[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 35

NRC-2022-0218

RIN 3150-AK91

Reporting Nuclear Medicine Injection Extravasations as Medical Events

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to require reporting of certain nuclear medicine injection extravasations as medical events and to require medical licensees to develop, implement, and maintain written procedures for evaluating and reporting extravasations. This proposed rule would affect medical licensees that administer intravascular radiopharmaceuticals for diagnostic or therapeutic purposes. The NRC plans to hold a public meeting to promote full understanding of this proposed rule to facilitate the development of public comments.

DATES: Submit comments by **[INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the NRC is able to ensure consideration only for comments received on or before this date.

ADDRESSES: You may submit comments by any of the following methods; however, the NRC encourages electronic comment submission through the **Federal rulemaking website**:

- **Federal Rulemaking website:** Go to https://www.regulations.gov and search for Docket ID NRC-2022-0218. Address questions about NRC dockets to Helen Chang; telephone: 301-415-3228; email: Helen.Chang@nrc.gov. For technical questions contact the individuals listed in the FOR FURTHER INFORMATION CONTACT section of this document.
- **Email comments to:** Rulemaking.Comments@nrc.gov. If you do not receive an automatic email reply confirming receipt, then contact us at 301-415-1677.
- **Fax comments to:** Secretary, U.S. Nuclear Regulatory Commission at 301-415-1101.
- **Mail comments to:** Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.
- **Hand deliver comments to:** 11555 Rockville Pike, Rockville, Maryland 20852, between 7:30 a.m. and 4:15 p.m. eastern time, Federal workdays; telephone: 301-415-1677.

You can read a plain language description of this proposed rule at https://www.regulations.gov/docket/NRC-2022-0218. For additional direction on obtaining information and submitting comments, see “Obtaining Information and Submitting Comments” in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: Sarah Lopas, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-6360, email: Sarah.Lopas@nrc.gov and

Daniel DiMarco, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-3303, email: Daniel.Dimarco@nrc.gov. Both are staff of the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

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I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID NRC-2022-0218 when contacting the NRC about the availability of information for this action. You may obtain publicly available information related to this action by any of the following methods:

- **Federal Rulemaking Website:** Go to https://www.regulations.gov and search for Docket ID NRC-2022-0218.

- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly available documents online in the ADAMS Public Documents collection at https://www.nrc.gov/reading-rm/adams.html. To begin the search, select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.Resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in the "Availability of Documents" section.

- **NRC's PDR**: The PDR, where you may examine and order copies of publicly available documents, is open by appointment. To make an appointment to visit the PDR, please send an email to PDR.Resource@nrc.gov or call 1-800-397-4209 or 301-415-4737, between 8 a.m. and 4 p.m. eastern time, Monday through Friday, except Federal holidays.

B. Submitting Comments

The NRC encourages electronic comment submission through the **Federal rulemaking website** (https://www.regulations.gov). Please include Docket ID NRC-2022-0218 in your comment submission.

The NRC cautions you not to include identifying or contact information that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at https://www.regulations.gov as well as enter the comment submissions into ADAMS. The NRC does not routinely edit comment submissions to remove identifying or contact information.

If you are requesting or aggregating comments from other persons for submission to the NRC, then you should inform those persons not to include identifying or contact information that they do not want to be publicly disclosed in their comment submission. Your request should state that the NRC does not routinely edit comment submissions to remove such information before making the comment submissions available to the public or entering the comment into ADAMS.

II. Background

This section discusses the evolution of the existing regulatory framework for medical event reporting and the NRC's previous consideration of whether certain extravasations should be included in medical event reporting to provide context for the proposed changes. The NRC proposes to define extravasation to mean the unintentional presence of a radiopharmaceutical in the tissue surrounding the blood vessel following an injection.

A. NRC's Medical Event Reporting Regulations

In May 1980, the NRC amended the medical use regulations in part 35 of Title 10 of the *Code of Federal Regulations* (10 CFR), “Medical Use of Byproduct Material,” to require the reporting of medical misadministrations (later renamed medical events) (45 FR 31701). Misadministration reporting allowed the NRC to investigate misadministrations for possible violations, evaluate licensee corrective actions, inform other licensees of potential problems, and take generic corrective actions. In the 1980 rulemaking, the NRC stated in a comment response that it did not consider an extravasation to be a misadministration because extravasations frequently occur in otherwise normal intravenous or intraarterial injections and that extravasations are virtually impossible to avoid. After the 1980 rulemaking, the misadministration reporting requirements were subsequently updated in final rules published in the *Federal Register* in July 1991, April 2002, and July 2018 (56 FR 34104, 67 FR 20250, and 83 FR 33046). In 2002, the term and criteria for ‘‘misadministration’’ were replaced with ‘‘medical event’’ and several updates were made to § 35.3045, ‘‘Report and notification of a medical event.’’ None of these updates addressed extravasations. Consistent with the terminology currently used in 10 CFR part 35, the NRC will use the term “medical event” for the rest of this document.

B. Requests for and Consideration of Revisions to NRC’s Regulations

1. NRC’s Advisory Committee on the Medical Uses of Isotopes (ACMUI)

In 2008 and 2009, ACMUI evaluated whether extravasations should continue to be excluded from medical event reporting after a licensee reported (and later retracted) an extravasation involving a common diagnostic radiopharmaceutical. During ACMUI public meetings in December 2008 and May 2009, the ACMUI discussed diagnostic and therapeutic extravasations and recommended all extravasations should continue to be

excluded from the medical event reporting requirements. The staff agreed with the ACMUI's recommendation.

2. Lucerno Dynamics Petition

On May 18, 2020, Lucerno Dynamics, LLC, submitted a petition for rulemaking (PRM)-35-22, that requested the NRC amend 10 CFR part 35 to require medical event reporting of radiopharmaceutical extravasations that lead to an irradiation resulting in a localized dose equivalent exceeding 50 rem (0.5 sievert). On September 15, 2020, the NRC published a notice of docketing and request for public comment in the *Federal Register* (85 FR 57148). The comment period closed on November 30, 2020, and the NRC received 488 comment submissions from the medical community, Agreement States, congressional representatives, and members of the public. Numerous medical professionals submitted comments stating that they were strongly opposed to regulating extravasations. Some representatives of the medical community commented that no technology can prevent extravasations, although monitoring for extravasations could allow clinicians to begin mitigation measures sooner. Multiple commenters stated that requiring extravasations to be reported as medical events would create a significant regulatory burden on licensees with no added safety benefit. One commenter stated that the NRC did not need to regulate extravasations because many institutions already have initiatives for injection quality monitoring and improvement and multiple mechanisms exist to evaluate and promote the safe medical use of radioactive materials.

3. NRC Evaluation

In a separate initiative, the NRC independently evaluated whether extravasations should be reported as medical events. To inform the independent evaluation, the NRC considered information from the petitioner, the ACMUI, Agreement States, and external

stakeholders, as well as available published literature on extravasations. The NRC's preliminary evaluation of extravasations and medical event reporting resulted in the consideration of several rulemaking options, all of which would require that certain extravasations be reported as medical events. The NRC staff provided its preliminary evaluation to the ACMUI extravasation subcommittee in April 2021. In September 2021, the subcommittee's recommendations were presented to the full ACMUI during a public meeting. At that meeting, the ACMUI endorsed the staff's preliminary non-dose-based rulemaking option for reporting extravasations that result in a radiation injury.

4. NRC Rulemaking Plan and Commission Direction

On May 9, 2022, the NRC staff submitted to the Commission SECY-22-0043, "Petition for Rulemaking and Rulemaking Plan on Reporting Nuclear Medicine Injection Extravasations as Medical Events (PRM-35-22; NRC-2020-0141)," requesting approval to consider the issues raised in PRM-35-22 in the rulemaking process and recommending initiating rulemaking to require reporting of extravasations that require medical attention for a suspected radiation injury.

In the staff requirements memorandum (SRM) to SECY-22-0043, dated December 12, 2022, the Commission approved the staff's recommendation to amend 10 CFR part 35 to include certain nuclear medicine injection extravasations as reportable medical events. Additionally, the Commission directed the staff to explore approaches to reduce reliance on patient reporting, develop regulatory guidance for all medical events, and look for opportunities to accelerate the rulemaking schedule without shortening public comment periods. On December 30, 2022, the NRC published a document in the *Federal Register* stating that the NRC would consider the issues raised in the petition in the rulemaking process and closed the petition docket (87 FR 80474).

5. Pre-rulemaking activities – Information Request

On April 19, 2023, the NRC published in the *Federal Register* an information request with preliminary proposed rule language and posed specific questions to obtain input from stakeholders (88 FR 24130). The questions were divided into three topics: definitions, procedures, and healthcare inequities. The NRC provided a 90-day public comment period, which the NRC later extended by 45 days to allow members of the public more time to develop and submit their input (88 FR 45824; July 18, 2023). On May 24, 2023, the NRC held a public meeting to facilitate stakeholder feedback on the preliminary proposed rule language and questions included in the information request. During the meeting, the NRC staff presented background on development of the NRC's medical event reporting requirements, the NRC's current regulations on medical event reporting, the basis for the preliminary proposed rule language, and the basis for the questions in the April 19, 2023, information request. Participants asked clarifying questions and were provided details on how to submit their feedback.

The NRC received over 200 submittals on the information request from members of the public, medical professionals, licensees, patient advocacy groups, nongovernmental organizations, and Agreement States. More than half of the submittals received were form letters that asked the NRC to reconsider the non-dose-based aspect of the extravasation rulemaking because it could put a burden on patients and stated the NRC should require providers to treat an extravasation like any other medical event (a threshold of 50 rem (0.5 sievert) localized dose). The NRC also received feedback that a rulemaking for extravasations was unnecessary because the NRC could instead clarify that the existing medical event regulations were inclusive of extravasations. The NRC staff determined that extravasations do not fit under the current medical event criteria; therefore, 10 CFR part 35 must be revised through the notice-and-comment rulemaking process in order to require reporting of extravasations as medical events. Copies of the

submittals received on the information request and preliminary proposed rule language may be viewed and downloaded from the Federal eRulemaking Website https://www.regulations.gov, under Docket ID NRC-2022-0218.

Since this comment period preceded the formal proposed rule notice-and-comment rulemaking process, formal responses to the submittals received on the information request were not prepared. However, the NRC considered these submittals in the development of this proposed rule and has made several modifications to the preliminary proposed rule language as a result of the public input. Those changes included the following:

- Revising the definition for “extravasation”;
- Removing the definition for “medical attention”;
- Changing “suspected radiation injury” to “radiation injury”;
- Revising the proposed reporting and notification requirements in § 35.3045; and
- Revising the section on procedures for evaluating and reporting extravasations.

III. Discussion

A. What Action is the NRC Taking?

This NRC is proposing to amend 10 CFR part 35 to require that licensees report as a medical event an administration of byproduct material that results or has the potential to result in a radiation injury from an extravasation, as determined by a physician. The NRC is also proposing to amend 10 CFR part 35 to require that licensees

have procedures in place for evaluating and reporting extravasations and that licensees retain a copy of those procedures for the duration of the license.

To support the implementation of these provisions, the NRC is proposing to add definitions of “extravasation” and “radiation injury” to the “Definitions” section of 10 CFR part 35. The NRC is also proposing changes that are corrective or of a minor or nonpolicy nature and do not substantially modify existing regulations in 10 CFR part 35 (e.g., inclusive language, plain language).

B. Who Would this Action Affect?

This proposed rule would affect all NRC and Agreement State medical licensees who administer intravascular radiopharmaceuticals for diagnostic or therapeutic purposes. Furthermore, this rulemaking would apply only to reportable extravasations occurring after implementation of the final rule.

C. Why Do the Requirements Need to be Revised?

As noted in the “Background” section of this document, the NRC currently excludes radiopharmaceutical extravasations from its medical event reporting regulations in 10 CFR part 35. Therefore, extravasations that cause radiation injury, including those that meet the public health and safety significance criteria for an abnormal occurrence, are not required to be reported to the NRC for consideration in NRC’s evaluation of medical events. If extravasations that result or have the potential to result in a radiation injury are reported to the NRC, the NRC can track these events and collect information on their occurrence, detection, mitigation, and possible preventive strategies that would be available for licensee and public use.

D. Why Does the NRC Believe a Non-Dose-Based Criterion is Appropriate for Extravasations?

The NRC proposes a non-dose-based criterion for the reporting of certain extravasations to gain further understanding of the extravasations that have potential radiation safety concerns. The severity of an extravasation may depend on a multitude of factors, and an extravasation may result from a nuclear medicine injection that was correctly administered. Extravasation is a known risk in all medical injections because a vessel is being punctured and fluid may inadvertently leak from the puncture site. In response to the NRC's information request, commenters generally noted that while extravasations may be prevalent, they tend to be of low volume and do not affect patient safety or care. Some commenters from the medical community stated that extravasations that result in patient harm or compromise patient care are very rare and typically only associated with therapeutic radiopharmaceuticals. However, the NRC does not possess data on the extent to which extravasations may result in patient harm or compromise patient care because currently the NRC has no reporting requirement for extravasations. The NRC expects that if finalized, the proposed reporting requirement would further the NRC's understanding of extravasations by providing information on radiation-safety-significant extravasations. This information could help the NRC understand the radiation safety risk posed by extravasations, and by collecting and sharing information on extravasation trends, could help medical licensees to improve prevention, mitigation, and best practices.

Because available information suggests that extravasations that result in patient harm or otherwise compromise patient care are rare, the NRC does not see a need for a dose-based criterion at this time. Moreover, since an extravasation can occur during almost any radiopharmaceutical intravascular injection, imposing a dose-based criterion would require monitoring millions of administrations per year, creating significant

regulatory burden for medical licensees for only a potentially marginal increase in radiation safety. Given the low level of risk posed by most extravasations of radiopharmaceuticals, the NRC believes a dose-based requirement would be inappropriate.

The dose-based criteria in § 35.3045(a) are primarily based on an error (i.e., wrong radioactive drug or radionuclide, wrong route of administration, wrong individual, wrong mode of treatment). The NRC is proposing a criterion for reporting an extravasation in § 35.3045(a)(3) that is different from the other medical event reporting criteria in § 35.3045(a) because there is no method to assess whether the extravasation resulted from an error or from other factors outside the licensee's control. Unintentional presence of a radiopharmaceutical in the tissue surrounding a blood vessel may be observed even when the prescribed dosage of a radiopharmaceutical as indicated in the written directive and intended by an authorized user (AU) is administered to a patient. While there may be some delay time, normal biological processes may transport the dose to the intended target. Further, a reporting requirement that does not include a dose-based threshold comports with the approach the NRC has taken for certain other reportable medical events that are not based on human error or a dose threshold. For example, § 35.3045(b) requires reporting of medical events resulting from patient intervention. This reporting requirement is not predicated on a medical error having occurred or on a dose threshold being exceeded; rather, under § 35.3045(b) an event is reportable if due to intervention of a patient the administration or radiation from byproduct material results in unintended permanent functional damage to an organ or physiological system, as determined by a physician.

Additionally, there does not yet exist a standardized dosimetry model for extravasations. The NRC has determined that a reporting criterion for nuclear medicine injection extravasations that does not rely on a dose differential strikes the appropriate

balance between the dosimetry required to properly characterize an extravasation and the potential for a radiation effect on a patient, regardless of whether the extravasation results from human error.

E. What is the Status of the Dosimetry Model?

Although the proposed reporting criterion for extravasations is not based on dose, licensees may want to perform a dose assessment of an extravasation because knowing the estimated dose to tissue could help licensees assess an extravasation for the potential of radiation injury. In SECY-22-0043, the staff indicated that it would develop a dosimetry model to assist licensees in characterizing reportable nuclear medicine injection extravasations. The NRC is currently developing a dosimetry methodology as a module in the VARSKIN+ computer code. VARSKIN+ is currently free to use and will allow interested stakeholders to use the code for dose assessments or research. This model is expected to be complete in early 2025.

F. Why Does the Reportable Threshold Require Reporting for an Extravasation that Results or Has the Potential to Result in a Radiation Injury from an Extravasation?

The reporting threshold in the proposed rule resulted from extensive interactions with ACMUI, medical professionals, and other members of the public. In section IV of the 2023 information request, the NRC issued preliminary proposed rule language and sought public comment on having certain extravasations that require “medical attention for a suspected radiation injury” be reported to the NRC as medical events. This language mirrored the staff’s recommendation in SECY-22-0043, which the Commission approved, to amend NRC regulations to mandate medical event reporting of extravasations that requirement medical attention or a suspected radiation injury.

Some commenters pointed to the definitions provided by the Common Terminology Criteria for Adverse Events (CTCAE) or deferred to the expertise of the medical community. Other commenters stated that the definition of medical attention was too ambiguous, as it was unclear who is providing the attention, what attention is being provided, and whether the care is preventative or reactive. Commenters also stated that some types of non-invasive or minor medical attention should not be included in the definition. The NRC has decided to revise the reporting requirements to remove "medical attention" due to the ambiguity of the term. Additionally, healthcare providers may already have mitigative measures for when a patient experiences an extravasation. Regardless of the severity of the extravasation, the NRC has determined that the application of medical care should not itself be a trigger for medical event reporting.

Some commenters suggested that the NRC require the reporting of an extravasation that results in an observable radiation injury. The commenters stated that only objective criteria can be used for uniform and fair implementation of the regulations. However, the NRC decided to keep the reporting criterion based on the potential for radiation injury in § 35.3045(a)(3) because deterministic effects of radiation to the skin often manifest days to weeks after exposure to radiation, depending on the dose. By focusing on the potential for radiation injury, the licensee does not need to wait for deterministic effects to manifest to ensure appropriate assessment and reporting of an extravasation that could result in risk to the patient. This places the responsibility of reporting on the licensee and reduces reliance on patient involvement in the identification of a reportable extravasation. Additionally, focusing on the potential for harm ensures that licensees have adequate procedures to detect and assess extravasations while the patient is still in the care of the licensee.

Many commenters stated that the NRC should only require reporting of extravasations of therapeutic radiopharmaceuticals because extravasations from

diagnostic radioactive drugs rarely result in harm to patients. There have been cases reported in scientific literature that show that certain radiopharmaceutical extravasations may have significant health effects for patients, including those from diagnostic administrations. For example, extravasations from I-131-iodocholesterol resulting in an erythematous plaque and Thallium-201 resulting in a radiation ulcer have been reported in the literature. Because radiation damage from all types of radiopharmaceutical administrations, although rare, continues to be documented in the literature, the NRC determined that including diagnostic radiopharmaceutical administrations in extravasation medical event reporting is consistent with the NRC's Medical Use of Byproduct Material policy statement (65 FR 47654; August 3, 2000). That policy statement provides that the NRC will regulate the radiation safety of patients primarily to assure the use of radionuclides is in accordance with the physician's directions, when justified by the risk to the patients. The ACMUI, in their final report, agreed that the NRC may be interested in all radiopharmaceutical extravasations that can cause radiation damage from a public health and safety perspective. Therefore, the NRC is not limiting the reporting criterion to only therapeutic administrations of radioactive drugs to ensure that the NRC captures risk to the patient from any radiopharmaceutical administration.

Several commenters recommended that the NRC align its reporting criterion with the CTCAE[1] developed by the National Cancer Institute. Specifically, commenters suggested that reporting be required if the extravasation results in a CTCAE Grade 3 or 4 event that can be attributed to radiation. The NRC's proposed reporting criterion is analogous to a potential for a CTCAE Grade 2 event. The NRC determined that the reportable level of potential radiation injury is appropriate because radiation injury to the injection site is not a typical risk in radiopharmaceutical injections like it is in other

[1] https://ctep.cancer.gov/protocoldevelopment/electronic_applications/ctc.htm

medical applications of radiation. The relative risk is well understood in machine produced radiation, and the link between dose and tissue injury is well defined. In radiopharmaceutical extravasation, the amount of material extravasated, the time the material dwells in the area, and a multitude of other physical and patient-related factors complicate the potential for radiation injury. Therefore, the NRC determined that reporting extravasations that result in a CTCAE Grade 3 or 4 event would not be appropriate.

In the proposed reporting criterion for extravasations, the NRC replaced "suspected radiation injury" with "an extravasation that results or has the potential to result in a radiation injury" and removed the requirement for medical attention. The NRC determined that the definition of "radiation injury" should not be ambiguous since the deterministic effects of radiation to tissue are well defined. Similarly, removing the more ambiguous term "medical attention" would provide more clarity and not impose additional burden to a licensee that is responding to an extravasation appropriately.

G. Why Does the Proposed Reporting Criterion Include a Determination by a Physician?

The proposed criterion in § 35.3045(a)(3) requires that the potential for radiation injury be determined by a physician. This is similar to patient intervention medical event reporting at § 35.3045(b), where a physician must make a determination of permanent functional damage to an organ or physiological system. The NRC received input from a number of stakeholders, and the ACMUI recommended in their final report, that determination of a suspected radiation injury should be made by an AU.

The NRC agrees that a complex issue such as a determination of a radiation injury from an extravasation should be made by a physician, but the NRC considers all physicians, not just those that are AUs, to have the expertise to make this determination. The expertise and experience required to make a determination of a radiation injury is

not exclusive to AUs; some guidelines, such as the American College of Radiology's Manual on Contrast Media, recommend a surgical consult for severe extravasation injuries. Some commenters also stated that patients may not have regular access to a licensee's physician or an AU, such as patients who travel for medical treatments. The NRC believes that determination by any physician—not just a licensee physician or AU—could help reduce burden on patients who seek medical follow-up for potential radiation injury and who do not have regular access to a licensee physician or AU. The NRC recognizes that the complexity of diagnosing and treating a radiation injury is a matter of medical practice.

The NRC considered whether other healthcare professionals (e.g., nurses, nuclear medicine technologists, physicists) could assess and determine whether an extravasation results or has the potential to result in a radiation injury. However, the NRC concluded that physicians are best suited to make this determination based on their training and experience, as well as their knowledge of a patient's condition, medical history, and plan of care.

H. What Definitions Did the NRC Update?

As discussed in the "Background" section of this document, the NRC initially proposed defining "extravasation" as the leakage of a radiopharmaceutical from the blood vessel into the surrounding tissue. In response to the NRC's 2023 request for information and comment on preliminary proposed rule language, the NRC received feedback on this definition of extravasation. The feedback raised several considerations, including whether the NRC should (1) use the term "extravasation" or "infiltration," (2) limit the definition to therapeutic radiopharmaceuticals, and (3) use the term "leakage" in the definition. Commenters noted that the definition of extravasation implied tissue damage from a vesicant and that radioisotopes could be considered as a type of

vesicant. Some commenters noted that infiltration may also mean the leakage of pharmaceutical around the injection site but that this leakage does not result in tissue damage. Feedback from the public stated that the NRC's preliminary proposed definition did not take into account extravasations that miss the blood vessel entirely and inject the radiopharmaceutical into the interstitial volume directly.

Upon consideration of this feedback, in this proposed rule the NRC defines the term "extravasation" in § 35.2 as the unintentional presence of a radiopharmaceutical in the tissue surrounding the blood vessel following an injection. The NRC has replaced the text "leakage" with the phrase, "unintentional presence of radiopharmaceutical surrounding the blood vessel". "Unintentional presence" captures injections that miss the blood vessel entirely in addition to injections that result in extravasations.

As discussed in section III.F. of this proposed rule, the NRC does not believe that the definition of extravasation should be limited to therapeutic radiopharmaceuticals. While the risk of deterministic effects from extravasations of diagnostic and therapeutic radiopharmaceuticals is different, diagnostic radiopharmaceutical extravasations have been shown in scientific literature to have caused radiation injury. Therefore, the NRC has determined that limiting the definition of extravasations to therapeutic uses of radiopharmaceuticals is not appropriate.

The proposed definition of extravasation also specifically uses the term "radiopharmaceutical" as the NRC determined that the definition should not include unsealed byproduct materials that are not radiopharmaceuticals, such as microspheres. The NRC determined that because a treatment site must be specified in the written directive for the administration of such material, any potential medical events would be captured under the existing wrong treatment site criteria in 10 CFR 35.3045(a)(1)(iii).

In the preliminary proposed rule language, the NRC defined "suspected radiation injury" as a potential or observable deterministic health effect to the area around an

injection site that can be attributed to radiation. As part of its information request, the NRC received feedback on this definition of “suspected radiation injury.” Commenters questioned the utility of the qualifiers “potential” and “suspected” and requested clarification of the term “deterministic health effect.” There were also statements that the “suspected radiation injury” determination should be made by some medical authority.

Upon consideration of this feedback, the NRC is proposing to define the term “radiation injury” in § 35.2 as a deterministic health effect to the area around an injection site that can be attributed to radiation. The potential for radiation injury is more appropriate in the reporting requirement in proposed § 35.3045(a)(3), rather than in the definition of “radiation injury” itself.

The reporting requirement in this proposed rule would require licensees to assess the risk to the patient in a prompt manner. This provision requiring the determination of the potential for radiation injury will ensure that the patient has sufficient information in the event that a radiation injury manifests after the patient has been released from the licensee's care. Licensees will also be able to glean additional and more accurate information from an early assessment of an extravasation, such as the specific timing of symptoms, any patient or clinician actions during the extravasation, and estimates of the volume of radiopharmaceutical extravasated. This information could be less accurate or unavailable if time is given to allow an observable effect to manifest.

Several commenters stated that deterministic effects of radiation injury should be well defined in the regulation. The NRC, however, determined that a specific deterministic effect should not be included in the definition for radiation injury. While the deterministic effects to the skin and tissues are well understood, these effects do not manifest consistently in patient populations. Therefore, the NRC determined that the potential for these effects is best determined on a case-by-case basis by a physician as proposed in § 35.3045(a)(3).

I. Why is the NRC Requiring that Licensees Have Procedures to Detect and Report Extravasations?

In SRM-SECY-22-0043, the Commission directed the staff to evaluate whether the NRC should require licensees to develop, implement, and maintain written procedures to provide high confidence that radiation-safety-significant extravasations will be detected and reported. As part of the preliminary proposed rule language, the NRC included a requirement for licensees to have procedures that address extravasations. In the information request, the NRC asked questions regarding what steps licensees can take to minimize, detect, assess, and characterize radiopharmaceutical extravasations. Many commenters agreed that licensees should be required to have procedures to address extravasations and that licensees should be provided the flexibility to institute their own policies for detecting and monitoring radiopharmaceutical extravasations.

The proposed requirements in new § 35.42 ensure that extravasations are being properly evaluated and managed during patient care. The proposed requirements in § 35.42 concerning written procedures would also ensure that licensees detect and report reportable extravasations as they happen. The model procedures referenced in the implementation guidance provide information that licensees can give to patients so that patients can identify symptoms or signs of a radiation injury that manifests after being released from the licensee's care. The NRC determined that licensees should handle minimizing extravasations as part of their quality management and injection quality programs. The proposed procedures would also require that licensees take steps to document how licensees implement these procedures in their evaluation of extravasations that may meet the proposed reporting criteria in § 35.3045(a)(3). The NRC has determined that documentation of the assessment of these incidents will ensure that licensees are evaluating potentially reportable extravasations in accordance

with their written procedures and that regulators have the information necessary to determine if further inquiry of incidents involving potential radiation injury from an extravasation is needed.

IV. Specific Requests for Comments

The NRC is seeking advice and recommendations from the public on this proposed rule.

- The NRC is seeking comments on the term “high confidence,” as used in § 35.41 and proposed § 35.42 with respect to procedures for written directives and for detecting and reporting extravasation medical events. Specifically, the NRC is seeking input on whether the NRC should include a definition of “high confidence” in § 35.2. Please provide the rationale for your response.
- The NRC is seeking comments related to the procedures for detecting and reporting extravasation medical events. The proposed § 35.42(b) would require a licensee’s written procedures to address how the licensee will determine that a reportable extravasation has occurred and how the licensee documents this determination. The NRC is seeking feedback on what elements should be included as part of these procedures. Additionally, the NRC is seeking feedback on whether licensees should be required to document and keep records of their assessments, including the process and determination of whether an extravasation is reportable. We are also seeking feedback on what steps the NRC can take to ensure that licensees are implementing these procedures. Please provide the rationale for your responses.
- The NRC is seeking comments on whether the proposed procedures in § 35.42 should also include monitoring of patients after injection, rather than only requiring

monitoring of injections, to ensure licensees are detecting extravasations as defined in § 35.3045 in a timely manner. Please provide the rationale for your response.

- The NRC is seeking comments on the assumptions used in developing the cost-benefit estimates in the draft regulatory analysis. Specifically, the NRC is seeking feedback related to the assumptions regarding extravasation rates and the costs licensees would incur to obtain additional methodologies or equipment or both to comply with this proposed rule. Please provide the rationale or specific numerical support for your response.

V. Section-by-Section Analysis

The following paragraphs describe the specific changes proposed by this rulemaking.

Section 35.2 Definitions

This proposed rule would add definitions for *Extravasation* and *Radiation injury*.

Section 35.8 Information collection requirements: OMB approval

This proposed rule would add new §§ 35.42 and 35.2042 to the approved information collection requirements contained in § 35.8(b) for Office of Management and Budget (OMB) control number 3150-0010.

Section 35.42 Procedures for evaluating and reporting extravasations

This proposed rule would add new § 35.42 to require written procedures for evaluating and reporting extravasations.

Section 35.2042 Records for procedures for evaluating and reporting extravasations

This proposed rule would add new § 35.2042 to require a copy of the procedures required by § 35.42(a) for the duration of the license.

Section 35.3045 Report and notification of a medical event

This proposed rule would add new paragraph (a)(3) to require the report and notification of a medical event that results or has the potential to result in a radiation injury from an extravasation, as determined by a physician.

In addition, this proposed rule would replace “shall” with “must” in § 35.3045 and make minor editorial and conforming changes to include gender-inclusive language.

VI. Regulatory Flexibility Certification

The NRC has prepared a draft regulatory flexibility analysis of the impact of this proposed rule on small entities. The draft regulatory flexibility analysis is included as a section in the draft regulatory analysis.

This proposed rule would affect 5,933 medical licensees that administer radiopharmaceuticals, some of which may qualify as small business entities as defined by § 2.810, “NRC size standards.” On the basis of the draft regulatory flexibility analysis conducted for this action, the estimated costs of this proposed rule for affected licensees are one-time implementation costs of $2,393 per licensee and annual costs of $26 per licensee. The NRC determined that the selected alternative reflected in the proposed rule is the least burdensome and most flexible alternative that would accomplish the NRC's regulatory objective.

The NRC is seeking public comment on the potential impact of this proposed rule on small entities. The NRC particularly desires comments from licensees who qualify as small businesses, specifically as to how the proposed regulation will affect them and how the regulation may be tiered or otherwise modified to impose less stringent requirements on small entities while still adequately protecting the public health and safety and common defense and security. Comments on how the regulation could

be modified to take into account the differing needs of small entities should specifically discuss the following:

(a) The size of the business and how the proposed regulation would result in a significant economic burden upon it as compared to a larger organization in the same business community;

(b) How the proposed regulation could be further modified to take into account the business's differing needs or capabilities;

(c) The benefits that would accrue, or the detriments that would be avoided, if the proposed regulation was modified as suggested by the commenter;

(d) How the proposed regulation, as modified, would more closely equalize the impact of NRC regulations as opposed to providing special advantages to any individuals or groups; and

(e) How the proposed regulation, as modified, would still adequately protect the public health and safety and common defense and security.

Comments should be submitted as indicated under the ADDRESSES caption.

VII. Regulatory Analysis

The NRC has prepared a draft regulatory analysis on this proposed regulation. The analysis includes the costs and benefits of each alternative considered by the NRC. The staff concluded that this proposed rule and associated guidance would result in a cost to the industry (NRC and Agreement State medical licensees that administer intravascular radiopharmaceuticals for diagnostic or therapeutic purposes), the NRC, and Agreement States of $29,357,000 using a 7-percent discount rate and $35,889,000 using a 3-percent discount rate. While the monetized benefits do not exceed the monetized costs identified in the regulatory analysis for the proposed rule, the NRC

plans to proceed with the proposed rule because it concluded that these costs would be outweighed by the public health benefits of the rulemaking, which could not be monetized for the analysis. The NRC requests public comment on the draft regulatory analysis. The draft regulatory analysis is available as indicated in the “Availability of Documents” section of this document. Comments on the draft regulatory analysis may be submitted to the NRC as indicated under the ADDRESSES caption of this document.

VIII. Backfitting and Issue Finality

The NRC's backfitting provisions (which are found in the regulations at §§ 50.109, 70.76, 72.62, and 76.76) and issue finality provisions of 10 CFR part 52 do not apply to this rule. Part 35 of 10 CFR does not contain a backfitting provision, and this rulemaking will not impact activities authorized by parts 50, 52, 70, 72, or 76. As a result, this rulemaking cannot constitute "backfitting" as defined in 10 CFR Chapter I or otherwise affect the issue finality of a 10 CFR part 52 approval.

IX. Cumulative Effects of Regulation

The NRC seeks to minimize any potential negative consequences resulting from the cumulative effects of regulation (CER). The CER describes the challenges that licensees, or other impacted entities such as State partners, may face while implementing new regulatory positions, programs, or requirements (e.g., rules, generic letters, backfits, inspections). The CER is an organizational effectiveness challenge that may result from a licensee or impacted entity implementing a number of complex regulatory actions, programs, or requirements within limited available resources.

The NRC is following its CER process by engaging with external stakeholders throughout this proposed rule and related regulatory activities. Public involvement has included a public meeting to facilitate feedback on the April 19, 2023, information request, and publication of preliminary proposed rule language. Another opportunity for public comment is provided to the public with this proposed rule. The NRC is issuing draft guidance for comment along with this proposed rule to support more informed external stakeholder feedback. Further, as stated in section XIX, "Public Meeting," of this document, the NRC will hold a public meeting on this proposed rule and may hold other meetings throughout the rulemaking process. Section XVIII, "Availability of Guidance," of this document describes how the public can access the draft guidance for which the NRC seeks external stakeholder feedback.

To better understand the potential CER implications incurred due to this proposed rule, the NRC is requesting comment on the following questions. Responding to these questions is voluntary, and the NRC will respond to any comments received in the final rule.

1. In light of any current or projected CER challenges, what period of time would be required to implement the new proposed requirements, including changes to programs, procedures, and the facility?

2. If CER challenges currently exist or are expected, what should be done to address them? For example, if more time is required for implementation of the new requirements, what period of time is sufficient?

3. What other (NRC or other agency) regulatory actions (e.g., orders, generic communications, license amendment requests, inspection findings of a generic nature) influence the implementation of the proposed rule's requirements?

4. Are there unintended consequences? Does the proposed rule create conditions that would be contrary to the proposed rule's purpose and objectives? If so, what are the unintended consequences, and how should they be addressed?

5. Please comment on the NRC's cost and benefit estimates in the regulatory analysis that supports the proposed rule.

X. Plain Writing

The Plain Writing Act of 2010 (Pub. L. 111-274) requires Federal agencies to write documents in a clear, concise, and well-organized manner. The NRC has written this document to be consistent with the Plain Writing Act as well as the Presidential Memorandum, "Plain Language in Government Writing," published June 10, 1998 (63 FR 31885). The NRC requests comment on this document with respect to the clarity and effectiveness of the language used.

XI. National Environmental Policy Act

The NRC has determined that this proposed rule is the type of action described in § 51.22(c)(3)(iii). Therefore, neither an environmental impact statement nor environmental assessment has been prepared for this proposed rule.

XII. Paperwork Reduction Act Statement

This proposed rule contains amended collections of information contained in 10 CFR part 35 and the "Nuclear Materials Events Database (NMED)" subject to the

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq). This proposed rule has been submitted to the OMB for review and approval of the information collections.

Type of submissions, new or revision: Revisions.

The titles of the information collections: (1) Reporting Nuclear Medicine Injection Extravasations as Medical Events, Proposed Rule; and (2) Nuclear Materials Events Database (NMED).

The form number if applicable: N/A for both collections.

How often the collections are required or requested: For 10 CFR part 35, on occasion when NRC and Agreement State licensees determine that an extravasation meets the requirements in 10 CFR 35.3045 for reporting it as a medical event. For the NMED, when Agreement States receive notification from a licensee of an extravasation medical event.

Who will be required or asked to respond: For 10 CFR part 35, NRC and Agreement State licensees who administer intravascular radiopharmaceuticals for diagnostic or therapeutic purposes. For the NMED, Agreement States whose licensees report an extravasation as a medical event.

An estimate of the number of annual responses: 7,088 for 10 CFR part 35 (489 reporting responses + 5,933 recordkeepers + 666 third-party disclosure responses). 148 extravasations for the NMED.

The estimated number of annual respondents: 5,933 for 10 CFR part 35 (547 NRC licensees + 5,386 Agreement State licensees). 39 Agreement States for the NMED.

An estimate of the total number of hours needed annually to comply with the information collection requirement or request: 36,238.3 hours for 10 CFR part 35 (652 reporting + 34,905.75 recordkeeping + 680.55 third-party disclosure). 222 hours for the NMED (222 Agreement State reporting).

Abstract: The NRC is proposing to amend 10 CFR part 35 to require reporting of certain nuclear medicine injection extravasations as medical events. The proposed changes would help staff track and trend extravasation medical events and collect information on their occurrence, detection, mitigation, and possible preventive strategies that would be available for licensee and public use. The proposed rule would also require licensees to develop, implement, and maintain written procedures for evaluating and reporting extravasations. These procedures are necessary to provide high confidence that these extravasations will be detected in a timely manner and reported to the NRC.

The NMED is a database that tracks nuclear material event information (including medical events), increases consistency of reported event information, improves ease of access and retrieval of event information, and reduces duplication of effort in processing by all parties involved. The NRC requires the Agreement States to provide the required event information to the NRC by letter or electronically. The reports are generally submitted directly to the appropriate NRC contact (e.g., NMED contractor) for entry into the NMED. The proposed rule would increase the number of medical events reported by the Agreement States and tracked in the NMED.

The NRC is seeking public comment on the potential impact of the information collections contained in this proposed rule, in the NMED, and on the following issues:

1. Are the proposed information collections necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility?

2. Are the estimates of the burden of the proposed information collections accurate?

3. Is there a way to enhance the quality, utility, and clarity of the information to be collected?

4. How can the burden of the proposed information collections on respondents be minimized, including the use of automated collection techniques or other forms of information technology?

Copies of the OMB supporting statements are available in ADAMS under Accession Nos. ML24106A199 and ML24141A117 or can be viewed free of charge by contacting the NRC's PDR reference staff at 1-800-397-4209, at 301-415-4737, or by email to PDR.resource@nrc.gov. You may obtain information and comment submissions related to the OMB clearance package by searching on https://www.regulations.gov under Docket ID NRC-2022-0218.

You may submit comments on any aspect of these proposed information collections, including suggestions for reducing the burden and on the above issues, by the following methods:

- **Federal rulemaking website:** Go to https://www.regulations.gov and search for Docket ID NRC-2022-0218.

- **Mail comments to:** FOIA, Library, and Information Collections Branch, Office of the Chief Information Officer, Mail Stop: T6-A10M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001 or to the OMB reviewer at: Office of

Information and Regulatory Affairs (3150-0010 and 3150-0178), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street, NW, Washington, DC 20503.

Submit comments by **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**. Comments received after this date will be considered if it is practical to do so, but the NRC staff is able to ensure consideration only for comments received on or before this date.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

XIII. Criminal Penalties

For the purposes of Section 223 of the Atomic Energy Act of 1954, as amended (AEA), the NRC is issuing this proposed rule that would amend part 35 under one or more of Sections 161b, 161i, or 161o of the AEA, except as noted in § 35.4002(b). Willful violations of the part 35 regulations not listed in § 35.4002(b) would be subject to criminal enforcement. Criminal penalties as they apply to regulations in part 35 are discussed in § 35.4002.

XIV. Coordination with NRC Agreement States

The working group that prepared this proposed rule included a representative from the Organization of Agreement States. A draft of the proposed rule was provided to

the Agreement States for review. Comments from Agreement States were taken into consideration during the development of this proposed rule.

XV. Coordination with the Advisory Committee on the Medical Uses of Isotopes

On March 7, 2024, a draft of the proposed rule was provided to the ACMUI for a 90-day review. The draft was made public to facilitate the ACMUI's review in a public forum. The ACMUI established a subcommittee to review and comment on the draft proposed rule. The subcommittee discussed their report on the draft proposed rule at a publicly held teleconference on June 17, 2024, and the report was unanimously approved by the full committee. The ACMUI provided its final report on June 18, 2024.

XVI. Compatibility of Agreement State Regulations

On the basis of the "Agreement State Program Policy Statement" approved by the Commission on October 2, 2017, and published in the *Federal Register* (82 FR 48535; October 18, 2017), NRC program elements can be placed into six categories (A, B, C, D, NRC, or health and safety (H&S)) to form the basis for evaluating and classifying the program elements. Under the Policy Statement, a program element means any component or function of a radiation control regulatory program, including regulations and other legally binding requirements imposed on regulated persons, which contributes to implementation of that program.

Compatibility Category A are those program elements that include basic radiation protection standards and scientific terms and definitions that are necessary to understand radiation protection concepts. Compatibility Category A program elements

adopted by an Agreement State should be essentially identical to those of the NRC to provide uniformity in the regulation of agreement material on a nationwide basis.

Compatibility Category B pertains to a limited number of program elements that cross jurisdictional boundaries and should be addressed to ensure uniformity of regulation on a nationwide basis. For Compatibility Category B, the Agreement State program element shall be essentially identical to that of NRC.

Program elements in Compatibility Category C include those program elements that are important for an Agreement State to have in order to avoid conflict, duplication, gaps, or other conditions that would jeopardize an orderly pattern in the regulation of agreement material on a national basis. An Agreement State program shall embody the essential objectives of the Category C program elements. Under Category C, Agreement State program elements may be more restrictive than NRC program elements; however, they should not be so restrictive as to prohibit a practice authorized by the AEA, and in the national interest without an adequate public health and safety or environmental basis related to radiation protection.

Compatibility Category D are those program elements that do not meet any of the criteria of Category A, B, or C, above, and are not required to be adopted by Agreement States for purposes of compatibility. An Agreement State has the flexibility to adopt and implement program elements within the State's jurisdiction that are not addressed by the NRC or that are not required for compatibility (*i.e.,* Compatibility Category D). However, such program elements of an Agreement State relating to agreement material shall (1) not create conflicts, duplications, gaps, or other conditions that would jeopardize an orderly pattern in the regulation of agreement material on a nationwide basis; (2) not preclude a practice authorized by the AEA and in the national interest; and (3) not preclude the ability of the NRC to evaluate the effectiveness of Agreement State programs for agreement material with respect to protection of public health and safety.

Compatibility Category NRC are those program elements that address areas of regulation that cannot be relinquished to the Agreement States under the AEA, or provisions of Title 10 of the of the *Code of Federal Regulations*. The NRC maintains regulatory authority over these program elements and the Agreement States must not adopt these NRC program elements. However, an Agreement State may inform its licensees of these NRC requirements through a mechanism under the State's administrative procedure laws, as long as the State adopts these provisions solely for the purposes of notification and does not exercise any regulatory authority as a result.

Category H&S program elements embody the basic health and safety aspects of the NRC's program elements. Although H&S program elements are not required for purposes of compatibility, they do have particular health and safety significance. The Agreement State must adopt the essential objectives of such program elements to maintain an adequate program.

The proposed new definition for "extravasation" in § 35.2 would be designated as Compatibility Category B. The NRC has determined that this definition needs to be adopted to ensure a consistent regulatory approach across the National Materials Program and inconsistent definition of this term would have direct and significant transboundary implications.

The proposed new definition for "radiation injury" in § 35.2 would be designated as Compatibility Category C because the NRC has determined that the essential objective of this definition needs to be adopted by the Agreement States in order to avoid conflict, duplication, gaps, or other conditions that would jeopardize an orderly pattern in the regulation of agreement material on a national basis.

Proposed new requirements related to procedures for evaluating and reporting extravasations in § 35.42(a) and (b) would be designated as Category H&S because the

essential objectives of these provisions have health and safety significance and need to be adopted by the Agreement States.

Proposed new requirements related to procedures for evaluating and reporting extravasations in § 35.42(c) would be designated as Compatibility Category D. The proposed Compatibility Category D designation for this provision would provide the flexibility for Agreement States insofar as requiring licensees to retain the copy of the procedures for a time period other than the duration of the license as specified in proposed § 35.2042. Proposed new requirements for maintaining records for procedures for evaluating and reporting extravasations in § 35.2042 would be designated as Compatibility Category D. The proposed Compatibility Category D designation for this provision would provide the flexibility for Agreement States insofar as requiring licensees to retain the copy of the procedures for a time period other than the duration of the license as specified in the proposed regulations.

Proposed new requirements for report and notification of a medical event in § 35.3045(a)(3) would be designated as Compatibility Category C because the NRC has determined that the essential objectives of these provisions need to be adopted by the Agreement States. The proposed compatibility category of this provision is to maintain consistency with the compatibility category designation for the current § 35.3045, which is Compatibility Category C.

Compatibility categories for other provisions that are subject to amendment would remain unchanged.

The final rule would be a matter of compatibility between the NRC and the Agreement States, thereby providing consistency among Agreement State and NRC requirements. The compatibility (A, B, C, D, and NRC) and adequacy (H&S) categories are designated in the following table:

Compatibility Table

Section	Change	Subject	Compatibility	
			Existing	New
10 CFR 35.2	New	Definition: Extravasation	-	B
10 CFR 35.2	New	Definition: Radiation injury	-	C
10 CFR 35.8(b)	Amend	Information collection requirements: OMB approval	D	D
10 CFR 35.42(a)	New	Procedures for evaluating and reporting extravasations	-	H&S
10 CFR 35.42(b)	New	Procedures for evaluating and reporting extravasations	-	H&S
10 CFR 35.42(c)	New	Procedures for evaluating and reporting extravasations	-	D
10 CFR 35.2042	New	Records for procedures for evaluating and reporting extravasations	-	D
10 CFR 35.3045(a)	Amend	Report and notification of a medical event	C	C
10 CFR 35.3045(a)(3)	New	Report and notification of a medical event	-	C
10 CFR 35.3045(b)	Amend	Report and notification of a medical event	C	C
10 CFR 35.3045(c)	Amend	Report and notification of a medical event	C	C
10 CFR 35.3045(d)	Amend	Report and notification of a medical event	C	C
10 CFR 35.3045(e)	Amend	Report and notification of a medical event	C	C
10 CFR 35.3045(g)	Amend	Report and notification of a medical event	C	C

XVII. Voluntary Consensus Standards

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. In this proposed rule, the NRC will revise the regulations to require reporting of certain nuclear medicine injection

extravasations as medical events. This action does not constitute the establishment of a standard that contains generally applicable requirements.

XVIII. Availability of Guidance

The NRC is issuing new draft guidance, Draft Regulatory Guide DG-8062, "Medical Event Evaluation and Reporting," for the implementation of the proposed requirements in this rulemaking. The guidance is available in ADAMS under Accession No. ML24016A109. You may obtain information and comment submissions related to the draft guidance by searching on https://www.regulations.gov under Docket ID NRC-2022-0218.

The draft regulatory guide describes an approach acceptable to NRC staff to meet the requirements for evaluating and reporting all medical events, including extravasations as described in this proposed rule. The draft regulatory guide provides licensees with guidance on when medical event reports are required, how reports should be made, and what is required to be in the report. In addition, the draft regulatory guide provides guidance for procedures for administrations requiring a written directive and for evaluating and reporting extravasations as described in this proposed rule.

You may submit comments on this draft regulatory guidance by the method outlined in the ADDRESSES section of this document.

XIX. Public Meeting

The NRC will conduct a public meeting on this proposed rule to promote full understanding of the proposed rule and associated guidance document.

The NRC will publish a notice of the location, time, and agenda of the meeting on the NRC's public meeting website within at least 10 calendar days before the meeting. Stakeholders should monitor the NRC's public meeting website for information about the public meeting at: https://www.nrc.gov/public-involve/public-meetings/index.cfm.

XX. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the following methods, as indicated.

DOCUMENT	ADAMS ACCESSION NO. / WEB LINK / *FEDERAL REGISTER* CITATION
Proposed Rule and Draft Guidance Documents	
Draft Regulatory Analysis for the Reporting Nuclear Medicine Injection Extravasations as Medical Events Proposed Rule	ML24016A293
Draft Supporting Statement for Information Collections Contained in the Reporting Nuclear Medicine Injection Extravasations as Medical Events Proposed Rule	ML24106A199
Draft Supporting Statement for Information Collections Contained in the Nuclear Materials Events Database (NMED)	ML24141A117
Draft Regulatory Guide DG-8062, "Medical Event Evaluation and Reporting"	ML24016A109
SECY-24-0067, "Proposed Rule: Reporting Nuclear Medicine Injection Extravasations as Medical Events (RIN 3150-AK91; NRC-2022-0218)," August 13, 2024	ML24016A294
Related Documents	
ACMUI Meeting Transcript, December 18, 2008	ML090340745
ACMUI Meeting Transcript, May 7, 2009	ML092090034
ACMUI Meeting Summary, September 2, 2021	ML21267A021
ACMUI Extravasation Subcommittee, Final Report, June 18, 2024	ML24170A316

Misadministration Reporting Requirements, Final Rule, May 14, 1980	45 FR 31701
Quality Management Program and Misadministrations, Final Rule, July 25, 1991	56 FR 34104
Medical Use of Byproduct Material, Final Rule, April 24, 2002	67 FR 20250
Medical Use of Byproduct Material – Medical Event Definitions, Training and Experience, and Clarifying Amendments, Final Rule, July 16, 2018	83 FR 33046
Preliminary Evaluation of Radiopharmaceutical Extravasation and Medical Event Reporting for ACMUI Review, July 30, 2021	ML21223A085
PRM-35-22, Reporting Nuclear Medicine Injection Extravasations as Medical Events, Petition for Rulemaking, May 18, 2020	ML20157A266
PRM-35-22, Reporting Nuclear Medicine Injection Extravasations as Medical Events, Petition for Rulemaking, Notification of Docketing and Request for Comment, September 15, 2020	85 FR 57148
PRM-35-22, Reporting Nuclear Medicine Injection Extravasations as Medical Events, Petition for Rulemaking, Consideration in the Rulemaking Process, December 30, 2022	87 FR 80474
Reporting Nuclear Medicine Injection Extravasations as Medical Events, Preliminary Proposed Rule Language, Notice of Availability and Public Meeting, April 19, 2023	88 FR 24130
Reporting Nuclear Medicine Injection Extravasations as Medical Events, Preliminary Proposed Rule Language, Extension of Comment Period, July 18, 2023	88 FR 45824
SECY-22-0043, “Petition for Rulemaking and Rulemaking Plan on Reporting Nuclear Medicine Injection Extravasations as Medical Events (PRM-35-22; NRC-2020-0141),” May 9, 2022	ML21268A005 (package)
SRM-SECY-22-0043, “Staff Requirements – SECY-22-0043 – Petition for Rulemaking and Rulemaking Plan on Reporting Nuclear Medicine Injection Extravasations as Medical Events (PRM-	ML22346A112 (package)

35-22; NRC-2020-0141),” December 12, 2022	
Plain Language in Government Writing, June 10, 1998	63 FR 31885
Agreement State Program Policy Statement, October 18, 2017	82 FR 48535

The NRC may post materials related to this document, including public comments, on the Federal rulemaking website at https://www.regulations.gov under Docket ID NRC-2022-0218. In addition, the Federal rulemaking website allows members of the public to receive alerts when changes or additions occur in a docket folder. To subscribe: 1) navigate to the docket folder (NRC-2022-0218); 2) click the “Subscribe” link; and 3) enter an email address and click on the “Subscribe” link.

List of Subjects in 10 CFR Part 35

Biologics, Byproduct material, Criminal penalties, Drugs, Health facilities, Health professions, Labeling, Medical devices, Nuclear energy, Nuclear materials, Occupational safety and health, Penalties, Radiation protection, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553, the NRC is proposing to amend 10 CFR part 35 as follows:

PART 35– MEDICAL USE OF BYPRODUCT MATERIAL

1. The authority citation for part 35 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 81, 161, 181, 182, 183, 223, 234, 274 (42 U.S.C. 2111, 2201, 2231, 2232, 2233, 2273, 2282, 2021); Energy Reorganization Act of 1974, secs. 201, 206 (42 U.S.C. 5841, 5846); 44 U.S.C. 3504

note.

2. In § 35.2, add definitions for *Extravasation* and *Radiation injury* in alphabetical order to read as follows:

§ 35.2 Definitions.

* * * * *

Extravasation means the unintentional presence of a radiopharmaceutical in the tissue surrounding the blood vessel following an injection.

* * * * *

Radiation injury means a deterministic health effect to the area around an injection site that can be attributed to radiation.

* * * * *

§ 35.8 [Amended]

3. In § 35.8(b), add in numerical order, “35.42” and “35.2042.”

4. Add § 35.42 to read as follows:

§ 35.42 Procedures for evaluating and reporting extravasations.

(a) For any administration in which an extravasation can occur, the licensee must develop, implement, and maintain written procedures to provide high confidence that an extravasation that results or has the potential to result in a radiation injury, as determined by a physician, will be detected in a timely manner and reported in accordance with § 35.3045.

(b) The written procedures required by paragraph (a) of this section must address how the licensee determines that an extravasation meets the criteria in § 35.3045(a)(3) for a medical event and how the licensee documents this determination.

(c) A licensee must retain a copy of the procedures required under paragraph (a) of this section in accordance with § 35.2042.

5. Add § 35.2042 to read as follows:

§ 35.2042 Records for procedures for evaluating and reporting extravasations.

A licensee must retain a copy of the procedures required by § 35.42(a) for the duration of the license.

6. In § 35.3045:

a. Remove the word “shall” wherever it may appear, and add in its place, the word “must”;

b. Add paragraph (a)(3); and

c. In paragraph (e) remove the phrase “he or she” and add in its place the phrase “the referring physician”.

The addition to read as follows:

§ 35.3045 Report and notification of a medical event.

(a) * * *

(1) * * *

(3) The administration of byproduct material that results or has the potential to result in a radiation injury from an extravasation, as determined by a physician.

* * * * *

Dated: <Month XX, 2024>.

For the Nuclear Regulatory Commission.
Carrie M. Safford,
Secretary of the Commission.