC regulates medical uses of byproduct material to ensure the safety of workers and the general public, and, while the staff considered patient access concerns, the NRC cannot regulate T&E with a primary goal of increasing patient access to radiopharmaceuticals or improving the geographic distribution of AUs. The staff’s evaluation of rulemaking options included consideration of whether the options would create new pathways for physicians to become AUs. However, staff notes that for reasons outside the NRC’s purview, creation of new AU pathways would not guarantee increased AU availability in rural areas or increased overall patient access to radiopharmaceuticals. The staff discusses this mapping effort and provides licensee location maps in “Evaluation of 10 CFR 35.300 Medical Facility Locations” (ADAMS Accession No. ML19176A456).

Regulating for the Future of Radiopharmaceuticals

Radiopharmaceutical therapies are expected to increase from 13 percent of the global nuclear medicine market in 2017 to 60 percent of the market by 2030.⁴ Emerging radiopharmaceutical therapies will likely become increasingly targeted to individual patients—considering patient anatomy, physiology, and genetic background to determine the most appropriate radiopharmaceutical and prescribed dose.⁵ The staff envisions that some emerging targeted radionuclide therapy procedures will require more extensive treatment planning, dosimetry modeling, and evaluation of tumor response. Administration protocols for these emerging radiopharmaceuticals will inherently be more complex. Conversely, other radiopharmaceuticals may trend towards less complex administration protocols requiring little or no dose manipulation. The staff also anticipates that nonnuclear medicine and nonradiation oncology physicians (such as hematologists, medical oncologists, and urologists) will increasingly want to serve as both the referring and treating physicians for some therapies. Given that the expansion of the number and type of radiopharmaceuticals is just beginning, the staff believes that a less prescriptive, more performance-based approach, would provide the flexibility needed to accommodate future radiopharmaceuticals. While tailored requirements are possible in some cases, definitive, specific requirements for current radiopharmaceuticals would not best accommodate the vast number of emerging and future technologies.

⁴ MEDraysintell, “Nuclear Medicine World Market Report & Directory, Edition 2018”; see <http://medraysintell.com/resources/Nuclear%20medicine%20Market%20Report%20and%20Directory%202018%20-%20Presentation.pdf>.

⁵ Society of Nuclear Medicine and Molecular Imaging, “Fact Sheet: Targeted Radionuclide Therapy and Prostate Cancer,” available at <http://www.snmmi.org/AboutSNMMI/Content.aspx?ItemNumber=12772>.

Risk-Informing Training and Experience for Specific Radiopharmaceuticals

The staff determined that the T&E requirements in the alternate pathway may not be well-suited for certain radiopharmaceuticals. For example, 700 hours of T&E may not be necessary to ensure the safe use of a radiopharmaceutical that is provided to the physician in a unit-dose, patient-specific form and features an uncomplicated administration protocol, patient release without restrictions,⁶ and sufficient operating history demonstrating safe use. Conversely, the existing knowledge topics and supervised work experience requirements may not encompass the safety-related characteristics of future radiopharmaceuticals, which may feature complex treatment procedures and higher administered doses. Tailoring T&E requirements for different categories of radiopharmaceuticals may not consider the unique aspects of radiopharmaceuticals within these categories that may indicate the need for additional T&E. Given these complexities, more involvement by the medical community in determining the appropriate training for the safe use of radiopharmaceuticals would be beneficial.

Review of Medical Events

The Idaho National Laboratory (INL) performed a study to determine whether there were trends in the number of medical events caused by inadequate training.⁷ The review focused on reportable medical events that occurred in fiscal years 2017 and 2018 (86 events total). Of the 86 events, the description of only one event identified inadequate training as the cause, while in three others, inadequate training was inferred. The specific cause of inadequate training was difficult to establish from the reference documents because they typically indicate only that events result from human error and do not describe why the human error occurred. The INL and NRC staff determined that the available records and references did not contain enough detailed information to identify how many medical events are caused by inadequate training of medical staff, and the study was inconclusive in identifying any trends in medical events caused by inadequate training of medical staff.

Review of International Regulations

Training for the use of radiopharmaceuticals in many European and Asian countries is generally under the practice of nuclear medicine and diagnostic and therapeutic radiopharmaceuticals are primarily administered by nuclear medicine physician specialists. The international community generally does not regulate the type and amount of T&E for these physician specialists; rather, the international community requires that the physicians administering radiopharmaceuticals have the proper certification as nuclear medicine specialists as set forth by the medical community. "International Benchmarking" (ADAMS Accession No. ML19176A453) documents the staff's independent research and outreach to several international regulators and one nuclear medicine society.

⁶ The NRC's patient release criteria are contained in 10 CFR 35.75, "Release of Individuals Containing Unsealed Byproduct Material or Implants Containing Byproduct Material."

⁷ INL/LTD-19-52843, "Nuclear Material Events Database—Review of Medical Events for Inadequate Training (Fiscal Year 2017–2018)," issued February 2019 (ADAMS Accession No. ML19065A234).

Summary

The staff finds that given the expected growth in the field of nuclear medicine and uncertainties in the safety-related characteristics of emerging and future radiopharmaceuticals, such as energy level, dose, half-lives, and administration protocol, a less prescriptive and more performance-based approach to regulating T&E would be beneficial because it could cover radiopharmaceuticals beyond those currently known or in use. In addition, increased involvement by the medical community in determining the appropriate safety criteria for radiopharmaceuticals and setting the associated T&E requirements could help accommodate the increasing interest of nonnuclear medicine and nonradiation oncology physicians in using radiopharmaceuticals. While the staff considered stakeholder concerns about patient access, the availability and geographic distribution of AUs did not drive the staff's evaluation of T&E.

**TRAINING AND EXPERIENCE REQUIREMENTS FOR
UNSEALED BYPRODUCT MATERIAL:
GUIDANCE DOCUMENTS AND INSPECTION PROCEDURES**

NUREG-1556, Volume 9, Revision 3, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Medical Use Licenses, Final Report," issued September 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19256C219), contains program-specific guidance intended to assist applicants and licensees in preparing applications for materials licenses for the medical use of byproduct material.

Portions of additional volumes of NUREG-1556 may apply to training and experience aspects of medical use licensees and may need to be updated as part of this rulemaking:

- Volume 7, Revision 1, "Program-Specific Guidance About Academic, Research and Development, and Other Licenses of Limited Scope, Including Electron Capture Devices and X-Ray Fluorescence Analyzers, Final Report," issued February 2018 (ADAMS Accession No. ML18065A006)
- Volume 10, Revision 1, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Master Materials Licenses, Final Report," issued June 2016 (ADAMS Accession No. ML18065A006)
- Volume 11, Revision 1, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Licenses of Broad Scope, Final Report," issued February 2017 (ADAMS Accession No. ML17059D332)
- Volume 13, Revision 2, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Commercial Radiopharmacy Licenses, Final Report," issued March 2019 (ADAMS Accession No. ML19079A207)

Inspection procedures are available in U.S. Nuclear Regulatory Commission Inspection Manuals and may need to be updated as part of this rulemaking:

- Manual Chapter 2800, "Materials Inspection Program," dated September 12, 2017 (ADAMS Accession No. ML17186A204)
- Inspection Procedure 87130, "Nuclear Medicine Programs, Written Directive Not Required," dated October 24, 2002 (ADAMS Accession No. ML023370121)
- Inspection Procedure 87131, "Nuclear Medicine Programs, Written Directive Required," dated August 24, 2011 (ADAMS Accession No. ML111610509)
- Inspection Procedure 87134, "Medical Broad-Scope Programs," dated August 24, 2011 (ADAMS Accession No. ML111610518)
- Inspection Procedure 87127, "Radiopharmacy Programs," dated July 1, 2008 (ADAMS Accession No. ML080740188)
- Inspection Procedure 87129, "Master Material License Oversight and Inspection Program," dated October 11, 2012 (ADAMS Accession No. ML12268A417)

TRAINING AND EXPERIENCE REQUIREMENTS FOR UNSEALED BYPRODUCT MATERIAL: OTHER OPTIONS CONSIDERED

In its evaluation of the training and experience (T&E) requirements for radiopharmaceuticals, the U.S. Nuclear Regulatory Commission (NRC) staff considered maintaining the status quo and several rulemaking options. The options below are presented for completeness, but the staff does not recommend them for Commission consideration. Although they could address stakeholder concerns regarding T&E requirements, these options would counter the NRC's Principles of Good Regulation¹ by requiring significant additional licensing resources for the NRC, Agreement States, and in some cases, the licensees, and by adding unnecessary complexity to the T&E requirements.

“Emerging Radiopharmaceuticals,” would involve conducting individual reviews of each emerging radiopharmaceutical to determine drug-specific tailored T&E and other requirements (e.g., physical presence) as necessary, similar to the current construct under Title 10 of the *Code of Federal Regulations* (10 CFR) 35.1000, “Other Medical Uses of Byproduct Material or Radiation from Byproduct Material.”

Pros:

- This option would address the complexities of and operating experience with emerging radiopharmaceuticals.
- This option could create additional authorized user (AU) pathways for specific physicians and may address concerns about burdensome T&E.

Cons:

- This option would require extensive licensing and inspection resources.
- Individual reviews could delay access to emerging radiopharmaceuticals, and licensee resources would be required to train licensee staff on each unique guidance.
- This option could create regulatory uncertainty for manufacturers, licensees, and AUs.
- This option would not address concerns about T&E for existing radiopharmaceuticals.
- No stakeholders supported this option due to the required licensing resources and concerns about potentially lengthy reviews delaying mass-market availability of new radiopharmaceuticals.

“Team-Based Requirements,” would create an additional alternate pathway in which T&E requirements for AUs would be reduced based on pairing AUs with other individuals who have radiation safety T&E. These approaches could include pairing AUs with authorized nuclear pharmacists (ANPs) or an “authorized administrator,” or requiring a “nuclear medicine team” for administration of therapeutic radiopharmaceuticals (minimally consisting of an AU, a nuclear medicine technologist, and a radiation safety officer).

¹ The NRC's Principles of Good Regulation are available at <https://www.nrc.gov/about-nrc/values.html#principles>.

Pros:

- This option would create additional AU pathways and might address concerns about T&E.
- The presence of more trained professionals could provide an additional measure of radiation safety while permitting flexibility in the T&E requirements for AUs.

Cons:

- Pairing AUs with ANPs may be impractical or infeasible because of legal, clinical, financial, and other professional issues outside the purview of the NRC.
- This option would be very complex to inspect and license.
- A team-based option could create gaps in responsibility for certain radiation safety aspects.
- Team-based options have minimal stakeholder support. Specifically, stakeholders oppose pairing AUs with ANPs because the T&E for ANPs does not address patient care or fully cover the radiation safety aspects of administration.

“Licensee Credentialing,” would require licensees to develop their own procedures to determine whether their physicians are adequately trained to safely use radiopharmaceuticals. The NRC would review and approve these procedures based on high-level requirements, and the procedures would be enforceable as license conditions.

Pros:

- This option could address stakeholder concerns about T&E through increased involvement by the medical community in setting T&E requirements.
- This option would better align with the Medical Policy Statement² than the existing T&E regulatory framework: the less prescriptive nature of this option and increased medical community involvement in setting T&E requirements and credentialing AUs would encroach less on the practice of medicine and better consider industry and professional standards.
- While still reviewing and approving licensee developed procedures, the NRC and Agreement States would require fewer licensing resources because they would no longer review and approve T&E for individual AUs.
- This option is agile and transformative in that it offers the flexibility needed to accommodate emerging and future radiopharmaceuticals; licensees could revise their T&E requirements as new radiopharmaceuticals are developed.

² “Medical Use of Byproduct Material; Policy Statement, Revision” (65 FR 47654; August 3, 2000).

Cons:

- The medical community could view this option as an abdication of the NRC's regulatory responsibilities.
- This option could create disparities in AU radiation safety competency across the National Materials Program.
- Licensees may object to expending additional resources needed to develop their own policies, procedures, and training programs.
- This option would initially require additional licensing resources from the NRC and Agreement States to review and approve licensee policies and procedures.
- No stakeholders supported this option, citing concerns about safety, practical implementation, and discrepancies in AU credentialing across the National Materials Program.