

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[NRC-2022-0048]

RIN 3150-AK75

Cost-Benefit Analysis for Power Reactor Radwaste Systems

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is proposing to amend its regulations regarding the cost-benefit analysis for light-water-cooled nuclear power reactor radwaste systems. The cost-benefit analysis is used to demonstrate that a radwaste system design includes all cost-beneficial items of reasonably demonstrated technology for reducing the cumulative population dose caused by radiological effluents. This proposed rule would remove the requirement to use a conversion factor of \$1,000 per person-rem for the cost-benefit analysis and would replace it with the current dollar per person-rem conversion factor as updated for inflation and real income growth. The NRC is requesting comment on the proposed rule and draft regulatory guidance.

DATES: Submit comments by **[INSERT DATE 60 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 Commission is able to ensure consideration only for comments received 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-2022-0048. Address questions about NRC dockets to Dawn Forder; telephone: 301-415-3407; email: Dawn.Forder@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.

- **Mail comments to:** Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.

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: Blake Purnell, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-1380, email: Blake.Purnell@nrc.gov, or Edward Stutzcage, Office of Nuclear Reactor Regulation, telephone: 301-415-5345, email: Edward.Stutzcage@nrc.gov. Both are staff of the U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID NRC-2022-0048 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-2022-0048.

- **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. The ADAMS accession number for each document referenced (if it is available in ADAMS) is provided the first time that it is mentioned in the SUPPLEMENTARY INFORMATION section.

- **NRC's PDR:** You may examine and purchase copies of public documents, by appointment, at the NRC's PDR, Room P1 B35, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852. 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 8:00 a.m. and 4:00 p.m. eastern time (ET), 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-2022-0048 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

The NRC has codified the dollar per person-rem criteria in appendix I, “Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion ‘As Low as is Reasonably Achievable’ for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents,” to part 50 of title 10 of the *Code of Federal Regulations* (10 CFR), “Domestic Licensing of Production and Utilization Facilities.” Section II, “Guides on design objectives for light-water-cooled nuclear power reactors

licensed under 10 CFR part 50 or part 52 of this chapter,” paragraph D, of appendix I to 10 CFR part 50 requires that the applicant¹ for a light-water-cooled nuclear power reactor include in the radwaste system all items of reasonably demonstrated technology that—when added to the system sequentially and in order of diminishing cost-benefit return, can form a favorable cost-benefit ratio—effect reductions in dose to the population reasonably expected to be within 50 miles of the reactor. This regulation assigns values of \$1,000 per total body person-rem² and \$1,000 per person-thyroid rem (or such lesser values as may be demonstrated to be suitable in a particular case) in the cost-benefit analysis.

The NRC and its predecessor agency, the Atomic Energy Commission, have implemented a dollar per person-rem conversion factor since the 1970s. The NRC uses the dollar per person-rem conversion factor in developing cost-benefit analyses to determine the monetary valuation of the consequences associated with averted radiological collective dose. The issue of assigning a monetary value to radiation dose in regulatory decisionmaking arose in 1974, during the hearing for a rulemaking addressing routine effluent releases from nuclear power reactors. The subsequent rule established the provisions in appendix I to 10 CFR part 50 in 1975 (40 FR 19439). Published studies that were mentioned in the rulemaking record gave values ranging from \$10 to \$980 per person-rem. The Commission decided to adopt, as an interim measure, the value of \$1,000 per person-rem for cost-benefit analyses. Therefore, the 1975 rule codified the \$1,000 per person-rem and \$1,000 per person-thyroid-rem values in appendix I to 10 CFR part 50 for the evaluation of a radwaste system design and its related

¹ The introductory paragraph to section II of appendix I to 10 CFR part 50 states that the guides for design objectives set forth in this section may be used by an applicant for a construction permit, combined license, design approval, design certification, or manufacturing license.

² The current regulations use man-rem to describe the conversion factor. If finalized, this proposed rule would change the description from man-rem to person-rem. For consistency, the NRC will use person-rem throughout this notice.

radiological effluent releases. The dollar per person-rem value has been used in other areas, such as accident analysis, environmental reviews, and in 10 CFR part 20, “Standards for Protection Against Radiation,” for the purpose of determining that doses are as low as is reasonably achievable; however, the regulations do not specify a specific dollar per person-rem value for these purposes.

In December 1995, the NRC issued NUREG-1530, “Reassessment of NRC’s Dollar Per Person-Rem Conversion Factor Policy” (ML063470485), which updated the dollar per person-rem conversion factor from \$1,000 to \$2,000. In February 2022, the NRC issued NUREG-1530, Revision 1 (ML22053A025), which updated the dollar per person-rem conversion factor from a constant value of \$2,000 to \$5,200 per person-rem.³ The \$5,200 value is to be adjusted annually for inflation and real income growth to provide an updated dollar per person-rem conversion factor.

On January 25, 2022, the Commission issued “Revised Staff Requirements—SECY-17-0017—Proposed Revision to NUREG-1530, ‘Reassessment of NRC’s Dollar Per Person-Rem Conversion Factor Policy’” (ML21347A846), directing the NRC staff to engage in rulemaking to update the conversion factor in section II, paragraph D, of appendix I to 10 CFR part 50. Regulatory Guide (RG) 1.110, Revision 1, “Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors” (ML13241A052), also would be revised to conform to the changes in this proposed rule and the technical basis provided in NUREG-1530, Revision 1.

III. Discussion

³ NUREG-1530, Revision 1, updated the dollar per person-rem conversion factor based on the updated value of a statistical life and cancer mortality risk coefficient.

The NRC is proposing to revise section II, paragraph D, of appendix I to 10 CFR part 50 by updating the \$1,000 per total body person-rem and \$1,000 per person-thyroid-rem for nuclear power reactor effluents from radwaste systems cost-benefit evaluations to \$5,200 per person-rem in 2014 dollars. This proposed rule would include a new requirement that applicants for light-water-cooled nuclear power reactors under 10 CFR part 50 and 10 CFR part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," calculate and use an updated dollar per person-rem conversion factor based on inflation and real income growth.

Because the current version of RG 1.110 is based on the \$1,000 per person-rem criteria and includes tables on the cost of augmenting different radwaste systems that are based on 1975 dollars, the NRC is proposing to update RG 1.110. The guidance would be revised to 1) remove the tables that provide 1975 costs and data, 2) refer to the updated requirement for a cost-benefit analysis, 3) provide a method for adjusting the dollar per person-rem conversion factor into current dollars using real income growth factors, and 4) provide simplified guidance for applicants to perform the cost-benefit analysis in accordance with this proposed rule.

IV. Section-by-Section Analysis

The following paragraph describes the specific changes proposed by this rulemaking.

10 CFR Part 50 Appendix I—Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents

This proposed rule would revise appendix I, section II, paragraph D, to adjust the dollar per person-rem value into current dollars using real income growth factors.

V. Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this rule, if adopted, would not have a significant economic impact on a substantial number of small entities. This proposed rule would affect only the licensing and operation of light-water-cooled nuclear power reactors. The companies that own these reactors do not fall within the scope of the definition of “small entities” set forth in the Regulatory Flexibility Act or the size standards established by the NRC (§ 2.810).

VI. Regulatory Analysis

The NRC has prepared a draft regulatory analysis for this proposed rule. The analysis examines the costs and benefits of the alternatives considered by the NRC. The NRC requests public comment on the draft regulatory analysis. The draft regulatory analysis is available in ADAMS under ML22264A004. Comments on the draft regulatory analysis may be submitted to the NRC as indicated under the ADDRESSES section of this document.

VII. Backfitting and Issue Finality

The NRC has determined that backfitting (§ 50.109) and the issue finality provisions in 10 CFR part 52 do not apply to this proposed rule because it would not involve any provisions that would impose backfits as defined in 10 CFR chapter I or affect the issue finality of any approval issued under 10 CFR part 52. The proposed rule

would revise appendix I to 10 CFR part 50 by removing the requirement to use a conversion factor of \$1,000 per person-rem for cost-benefit analyses and adding a requirement to calculate and use an updated dollar per person-rem conversion factor that would be equal to \$5,200 per person-rem in 2014 dollars. The provisions in 10 CFR part 50 and part 52 do not require updates to the cost-benefit analyses for radwaste system designs after the designs have been approved. Therefore, the NRC has determined that the backfitting rule in § 50.109, "Backfitting," and the issue finality provisions in 10 CFR part 52 do not apply to this proposed rule because this amendment, if finalized, would not involve any provision that would either constitute backfitting, as that term is defined in 10 CFR chapter I, or affect the issue finality of any approval issued under 10 CFR part 52. For these reasons, neither a backfit analysis nor a discussion addressing the issue finality provisions in 10 CFR part 52 was prepared for this proposed rule.

The NRC's determination on this matter is in accordance with Management Directive 8.4, "Management of Backfitting, Forward Fitting, Issue Finality, and Information Requests" (ML18093B087).

VIII. 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.

IX. Compatibility of Agreement State Regulations

Under 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), this rule is classified as compatibility “NRC.” Compatibility is not required for Category “NRC” regulations. The NRC program elements in this category are those that relate directly to areas of regulation reserved to the NRC by the Atomic Energy Act or the provisions of 10 CFR, and although an Agreement State may not adopt program elements reserved to the NRC, it may wish to inform its licensees of certain requirements via a mechanism that is consistent with the particular State’s administrative procedure laws but does not confer regulatory authority on the State.

X. National Environmental Policy Act

The NRC has determined that this proposed rule is the type of action described in § 51.22(c)(3). Therefore, neither an environmental impact statement nor environmental assessment has been prepared for this proposed rule. This action is procedural in nature in that it pertains to reviewing the cost-benefit analysis for nuclear power reactor radwaste systems using the updated dollar per person-rem conversion factor.

XI. Paperwork Reduction Act

This proposed rule does not contain any new or amended collections of information subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

Existing collections of information were approved by the Office of Management and Budget, approval number 3150-0011.

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.

XII. Availability of Guidance

The NRC is issuing for comment draft guidance DG-1411, “Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors,” to support the implementation of this proposed rule. The draft guidance is available in ADAMS under ML22201A498. You may obtain information and comment submissions related to the draft guidance by searching on <https://www.regulations.gov> under Docket ID NRC-2022-0048.

The NRC staff has developed a series of guides that provide methods acceptable to the staff for calculating effluent releases, dispersion of effluents in the atmosphere and different water bodies, associated radiation doses to humans, and cost-benefit aspects of treating radwaste. Draft Regulatory Guide DG-1411 describes methods and procedures that the NRC considers acceptable for performing a cost-benefit analysis for liquid and gaseous radwaste system components for light-water-cooled nuclear power reactors. This draft guide applies to applicants for a nuclear power reactor subject to appendix I to 10 CFR part 50.

You may submit comments on the draft guide by the methods outlined in the ADDRESSES section of this document.

List of Subjects in 10 CFR Part 50

Administrative practice and procedure, Antitrust, Backfitting, Classified information, Criminal penalties, Education, Emergency planning, Fire prevention, Fire protection, Intergovernmental relations, Nuclear power plants and reactors, Penalties, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements, Whistleblowing.

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 50 as follows:

PART 50 - DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES

1. The authority citation for part 50 continues to read as follows:

Authority: Atomic Energy Act of 1954, secs. 11, 101, 102, 103, 104, 105, 108, 122, 147, 149, 161, 181, 182, 183, 184, 185, 186, 187, 189, 223, 234 (42 U.S.C. 2014, 2131, 2132, 2133, 2134, 2135, 2138, 2152, 2167, 2169, 2201, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2239, 2273, 2282); Energy Reorganization Act of 1974, secs. 201, 202, 206, 211 (42 U.S.C. 5841, 5842, 5846, 5851); Nuclear Waste Policy Act of 1982, sec. 306 (42 U.S.C. 10226); National Environmental Policy Act of 1969 (42 U.S.C. 4332); 44 U.S.C. 3504 note; Sec. 109, Pub. L. 96-295, 94 Stat. 783.

2. In appendix I to part 50, revise section II, paragraph D, to read as follows:

Appendix I to Part 50—Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as is Reasonably

Achievable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents

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SECTION II. * * *

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D. In addition to the provisions of paragraphs A, B, and C of this section, the applicant must include in the radwaste system all items of reasonably demonstrated technology that, when added to the system sequentially and in order of diminishing cost-benefit return, can for a favorable cost-benefit ratio effect reductions in dose to the population reasonably expected to be within 50 miles of the reactor. The cost-benefit analysis must be performed in current dollars using a conversion factor value of \$5,200 per person-rem, in 2014 dollars, which must be adjusted for inflation and real income growth. The requirements of this paragraph D need not be complied with by persons who have filed applications for construction permits that were docketed on or after January 2, 1971, and prior to June 4, 1976, if the radwaste systems and equipment described in the preliminary or final safety analysis report and its amendments satisfy the Guides on Design Objectives for Light-Water-Cooled Nuclear Power Reactors

proposed in the Concluding Statement of Position of the Regulatory Staff in
Docket-RM-50-2 dated February 20, 1974, pp. 25-30, reproduced in the annex to this
appendix I.

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Dated: <Month XX, 2023>.

For the Nuclear Regulatory Commission.

Brooke P. Clark,
Secretary of the Commission.