Proposed Rules

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This section of the FEDERAL REGISTER contains notices to the public of the proposed issuance of rules and regulations. The purpose of these notices is to give interested persons an opportunity to participate in the rule making prior to the adoption of the final rules.

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50, Appendix I

[NRC–2014–0044]

RIN 3150–AJ38

Reactor Effluents

AGENCY: Nuclear Regulatory Commission.

ACTION: Advance notice of proposed rulemaking; request for comment.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is issuing this advance notice of proposed rulemaking (ANPR) to obtain input from stakeholders on the development of a regulatory basis for the NRC's regulations governing radioactive effluents from nuclear power plants. The regulatory basis would support potential changes to better align the NRC regulations governing dose assessments for radioactive effluents from nuclear power plant operations with the most recent terminology and dose-related methodology published by the International Commission on Radiological Protection (ICRP) contained in the ICRP Publication 103 (2007). The NRC has identified specific questions and issues with respect to a possible revision of the NRC's current regulations and guidance governing radioactive gaseous and liquid effluents from nuclear power plants. The NRC seeks public and other stakeholder input on these questions and issues in order to develop the regulatory basis.

DATES: Submit comments by September 1, 2015. Comments received after this date will be considered if it is practical to do so, but the NRC is only able to ensure consideration of comments received on or before this date.

ADDRESSES: You may submit comments by any of the following methods (unless this document describes a different method for submitting comments on a specific subject):

- *Federal Rulemaking Web site:* Go to *http://www.regulations.gov* and search for Docket ID NRC–2014–0044. Address questions about NRC dockets to Carol Gallagher; telephone: 301–415–3463; email: *Carol.Gallagher@nrc.gov.* For technical questions contact the individual 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.

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: Carolyn Lauron, telephone: 301–415–2736, email: *Carolyn.Lauron@nrc.gov;* or Nishka Devaser, telephone: 301–415–5196, email: *Nishka.Devaser@nrc.gov.* Both of the Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001.

SUPPLEMENTARY INFORMATION:

I. Obtaining Information and Submitting Comments

A. Obtaining Information

Please refer to Docket ID NRC–2014–0044 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 Web site: Go to *http://www.regulations.gov* and search for Docket ID NRC–2014–0044.
- NRC's Agencywide Documents Access and Management System (ADAMS): You may obtain publicly available documents online in the ADAMS Public Documents collection at *http://www.nrc.gov/reading-rm/adams.html.* To begin the search, select ''*ADAMS Public Documents*'' and then select ''*Begin Web-based ADAMS Search.*'' For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1–800–397–4209, 301–415–4737, or by 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 referenced in the **SUPPLEMENTARY INFORMATION** section of this document. For the convenience of the reader, the ADAMS accession numbers are also provided in a table in the ''Availability of Documents'' section of this document.
- NRC's PDR: You may examine and purchase copies of public documents at the NRC's PDR, Room O1–F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

B. Submitting Comments

Please include Docket ID NRC–2014–0044 in the subject line of your comment submission.

The NRC cautions you not to include identifying or contact information in comment submissions that you do not want to be publicly disclosed in your comment submission. The NRC will post all comment submissions at *http://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 submissions into ADAMS.

II. Background

The requirements of appendix I of part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR) were first published in 1975 (40 FR 19439; May 5, 1975) and are based on the terminology and methodology for dose assessment described in ICRP Publication 2 (1959).[1]

[1] ICRP Publication 2 (1959), ''Permissible Dose for Internal Radiation.'' The condensed ICRP reference

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The requirements of 10 CFR part 50, appendix I, apply to persons who hold NRC licenses to operate nuclear power reactors under 10 CFR part 50 or 10 CFR part 52. Specifically, 10 CFR part 50, appendix I, prescribes the design and performance of equipment used to control radioactive liquid and gaseous effluents to the environment and doses to members of the public from nuclear power plants during normal operations and expected operational occurrences. The 10 CFR part 50, appendix I, regulations provide guidance to licensees for developing technical specifications, as required by 10 CFR 50.36a(a), to keep levels of radioactive materials in effluents released in unrestricted areas ''As Low As Is Reasonably Achievable'' (ALARA).[2]

The ALARA requirements for equipment designed to control releases of radioactive materials are contained in various provisions in 10 CFR parts 50 and 52, and the design objectives are contained in 10 CFR part 50, appendix I.[3] The dose criteria are based on ICRP Publication 2 dosimetry (*i.e.,* total body and critical organ dose concepts and models). Since its implementation in 1975, the 10 CFR part 50, appendix I, regulations were revised several times, but none of the amendments involved an alignment of the dosimetry basis with that of the NRC's general radiation protection regulations in 10 CFR part 20.

In 1991, the NRC substantively amended its 10 CFR part 20 regulations (56 FR 23360; May 21, 1991). The purpose of the 1991 amendments was to adopt the basic tenets of the ICRP system of radiation dose limitation described in ICRP Publication 26 (1977), ''Recommendations of the ICRP.'' The 1991 amendments to 10 CFR part 20 were also based upon ICRP Publication 30 (1979–1988), ''Limits for Intakes of Radionuclides by Workers,'' including its four parts, four supplements and index, which were published during the period of 1979 through 1988. The concern with the current 10 CFR part 50, appendix I, regulations, guidance, and software that supports the guidance is that they are based on dosimetry concepts issued in 1959 under the recommendations of ICRP Publication 2, and as such, no longer align with those used in 10 CFR part 20. In total, the ICRP has updated its terminology and methodology for dose assessments three times since 1959. The most recent terminology and methodology for dose assessments are described in ICRP Publication 103, which was published in 2007.[4]

In response to the ICRP Publication 103 recommendations, the NRC staff prepared two papers for the Commission's review, SECY–08–0197, ''Options to Revise Radiation Protection Regulations and Guidance with Respect to the 2007 Recommendations of the International Commission on Radiological Protection,'' dated December 18, 2008 (ADAMS Accession No. ML091310193), and SECY–12–0064, ''Recommendations for Policy and Technical Direction to Revise Radiation Protection Regulations and Guidance,'' dated April 25, 2012 (ADAMS Accession No. ML121020108). Both papers considered potential revisions to the NRC's regulations in 10 CFR part 20 and 10 CFR part 50, appendix I. The papers are publicly available and described in further detail below.[5]

The SECY–08–0197 paper described and evaluated the ICRP Publication 103 recommendations along with an NRC staff recommendation that the Commission approve a closer alignment of the NRC regulatory framework with the recommendations of ICRP Publication 103. The NRC staff identified a number of recommendations to achieve this alignment, including (1) the development of a technical basis, or the rationale, for revising radiation protection regulations and (2) outreach with stakeholders and interested parties to identify issues, options, and potential impacts. The NRC staff stated that it would provide the Commission with the results of the stakeholder and interested party interactions, the scope of any proposed rulemaking, regulatory analysis of costs and benefits, evaluation of necessary policy and implementation issues, the resources, and the projected rulemaking completion date, which would be dependent on the ICRP's development of essential technical information. At present, the ICRP is still developing this technical information and it is currently scheduled for publication in 2015.

The Commission made findings and provided direction to the NRC staff in staff requirements memorandum (SRM), SRM–SECY–08–0197, ''Options to Revise Radiation Protection Regulations and Guidance with Respect to the 2007 Recommendations of the International Commission on Radiological Protection,'' dated April 2, 2009 (ADAMS Accession No. ML090920103). In SRM–SECY–08–0197, the Commission approved the NRC staff's recommendation to ''begin engagement with stakeholders and interested parties to initiate development of the technical basis for a possible revision of the NRC's radiation protection regulations, as appropriate and where scientifically justified, to achieve greater alignment with the 2007 recommendations . . . contained in ICRP Publication 103.'' The Commission agreed with the NRC staff and the NRC's Advisory Committee on Reactor Safeguards (ACRS) ''that the current regulatory framework continues to provide adequate protection of the health and safety of workers, the public, and the environment.'' The Commission further stated, ''[f]rom a safety regulation perspective, ICRP Publication 103 proposes measures that go beyond what is needed to provide for adequate protection,'' and that ''[t]his point should be emphasized when engaging stakeholders and interested parties, and thereby focus the discussion on discerning the benefits and burdens associated with revising the radiation protection regulatory framework,'' which includes 10 CFR part 50, appendix I.

In response to the Commission's direction in SRM–SECY–08–0197, the NRC staff engaged in extensive stakeholder outreach activities on the broad issues arising from a possible revision of the NRC's radiation protection framework. Three **Federal Register** notices (FRNs) were issued requesting public feedback and comments (74 FR 32198, July 7, 2009; 75 FR 59160, September 27, 2010; and 76 FR 53847, August 30, 2011). Presentations were made and discussions were held at a variety of professional societies, licensee organizations, public interest groups, and State organizations (*e.g.,* Conference

formats used in this document are ''ICRP Publication 103,'' and ''ICRP Publication 103 (2007).''

[2] The NRC's regulations (10 CFR 20.1003) define ALARA as ''making every reasonable effort to maintain exposures to radiation as far below the dose limits in this part [10 CFR part 20] as is practical consistent with the purpose for which the licensed activity is undertaken . . . .''

[3] The NRC's regulations in 10 CFR 50.34a establish design objectives for equipment to control releases of radioactive material in effluents. These releases are reported to the NRC in accordance with requirements set forth in 10 CFR 50.36a. In addition, 10 CFR 52.47, 52.79, 52.137, and 52.157 provide that applications for design certification, combined license, design approval, or manufacturing license, respectively, shall include a description of the equipment and procedures for the control of gaseous and liquid effluents and for the maintenance and use of equipment installed in radioactive waste systems.

[4] ICRP, 2007. The 2007 Recommendations of the International Commission on Radiological Protection, ICRP Publication 103. Ann. ICRP 37 (2–4).

[5] The NRC staff has published an Advance Notice of Proposed Rulemaking (ANPR) for its radiation protection regulations in 10 CFR part 20 (79 FR 43284; July 25, 2014). The 10 CFR part 20 ANPR described many potential revisions to the 10 CFR part 20 regulations, including a closer alignment with the ICRP Publication 103 dosimetry and terminology recommendations.

of Radiation Control Program Directors, and Agreement States). In the fall of 2010, the NRC staff conducted a series of facilitated roundtable workshops in Washington, DC, Los Angeles, CA, and Houston, TX. Each workshop included representatives from a broad range of users of radioactive material. This process provided an opportunity for various groups of stakeholders to have a more focused discussion. The October 2010 workshop in Washington, DC, focused on the nuclear power and fuel cycle industries, and the radiation protection programs of other Federal agencies, (*e.g.,* U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), U.S. Navy, Armed Forces Radiobiology Research Institute, and National Institutes of Health). Some of the participants at the Washington, DC, workshop indicated a general support for an integrated alignment of 10 CFR part 20 and 10 CFR part 50, appendix I, regulations with the recommendations of ICRP Publication 103. Participants also urged a coordinated revision of the NRC's regulations with the requirements of EPA's 40 CFR part 190 because the NRC requires licensees to follow this EPA requirement through the NRC's regulation in 10 CFR 20.1301(e). Finally, some participants noted a concern as to the justification for any revision of 10 CFR part 50, appendix I, as it is not a safety standard and speculated that such a revision would be costly to the industry. Transcripts of each workshop and all written comments received in response to the FRNs are publicly available through the NRC's public Web site on the page entitled, ''Options to Revise Radiation Protection Regulations and Guidance,'' *http://www.nrc.gov/about-nrc/regulatory/rulemaking/potential-rulemaking/opt-revise.html.*

In addition to the national outreach described above, the NRC's staff participated in international outreach activities in response to the Commission's direction in SRM–SECY–08–0197. The NRC staff's activities during this time included participation in the revision of the International Basic Safety Standards by the International Atomic Energy Agency (IAEA), from 2009 through its completion in the second quarter of 2013, and observation of the revision of the Euratom Basic Safety Standards Directive in the European Union. The IAEA's and Euratom's revisions focused on aligning their requirements with the recommendations of ICRP Publication 103.

In SECY–12–0064, the NRC staff recommended amending the NRC's regulatory framework, including 10 CFR part 50, appendix I, to better align with those ICRP Publication 103 recommendations concerning terminology and dose calculation methodologies for estimating radiation exposure and risk. The NRC staff cautioned, however, that the NRC should not initiate a rulemaking to better align with these ICRP Publication 103 recommendations until the ICRP publishes its updated dose coefficients and other supporting information, thereby allowing the NRC to engage in a single rulemaking effort. The NRC staff also recommended that it continue to engage in stakeholder outreach.

In SRM–SECY–12–0064, ''Recommendations for Policy and Technical Direction to Revise Radiation Protection Regulations and Guidance,'' dated December 17, 2012 (ADAMS Accession No. ML12352A133), the Commission directed the NRC staff to develop a regulatory basis for proposed revisions to 10 CFR part 20 and to 10 CFR part 50, appendix I, in parallel, for the purpose of aligning each with the most recent methodology and terminology for dose assessment (namely, the ICRP Publication 103 recommendations). With respect to potential changes to the 10 CFR part 20 regulations, the NRC issued an ANPR on July 25, 2014 (79 FR 43284).[6] The potential changes to the 10 CFR part 50, appendix I, regulations under consideration also involve a closer alignment of these regulations with the recommendations in ICRP Publication 103 concerning terminology and dose calculation methodologies for estimating radiation exposure and risk due to effluent releases. The NRC staff will coordinate the development of both regulatory bases together, including consideration of public comments (some of which have already been received) that raise matters common to both sets of regulations. If rulemaking is eventually promulgated, this approach would help ensure that the requirements of 10 CFR part 20 and 10 CFR part 50, appendix I, regulations would be based on a common dosimetry basis, terminology, and dose calculation methodology. A closer alignment of 10 CFR part 50, appendix I, with ICRP Publication 103 would also modernize the NRC's design objectives, regulatory guidance, and supporting computer software.

The EPA is also examining possible revisions to the ''Environmental Radiation Protection Standards for Nuclear Power Operations,'' 40 CFR part 190, which applies to the entire nuclear fuel cycle.[7]

Section II of 10 CFR part 50, appendix I, assigns design objectives for doses due to liquid and gaseous effluents. Under Section II.A of appendix I, the annual design objectives for liquid effluents from all pathways of exposure are 0.03 milliSievert (mSv) (3 millirem (mrem)) to the total body and 0.1 mSv (10 mrem) to any organ. Under Section II.B, the annual design objectives for noble gases in gaseous effluents are 0.1 milliGray (mGy) (10 millirad (mrad)) gamma-air dose and 0.2 mGy (20 mrad) beta-air dose, with provisions for increasing or decreasing the design objectives based on total body dose and skin dose. Under Section II.C of appendix I, the annual design objective for radioactive iodines and particulates in gaseous effluents is 0.15 mSv (15 mrem) to any organ.

These design objectives are referenced to the total body and various organs of the human body in accordance with the 1959 recommendations of ICRP Publication 2. ICRP Publication 103 has a larger list of organs and suggests effective dose may be a good indicator of health risk for very low exposures, like those normally encountered with radioactive effluents from nuclear power plants. The design objectives apply to each reactor unit and to radioactive releases to unrestricted areas.

Section II.D of 10 CFR part 50, appendix I, concerns the use of cost-benefit ratios, to ensure facilities use radwaste treatment technology that can reduce the dose to the population within 50 miles of the reactor. The cost-benefit criteria are $1,000 per total body man-rem and $1,000 per man-thyroid-rem. The design objectives and cost benefit criteria may need to be revised to better align 10 CFR part 50, appendix I, with the recommendations of ICRP Publication 103. For example, the dose calculation methodologies in 10 CFR part 50, appendix I (based on ICRP Publication 2), result in a total body dose, while the dose calculation methodologies in ICRP Publication 103 result in an effective dose. Although both calculation methodologies result in an estimate of the dose to an individual, different assumptions are used in each

[6] The 10 CFR part 20 ANPR is available on *http://www.regulations.gov* under Docket ID NRC–2009–0279. On November 20, 2014 (79 FR 69065), the NRC extended the 10 CFR part 20 ANPR comment period to March 24, 2015. On March 18, 2015 (80 FR 14033), the NRC extended the 10 CFR part 20 ANPR comment period a second time, to June 22, 2015.

[7] The 40 CFR part 190 ANPR was published by EPA on February 4, 2014 (79 FR 6509), and is available on *www.regulations.gov* under Docket ID EPA–HQ–OAR–2013–0689.

calculation. As a result, the estimated doses to the individual will be different, but the differences are not expected to be significant with respect to radiological protection for members of the public. A more exact estimate of the differences in dose estimates between the two calculation methodologies will be available once all of the dose coefficients for ICRP Publication 103 are published, which is currently scheduled for 2015. A summary of the differences in the dose estimates between ICRP Publication 2 and ICRP Publication 103 methodologies is expected to be included in the regulatory basis document.

Some of the design objectives in 10 CFR part 50, appendix I, are stated in terms of organ dose. The ICRP Publication 103 indicates that the primary use of effective dose is for demonstrating compliance with dose limits. As a result, the NRC is interested in public comments on whether the concept of the organ dose, used in 10 CFR part 50, appendix I, design objectives, should be replaced with effective dose. The ICRP Publication 103 indicates the effective dose is particularly suited to cases where the estimated doses are much less than the annual limit for a member of the public (*i.e.,* 0.1 mSv or 100 mrem per 10 CFR 20.1301). Additionally, if the organ dose design objectives were to be eliminated, the NRC is interested in public comments on what new values may be assigned to the effective dose values that would replace the organ doses.

In addition, 10 CFR part 50, appendix I, includes additional design objectives in Docket RM–50–2, ''Concluding Statement of Position of the Regulatory Staff, Guides on Design Objectives for Light-Water-Cooled Nuclear Power Reactors'' (February 20, 1974, pp. 25–30).[8] For liquid or gaseous effluents, considering all release pathways, the design objective for the site is an annual dose to the total body or to any organ of an individual in an unrestricted area not to exceed 0.05 mSv (5 mrem). For gaseous effluents, as radioactive iodines and particulates in consideration of all release pathways, the design objective for the site is an annual dose to any organ of an individual in an unrestricted area not to exceed 0.15 mSv (15 mrem). The design objective for radioactivity in liquid effluents, excluding tritium and dissolved gases, is a calculated annual quantity not to exceed 5 Curies (Ci) (185 gigaBequerel (GBq)) per reactor unit. Additionally, the design objective for I–131 in gaseous effluents is a calculated annual quantity not to exceed 1 Ci (37 GBq) per reactor unit. The annual design objective for radioactive material above background in gaseous effluents is a calculated quantity not to exceed 0.1 mGy (10 mrad) gamma-air dose and 0.2 mGy (20 mrad) beta-air dose, with provisions for increasing or decreasing the design objectives based on total body dose and skin dose. The Docket RM–50–2 objectives and dose limits are applicable to reactor construction permit applications that were docketed on or after January 2, 1971, and prior to June 4, 1976. As a result, compliance with the Docket RM–50–2 criteria would relieve such applicants from the other cost-benefit provisions of Section II.D of 10 CFR part 50, appendix I.

The dose calculation methodology used to demonstrate compliance with the 10 CFR part 50, appendix I, design objectives is different than the dose methodology used for compliance with 10 CFR part 20. There are multiple methods of calculating dose. In 10 CFR part 20, dose is expressed as total effective dose equivalent (TEDE), which incorporates a risk-based dose, weighted by tissues or organs, as outlined in ICRP Publication 26. Under this TEDE approach, the dose to the body is expressed in a single value. By contrast, 10 CFR part 50, appendix I, uses the recommendations of ICRP Publication 2 to express separate doses for the total body and critical organs. Other differences between 10 CFR part 20 dose constructs and 10 CFR part 50, appendix I, dose constructs exist, such as the use of non-stochastic effects in limiting doses to specific organs in 10 CFR part 20. The ICRP Publication 2 approach used in 10 CFR part 50, appendix I, does not make such distinctions among organs.

The differences between the various dose calculation methodologies used in the NRC's current regulatory framework (*i.e.,* 10 CFR part 20 and 10 CFR part 50, appendix I) and those recommended by the ICRP after ICRP Publication 30,[9] have created challenges for the NRC and its licensees. The NRC staff described these challenges in its paper to the Commission, SECY–01–0148, ''Processes for Revision of 10 CFR part 20 Regarding Adoption of ICRP Recommendations on Occupational Dose Limits and Dosimetric Models and Parameters,'' dated August 2, 2001 (ADAMS Accession No. ML011580363). Specifically, the challenges included licensees' requests to use dosimetry methods based upon the recommendations in the various ICRP publications issued after ICRP Publication 30 for both external (to the body) and internal (within the body) dose assessments; areas of non-alignment between the NRC and international regulatory bodies, including the differences in occupational exposure limits; and the use by some Federal agencies (*e.g.,* DOE and EPA), of dosimetry models based upon ICRP recommendations that were either not incorporated in the NRC's 1991 10 CFR part 20 rulemaking or were published after that rulemaking. The reader is encouraged to review the parallel ANPR on the potential revisions to 10 CFR part 20 for more details related to SECY–01–0148.[10]

The 10 CFR part 50, appendix I, design objectives for plant systems are more restrictive than either the 1 mSv (100 mrem) per year dose limit for members of the public in 10 CFR 20.1301(a), or the effluent concentration limits (ECLs) in 10 CFR part 20, appendix B, Table 2, ''Effluent Concentrations,'' which correspond to 0.5 mSv (50 mrem) per year.[11] As stated in 10 CFR 50.34a(a), the design objectives of 10 CFR part 50, appendix I, are not radiation protection standards, but are design criteria to ensure equipment designs maintain radioactive effluents ALARA. The NRC's regulation in 10 CFR 50.36a(b), which is referenced in Section IV of 10 CFR part 50, appendix I, invokes compatibility in balancing the need for operational flexibility while still ensuring public health and safety. Releases of

[8] The ''Concluding Statement of Position of the Regulatory Staff'' in Docket RM–50–2 is attached as an annex to 10 CFR part 50, appendix I.

[9] These ICRP recommendations include those published in: ICRP Publication 60 (1991), ''1990 Recommendations of the International Commission on Radiological Protection;'' ICRP Publication 61 (1991), ''Annual Limits on Intake of Radionuclides by Workers Based on the 1990 Recommendations;'' ICRP Publication 66 (1994), ''Human Respiratory Tract Model for Radiological Protection;'' ICRP Publication 67 (1993), ''Age-dependent Doses to Members of the Public from Intake of Radionuclides—Part 2 Ingestion Dose Coefficients;'' ICRP Publication 68 (1994), ''Dose Coefficients for Intakes of Radionuclides by Workers;'' ICRP Publication 69 (1995), ''Age-dependent Doses to Members of the Public from Intake of Radionuclides—Part 3 Ingestion Dose Coefficients;'' ICRP Publication 71 (1995), ''Age-dependent Doses to Members of the Public from Intake of Radionuclides—Part 4 Inhalation Dose Coefficients;'' ICRP Publication 72 (1995), ''Age-dependent Doses to the Members of the Public from Intake of Radionuclides—Part 5 Compilation of Ingestion and Inhalation Coefficients;'' and ICRP Publication 74 (1996), ''Conversion Coefficients for use in Radiological Protection against External Radiation.''

[10] See 79 FR 43287.

[11] In accordance with 10 CFR 20.1302(b)(2)(i), each NRC licensee may demonstrate compliance with the public dose limit set forth in 10 CFR 20.1301(a) by showing that the ''annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values specified in table 2 of appendix B to part 20.''

radioactive effluents from nuclear power plants are controlled by plant specific technical specifications to ensure that such releases are maintained: (1) ALARA using 10 CFR part 50, appendix I, design objectives and requirements; (2) a small fraction of the 10 CFR 20.1301 public dose limit; and (3) within the EPA's 40 CFR part 190 environmental dose standards for facilities that are part of the uranium fuel cycle,[12] as required by 10 CFR 20.1301(e).[13] As a result, the 10 CFR 20.1301 public dose limit of 1 mSv (100 mrem) per year on radioactive effluents is rarely controlling in limiting radioactive releases from nuclear power plants as effluents typically are only a fraction of such dose limit or of the 10 CFR part 20, appendix B, Table 2 concentration limits.

Inasmuch as the regulatory purpose of 10 CFR part 20 is not the same as 10 CFR part 50, appendix I, the difference in dosimetry concepts between 10 CFR part 20 (based on ICRP Publication 26) and 10 CFR part 50, appendix I (based on ICRP Publication 2), does not preclude the NRC from having an effective regulatory framework. However, there are practical considerations, as discussed in SECY–08–0197, Enclosure 3, ''Details of Technical Options for Revision of 10 CFR part 50 and Appendix I Regulations and Regulatory Guidance for Light Water-Cooled Nuclear Power Reactors,'' that the NRC should evaluate when determining whether to transition to a common dosimetry concept for both 10 CFR part 20 and 10 CFR part 50, appendix I, regulations, guidance, and supporting computer software. Enclosure 4, ''Listing of NRC Guidance Potentially Subject for Update,'' of SECY–08–0197 lists NRC documents and computer codes that would need to be reviewed and updated.

In implementing the ALARA requirements of 10 CFR part 50, appendix I, the NRC published a series of regulatory guides to provide guidance on how to demonstrate compliance with 10 CFR part 50, appendix I. The regulatory guides address methods for estimating the activity released in gaseous and liquid effluents, dispersion of effluents in the atmosphere and water bodies, and calculating potential radiation doses to offsite members of the public (see Section VIII of this ANPR for the full title and availability of documents cited within this ANPR). The key guidance document is Regulatory Guide (RG) 1.109, ''Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR part 50, Appendix I, Rev. 1,'' which describes mathematical models and assumptions for estimating radiation doses to members of the public from radioactive effluents. Two separate guidance documents, NUREG/CR–4013, ''LADTAP II–Technical Reference and Users Guide,'' and NUREG/CR–4653, ''GASPAR II–Technical Reference and Users Guide,'' describe computer models that implement the guidance of RG 1.109 and therefore are acceptable methods in demonstrating compliance with the 10 CFR part 50, appendix I, requirements.

Regulatory Guide 1.109 contains tables of dose factors. As described in SECY–08–0197, a revised set of dose factors are a crucial step to any revision of the NRC's radiation protection framework for radioactive effluents. These dose factors provide a basis for calculating doses and determining design objectives in 10 CFR part 50, appendix I. These dose factors would also provide the basis for revising the limits for radioactive effluents in 10 CFR part 20, appendix B, Table 2, ECLs for a representative member of the public. These ECLs are calculated in one of two ways and contain factors to account for the exposure time, the breathing rate, the dose limit for members of the public, and the various age groups exposed. These dose conversion factors also provide a basis for the 10 CFR part 20, appendix B, Table 3, ''Releases to Sewers,'' limits, which are calculated on a similar basis as 10 CFR part 20 appendix B, Table 2, but with different assumptions. The tables of dose factors in RG 1.109 should be revised as part of any effort to more closely align the NRC's regulations with ICRP Publication 103 recommendations.

Besides the computer codes, RG 1.109 is supported by a series of related documents, including RG 1.110, ''Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors;'' which provides methods to conduct cost-benefit analyses in evaluating the performance of radwaste systems used in light water reactors; RG 1.111, ''Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors;'' which describes mathematical models and assumptions for estimating atmospheric transport, dispersion, and deposition of airborne effluents during routine operation; RG 1.112, ''Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors,'' which describes methods for calculating radioactive source terms for evaluating radioactive waste treatment systems; RG 1.113, ''Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I, Rev. 1,'' which provides mathematical models and methods in estimating aquatic dispersion of both routine and accidental releases; and RG 1.21, ''Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power, Rev. 2,'' which provides guidance on how to measure, evaluate, and report to the NRC, plant-related radioactivity (excluding background radiation) in effluents. These documents should be revised as part of any effort to more closely align the NRC's regulations with ICRP Publication 103 recommendations.

The NRC has issued several NUREGS that support RG 1.109 and 10 CFR part 50, appendix I. For example, NUREG–1301, ''Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors,'' NUREG–1302, ''Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors,'' NUREG–0543, ''Methods for Demonstrating LWR Compliance With the EPA Uranium Fuel Cycle Standard (40 CFR part 190),'' and NUREG–0133, ''Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants: A Guidance Manual for Users of Standard Technical Specifications,''

[12] The EPA's regulation in 40 CFR 190.2 defines the uranium fuel cycle as ''the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel, and reprocessing of spent uranium fuel, to the extent that these directly support the production of electrical power for public use utilizing nuclear energy, but excludes mining operations, operations at waste disposal sites, transportation of any radioactive material in support of these operations, and the reuse of recovered non-uranium special nuclear and by-product materials from the cycle.''

[13] The NRC's regulation in 10 CFR 20.1301(e) states that a NRC licensee ''subject to the provisions of EPA's generally applicable environmental radiation standards in 40 CFR part 190 shall comply with those standards.'' The primary 40 CFR part 190 requirement of concern to NRC nuclear reactor licensees is 40 CFR 190.10(a), which states that operations must be conducted in such a manner as to provide reasonable assurance that ''[t]he annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public, as the result of exposures to planned discharges of radioactive materials, radon and its daughters excepted, to the general environment from uranium fuel cycle operations and to radiation from these operations.'' It should be noted that the dose limits of this EPA standard are also based on ICRP Publication 2 dosimetry concepts and dose calculation methods.

present guidance on the format and contents of operational programs. The programs include the Offsite Dose Calculation Manual, the radioactive effluent control program (previously known as Radiological Effluent Technical Specifications or RETS), and the Radiological Environmental Monitoring Program (or REMP).

There are other regulatory guides, although not issued for the purpose of supporting RG 1.109, that are nonetheless linked to implementation of 10 CFR part 50, appendix I. For example, RG 4.15, ''Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)—Effluent Streams and the Environment, Rev. 2,'' addresses quality assurance for maintaining radiological effluent monitoring programs at or around reactor sites. Enclosure 4 of SECY–08–0197 presents an initial listing of NRC guidance (documents and computer codes) that would be reviewed and updated, as needed, in supporting the implementation of any potential revision to 10 CFR part 50, appendix I.

Even though the NRC's regulations on radioactive effluents are protective of the health and safety of the public, over the past decade there have been discussions with stakeholders about updating the basis of 10 CFR part 50, appendix I, design objectives, the regulatory guidance documents, and the supporting computer software to be consistent with the dose methodology used in 10 CFR part 20. Some of the considerations identified by NRC staff are:

(1) Updating 10 CFR part 50, appendix I, requirements and associated dose calculation methodology, which is based upon the recommendations of ICRP Publication 2 (1959), to reflect current scientific knowledge underlying radiation protection principles, such as those described in ICRP Publication 103 (2007);

(2) Engaging in parallel revisions of 10 CFR part 20 and 10 CFR part 50, appendix I, for better alignment with ICRP Publication 103 terminology and methodology for dose assessments; as well as to ensure that any rulemaking amending 10 CFR part 20 and 10 CFR part 50, appendix I, have a common effective or compliance date;

(3) Updating the radiation protection principles because ICRP Publication 2 recommendations are no longer taught in current health physics university curricula and as a result, the NRC staff and industry need to instruct new employees about the implementation of ICRP Publication 2 in reviewing and preparing reactor license applications that rely upon NRC guidance and dose computer codes (*e.g.,* the computer codes LADTAP and GASPAR which calculate doses for liquid effluents and gaseous effluents, respectively) based upon ICRP Publication 2; and

(4) Whether amending 10 CFR part 50, appendix I, to more closely align with the ICRP Publication 103 recommendations substantially increases the overall protection of the public health and safety, and is cost-justified under a backfit or issue finality analysis, such that a revised 10 CFR part 50, appendix I, should be applied to existing 10 CFR part 50 licensees and to those persons who hold NRC licenses under 10 CFR part 52 (*e.g.,* combined license holders and applicants, a holder of a standard design certification).

Given these concerns, the NRC staff is considering more closely aligning the dose concepts of 10 CFR part 20 and the 10 CFR part 50, appendix I, to the ICRP Publication 103 recommendations.

III. Regulatory Objectives

The NRC staff has identified the following objectives in any potential rulemaking to revise 10 CFR part 50, appendix I:

1. Engage stakeholders in a discussion on ways to improve 10 CFR part 50, appendix I, with particular emphasis on improving the terminology and methodology for dose assessments.

2. Collect stakeholder comments, consider stakeholder input, and evaluate various options to achieve a better alignment between 10 CFR part 50, appendix I, and the most recent terminology and methodology for dose assessments in ICRP Publication 103.

3. Establish a technical basis for exceptions to the recommendations of ICRP Publication 103, to the extent these recommendations are considered by the NRC in a future proposed rulemaking.

4. Prepare and submit a regulatory basis document to the Commission in accordance with the Commission's direction in SRM–SECY–12–0064.

IV. Policy and Technical Issues

Achieving a closer alignment between 10 CFR part 50, appendix I, and the ICRP Publication 103 recommendations would involve changing the underlying terminology and methodology for dose assessment in 10 CFR part 50, appendix I. This closer alignment, if adopted by the NRC, would pose several challenges for the NRC, including the need to revise guidance documents and implementing procedures, and updating computer codes. Likewise, a closer alignment would require licensees to re-train workers to use a new dose assessment system, revise implementing procedures and programs, and revise record keeping and data reporting practices. Therefore, the NRC is seeking to understand the impacts of more closely aligning 10 CFR part 50, appendix I, and associated guidance with the ICRP Publication 103 recommendations regarding terminology and methodology for dose assessments. The issues and options below are intended to elicit input from the public, the regulated community, and other stakeholders. This information will be used to support the development of a regulatory basis for a potential revision of the 10 CFR part 50, appendix I, regulations and associated guidance.

A. Issue No. 1: Closer Alignment of 10 CFR Part 20 and 10 CFR Part 50, Appendix I, With the Terminology and Methodology Recommendations of ICRP Publication 103

The ICRP has published four primary sets of radiological protection recommendations, namely, ICRP Publication 2 (1959), ICRP Publication 26 (1977); ICRP Publication 60 (1990), and ICRP Publication 103 (2007). As noted earlier, the 10 CFR part 20 regulations are based on ICRP Publication 26, while the 10 CFR part 50, appendix I, requirements are based on ICRP Publication 2. One important way the dose terminology used in 10 CFR part 20 deviates from the ICRP Publication 26 recommendations is by the use of the term ''Total Effective Dose Equivalent.'' This term was created by the NRC to describe the summation of internal and external exposure. The ICRP Publication 26 recommendations use the phrase ''the sum of the dose-equivalent from external exposure'' and ''the committed effective dose equivalent from the intake of radionuclides.'' The ICRP Publication 60 recommendations changed the way tissue and radiation weighting factors were defined and used. There was also a corresponding change in the terminology from quality factors to radiation weighting factors. The ICRP Publication 60 introduced the terms ''Effective Dose'' (ED) and ''Total Effective Dose'' (TED) to clearly represent the summation of the dose contributions from external exposure and the intake of radioactive material.

The ICRP Publication 103 recommendations retained the terminology of effective dose and equivalent dose but made several revisions to the calculation of dose, including: (1) The modification of the modeling used for calculation of radiation exposures; (2) changes in tissue weighting factors and radiation

weighting factors; and (3) modifications of the metabolic models used to represent the movement of radioactive material through the human body, by use of computer models. These revisions have resulted in the development of reference computational phantoms that are specific models for adult males and females, 15-year-old males and females, and for various other age groups, including infants and 1-year-old, 5-year-old, and 10-year-old children. The reference phantoms for the human body are described in general terms in ICRP Publication 103 and more specifically in ICRP Publication 110 (2009).[14]

The availability of new models for different age groups provides the opportunity to calculate the numeric values for public exposure to effluents in a more comprehensive manner as compared to the previous calculation methodology of basing assessments primarily on an adult member of the public. As part of the potential rulemaking to amend 10 CFR part 20, the NRC is considering the use of an age and gender weighted dose coefficient and revising the definition of the term ''reference man'' [15] to be used in environmental dose calculations. With respect to the implementation of 10 CFR part 50, appendix I, RG 1.109 considers four age groups: Infant, child, teenager, and adults. The development of age-specific dose coefficients per unit intake of radioactivity (inhaled or ingested) is described in NUREG–0172, ''Age-Specific Radiation Dose Commitment Factors for a One-Year Intake.'' As part of this ANPR, the NRC is considering the use of an age and gender averaged approach in any revision to the 10 CFR part 20 and 10 CFR part 50, appendix I.

The NRC staff, as part of its development of the regulatory basis, will consider revising the regulations in 10 CFR part 20 and 10 CFR part 50, appendix I, as well as making conforming changes to other NRC regulations to incorporate the ICRP Publication 103 terms, equivalent dose, effective dose, and ''Total Effective Dose.'' The NRC staff recognizes the preference, from a regulatory stability standpoint, for retaining TEDE but will analyze, in the regulatory basis, the advantages and disadvantages of replacing TEDE with TED in the NRC regulations. The reader is encouraged to review the parallel ANPR (Docket ID NRC–2009–0279, 79 FR 43284) on the proposed revision to 10 CFR part 20 for more details.

The following options and questions are intended to elicit information and initiate a dialog with the public, the regulated community, and other stakeholders in future workshops and meetings.

Option 1a: Do not change the basis of 10 CFR part 50, appendix I, and continue to use the existing requirements and NRC guidance. This option is based on current NRC regulations continuing to adequately protect the public, although 10 CFR part 20 and 10 CFR part 50, appendix I, are based on different methods of assessing dose. Licensee compliance with 10 CFR part 50, appendix I, will continue to demonstrate that radioactive effluents to unrestricted areas are ALARA. If the NRC selects this option, the NRC may make minor revisions to update supporting NRC guidance, as most of such guidance was published in the late 1970s.

Option 1b: Revise the terminology and methodology for dose assessments in 10 CFR part 50, appendix I, to more closely align with the recommendations of ICRP Publication 103, in parallel with any revisions made to the 10 CFR part 20 regulations.[16] This approach would ensure a consistent application of regulatory criteria between 10 CFR part 20 and 10 CFR part 50, appendix I. This option would offer the opportunity to use to a common regulatory basis for calculating and reporting doses.

Questions

Question 1–1: What are the advantages and disadvantages of the NRC selecting option 1a?

The following questions are based upon the NRC selecting option 1b:

Question 1–2: What are the advantages and disadvantages of more closely aligning the 10 CFR part 50, appendix I, terminology and methodology for dose assessments with those of the ICRP Publication 103 recommendations?

Question 1–3: At this time, the NRC is contemplating a parallel rulemaking effort, one for 10 CFR part 20 and one for 10 CFR part 50, appendix I, with a common effective or compliance date for both rules. What are the advantages or disadvantages of the NRC conducting such a parallel rulemaking effort?

Question 1–4: What are the backfitting implications of applying option 1b to 10 CFR part 50 licensees? What are the issue finality implications of applying option 1b to those persons who hold NRC approvals under 10 CFR part 52 (*e.g.,* combined license holders and applicants, a holder of a standard design certification)?

Question 1–5: What cost savings would be realized over the life of the operational programs if dose calculation methods (for 10 CFR part 20 and 10 CFR part 50, appendix I) are standardized?

Question 1–6: What operational impacts and costs (per reactor unit) would be incurred by licensees (*e.g.,* in updating licensee programs, procedures, computer codes, training)?

Question 1–7: Would licensee costs and the operational impacts of complying with a revised 10 CFR part 50, appendix I, be similar for both BWRs and PWRs?

Question 1–8: Should all of the conforming changes to the dose based criteria in 10 CFR part 50 (*e.g.,* the TEDE criteria in 10 CFR 50.34(a)(1)(ii), 10 CFR 50.67, and appendix A, ''General Design Criteria for Nuclear Power Plants,'' Criterion 19, ''Control Room'') be changed coincident with the changes to 10 CFR part 50, appendix I, or should conforming changes to other parts of the regulations be conducted in a separate, later rulemaking?

Question 1–9: Should the NRC expand the number of age groups from 4 to 6 as recommended in ICRP Publication 103?

B. Issue No. 2: Scope of Changes to NRC Guidance Documents Associated With 10 CFR Part 50, Appendix I in Terms of Regulatory Guide 1.109

In the event of a revision of the 10 CFR part 50, appendix I, regulations, the NRC would need to consider making revisions to several guidance documents associated with the 10 CFR part 50, appendix I, regulations. In Enclosure 3 of SECY–08–0197, the NRC staff examined a tiered approach reflecting increasing levels of complexity of a revision to the associated guidance documents. The discussion in SECY–08–0197 considered three options for revising those guidance documents associated with 10 CFR part 50, appendix I. The NRC staff notes that the primary guidance document, RG 1.109, has not been updated since 1977.

The following options and questions are intended to elicit information and initiate a dialog with the public, the regulated community, and other

[14] ICRP Publication 110 (2009), ''Adult Reference Computational Phantoms.''

[15] The NRC regulations use the term ''Reference man,'' which means a hypothetical aggregation of human physical and physiological characteristics arrived at by international consensus. These characteristics may be used by researchers and public health workers to standardize results of experiments and to relate biological insult to a common base (10 CFR 20.1003, definition of ''Reference man'').

[16] See the 10 CFR part 20 ANPR (Docket ID NRC–2009–0279), published in the **Federal Register** on July 25, 2014 (79 FR 43284), for further details about potential revisions to 10 CFR part 20.

stakeholders in future workshops and meetings.

Option 2a: Limited Scope Revision (no changes to the numerical values)—Under this option, the proposed revision would include very limited changes to 10 CFR part 50, appendix I (*e.g.,* to change the design objectives for total body dose only), and would involve very limited changes to only one regulatory guide (*e.g.,* the dose coefficients in R.G. 1.109, Table B–1, ''Dose Factors for Exposure to a Semi-Infinite Cloud of Noble Gases,'' and Tables E–6, ''External Dose Factors for Standing on Contaminated Ground,'' to E–14, ''Ingestion Dose Factors for Infant,'' only).

Option 2b: Full Scope Revision—Under this option, the NRC would consider a complete revision to 10 CFR part 50, appendix I, and all NRC guidance documents, which would include a total of more than 30 regulatory guides, NUREGs, generic communications, and associated software programs. A full scope revision also involves evaluating new radwaste systems, updating dispersion models, new source terms, rewriting RG 1.109, RG 1.110, RG 1.111, and RG 1.112.

Option 2c: Expanded Scope Revision—Under this option, the NRC would include more substantive changes to the regulations and applicable guidance documents than included in Option 2a and potentially substantially less than that listed in Option 2b.

Questions

Question 2–1: Which Option (*i.e.,* what scope of changes to NRC guidance documents) seems most appropriate, and are other options available?

Question 2–2: What are the advantages and disadvantages of each of the three options?

C. Issue No. 3: Detailed Considerations for Revising 10 CFR Part 50, Appendix I

The questions in this section explore some of the specific technical details that may be associated with revising the design objectives. The NRC staff has identified the following options for potential revisions to the 10 CFR part 50, appendix I. It should be noted that the various options below are not considered to be mutually exclusive; that is, the NRC may consider one or more of these options, or various combinations of these options:

Option 3a: Maintain the numerical values of the 10 CFR part 50, appendix I, design objectives—the NRC staff would keep the numerical values for design objectives, but change the units. For example, the annual design objective for liquid effluents, which is currently a total body dose of 3 mrem on an annual basis, would be changed to an effective dose of 3 mrem.

Option 3b: Eliminate the use of organ dose as design objectives in 10 CFR part 50, appendix I, for liquid and gaseous effluents—the NRC staff would provide a single effective dose based criterion in lieu of specific organ dose criteria (*e.g.* thyroid).

Option 3c: Eliminate the use of annual gamma and beta-air doses for gaseous effluents—the NRC staff would eliminate annual gamma-air and beta-air doses for gaseous effluents or convert them to an effective dose.

Option 3d: Update cost-benefit criteria in Section II.D of 10 CFR part 50, appendix I—the NRC staff would update the constant dollar basis in the cost-benefit criteria in Section II.D of 10 CFR part 50, appendix I.

Option 3e: Disposition of Docket RM–50–2, ''Guides on Design Objectives for Light-Water-Cooled Nuclear Power Reactors,'' in the ''Concluding Statement of Position of the Regulatory Staff,'' pp. 25–30 (February 20, 1974)—the NRC staff would remove Docket RM–50–2 from 10 CFR part 50, appendix I, Section V, if the NRC staff determines that it is no longer applicable to any pending applications.

The following options for potential revisions to 10 CFR part 50, appendix I, are unrelated to the alignment with the ICRP Publication 103 terminology and methodology but have some implications for associated NRC guidance.

Option 3f: Light-water-cooled reactor provisions of 10 CFR part 50, appendix I—the NRC staff would expand scope of 10 CFR part 50, appendix I, to include designs other than Light-Water-Cooled Reactors.

Option 3g: Consolidation of NRC licensing guidance implementing 10 CFR part 50, appendix I—the NRC staff would consolidate some NRC guidance documents, if appropriate, and update the following RGs and NUREGs:

a. RG 1.21
b. RG 1.109
c. RG 1.206
d. RG 4.15
e. NUREG–1301
f. NUREG–1302
g. NUREG–0133
h. NUREG–0543
i. NUREG/CR–4013—LADTAP
j. NUREG/CR–4013—GASPAR
k. NUREG–0800

The following questions are intended to elicit information and initiate a dialog with the public, the regulated community, and other stakeholders in future workshops and meetings.

Questions

Question 3–1: Should the NRC focus on only those changes necessary to align 10 CFR part 50, appendix I, with ICRP Publication 103 dose calculation methods (*e.g.,* Issue 3, options 3a thru 3e) or should all of the specific changes identified in options 3a thru 3g be evaluated?

Question 3–2: What significant impacts would be expected if 10 CFR part 50, appendix I, were revised to include all of the options (Issue 3, options 3a thru 3g)?

Question 3–3: Given the scope of the regulatory and technical issues associated with making all of the specific changes identified in Issue 3, options 3a thru 3g, is there any merit in addressing selected options in future implementation phases of this rulemaking (or in separate rulemaking efforts)? If so, which of the options should be delayed?

Question 3–4: Should licensees still report doses separately for organs, such as skin and thyroid, whenever airborne effluent releases are dominated by radioactive iodines and noble gases?

Question 3–5: Should licensees continue to report skin doses, skin dose rates, total body dose rates, and organ doses (including thyroid doses) if organ doses are eliminated? Why or why not?

Question 3–6: Should the categories of releases described in 10 CFR part 50, appendix I (liquid activity, noble gases in gaseous releases, radioactive iodines, tritium, other nuclides in gaseous releases), be expanded or otherwise revised?

D. Issue No. 4: Metrication—Units of Radioactivity, Radiation Exposure, and Dose

The current 10 CFR part 20 radiation protection regulations were promulgated approximately 1 year prior to the publication of the NRC's metrication policy (57 FR 46202; October 7, 1992). The metrication policy addresses the units to be used to express radioactivity, radiation exposure and dose. Therefore, regulations referencing dose limits and other measurements are formatted with the SI units in parentheses. Other NRC regulations have instances in which the SI units are listed first, with the traditional or ''English'' units in parentheses. Numerical values listed in the 10 CFR part 20 appendices are given only in the traditional units. In SRM–SECY–12–0064, the Commission disapproved the elimination of traditional units or ''English'' dose units from the NRC's

regulations. The SRM further stated that both the traditional and SI units should be maintained.

Pursuant to the NRC's 1992 metrication policy, the NRC supports and encourages the use of the metric system of measurement by the nuclear industry. The 1992 policy directed that the NRC, beginning in 1993, publish the following documents in dual units, with the SI units listed first followed by the English units in parentheses: New regulations, major amendments to existing regulations, regulatory guides, NUREG-series documents, policy statements, information notices, generic letters, bulletins, and all written communications directed to the public. The NRC's policy further directs that NRC documents specific to a licensee, such as inspection reports and docketed material concerning a particular licensee, will be in the system of units employed by the licensee. Furthermore, all event reporting and emergency response communications between licensees, the NRC, and State and local authorities will use the traditional system of measurement. In a 1996 review of its 1992 metrication policy, the Commission stated that it does not intend to revisit the 1992 policy unless it is shown to cause an undue burden or hardship (61 FR 31169–31171; June 19, 1996).

The NRC has issued an ANPR concerning a potential revision to its radiation protection regulations in 10 CFR part 20. In its 10 CFR part 20 ANPR, the NRC staff is seeking input on how the Commission's metrication policy should be implemented, particularly with how the numerical values should be presented in appendix B of 10 CFR part 20. Appendix B of 10 CFR part 20 is set forth in a tabular format with nine columns providing each radionuclide's annual limits on intake (ALI) and derived air concentrations (DAC), effluent concentration limits for airborne and liquid releases to the general environment, and concentration limits for discharges to sanitary sewer systems in the traditional units of microcuries (μCi) or microcuries per milliliter (μCi/ml).

The concerns identified in the 10 CFR part 20 ANPR, such as the use of dual units (SI and traditional) are also relevant to the guidance used in implementing 10 CFR part 50, appendix I. For example, RG 1.109, presents traditional units of radioactivity, dose coefficients, and dose conversion factors, specifically in Table A–1, ''Bioaccumulation Factors to Be Used in the Absence of Site-Specific Data;'' Table B–1, ''Dose Factors for Exposure to a Semi-Infinite Cloud of Noble Gases;'' Table E–6, ''External Dose Factors for Standing on Contaminated Ground;'' Tables E–7 to E–10, ''Inhalation Dose Factors;'' and Tables E–11 to E–14, ''Ingestion Dose Factors.'' As noted in the 10 CFR part 20 ANPR, the conversion of the unit of radioactivity from the traditional unit of μCi to the SI unit of becquerel (Bq) is not a whole number or an integer value. As a result, the number of significant digits will result in different values, with the difference determined by the rounding of the numerical values. For example, if rounded to one significant digit, using the standard rounding conventions, the value in SI unit would be smaller than the value in μCi, and would be more restrictive. Therefore, the NRC staff is seeking to explore the implications of presenting dose coefficients, dose conversions factors, and cost-benefit ratios in both SI and traditional units. Licensees are encouraged to review the technical and metrication policy issues described in the 10 CFR part 20 ANPR, as they are not repeated here for brevity.

If 10 CFR part 20 and appendix B to 10 CFR part 20 were revised to include both SI and traditional units, then it would be necessary for consistency to also revise the numerical guides of Section II of 10 CFR part 50, appendix I, and guidance used to implement these requirements. Therefore, providing both sets of units may be perceived as resulting in a cumbersome set of regulatory criteria and tabulations in RG 1.109. Similarly, parallel revisions would need to be made to computer codes used to calculate doses such that dose results would be expressed in both units. One alternative could be to provide an expanded set of tables in the regulatory guide or a NUREG for the convenience of users. The use of traditional and SI units pose significant communication challenges given the potential for confusion when different sets of units are used. The NRC staff is interested in views of possible alternatives, and implications of alternatives on the format of regulations and guidance and impacts on plant operations in aligning any revisions to 10 CFR part 20 and 10 CFR part 50, appendix I, with the Commission's metrication policy.

The following questions are intended to elicit information and initiate a dialog with the public, the regulated community, and other stakeholders in future workshops and meetings.

Questions

Question 4–1: Should the annual radioactive effluent release reports contain both metric and English units (*e.g.,* metric units first, followed by English units in parentheses)? Would this be an undue burden or hardship, as identified in the Commission's 1996 review of the 1992 metrication policy (61 FR 31171; June 19, 1996)? Explain and provide examples.

Question 4–2: What costs or other impacts to operational programs would be incurred if metrication was changed as described above?

Question 4–3: Should the requirements of 10 CFR 20.2101(a) and the guidance of RGs 1.21 and 4.15 be revised and integrated with those in 10 CFR part 50, appendix I, thereby allowing licensees to provide records and reports in SI units only?

V. Public Meetings

The NRC plans to conduct public meetings and participate in industry workshops and conferences for the purpose of discussing the issues identified in this ANPR. The public meetings will provide forums for the NRC staff to discuss the issues and questions identified in this ANPR with external stakeholders and to receive information to support development of a regulatory basis for a potential revision to 10 CFR part 50, appendix I. The meetings are not intended to be a formal solicitation of comments, but rather to encourage stakeholders to provide feedback in written form during the ANPR comment period. The NRC will post public meeting announcements at least 10 calendar days before the date of the meetings at *http://www.nrc.gov/public-involve/public-meetings/index.cfm.* Stakeholders should monitor this NRC public meeting Web site for information about the meetings and issues specific to the potential revision of 10 CFR part 50, appendix I, regulations and guidance.

VI. Cumulative Effects of Regulation

The NRC has implemented a program to address the possible ''Cumulative Effects of Regulation'' (CER) in the development of regulatory bases for rulemakings. The CER recognizes the challenges that licensees or other impacted entities (such as Agreement States) may face while implementing new NRC or other agency regulatory requirements. The CER is an organizational effectiveness challenge that results from a licensee or other impacted entity implementing a number of complex positions, programs or requirements within a prescribed implementation period and with limited available resources, including the ability to access technical expertise to address

a specific issue. The NRC is specifically requesting comments on the cumulative effects that may result from potential amendments to 10 CFR part 50, appendix I, and revisions to associated guidance documents. When developing comments on the possible cumulative effects of any future rulemaking to amend the 10 CFR part 50, appendix I, and associated guidance documents, please consider the following questions:

Questions

Question 5–1: If the NRC conducts a parallel rulemaking effort (amending its regulations in both 10 CFR part 20 and 10 CFR part 50, appendix I), should there be a separate, later compliance date (*i.e.,* a period of time between the rules' effective date and a date when licensees must be in compliance with the rules)? If so, when should the compliance date be set, *e.g.,* 1 year after the effective date? Two years? Another length of time? Please explain the rationale or justification for any such compliance date.

Question 5–2: What actions could be taken to reduce or minimize the implementation time?

Question 5–3: What other requirements, regulations, or orders, whether issued or promulgated by the NRC or another Federal agency, may compete with, or take priority over implementing any potential changes to 10 CFR part 50, appendix I? If so, what are the consequences, including associated costs, and how should they be addressed?

Question 5–4: If 10 CFR part 50, appendix I, is amended, what unintended consequences, including associated costs, may arise that would negate the benefits to revising it? What could be done to minimize unintended consequences?

In addition to responding to the questions above, please provide, if available, information on the costs and benefits of any potential revisions to the 10 CFR part 50, appendix I, regulations and associated guidance documents. This information will be used to support any regulatory analysis performed by the NRC.

VII. 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 31883). The NRC requests comments on this ANPR with respect to the clarity and effectiveness of the language used.

VIII. 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.

Cited documents	ADAMS Accession No.
Proposed Revision to 10 CFR part 20, ANPR (79 FR 43284; July 25, 2014)	ML14084A333
Extension of Comment Period for the 10 CFR part 20 ANPR (79 FR 69065; November 20, 2014)	ML14325A519
Proposed Revision to 40 CFR part 190, ANPR (79 FR 6509; February 4, 2014)	Not in ADAMS
SECY–01–0148, ''Processes For Revision of 10 CFR Part 20 Regarding Adoption Of ICRP Recommendations On Occupational Dose Limits And Dosimetric Models and Parameters,'' August 2, 2001.	ML011580363
SRM–SECY–01–0148, ''Processes For Revision of 10 CFR Part 20 Regarding Adoption Of ICRP Recommendations On Occupational Dose Limits And Dosimetric Models And Parameters,'' April 12, 2002.	ML021050104
SECY–08–0197, ''Options to Revise Radiation Protection Regulations And Guidance With Respect to the 2007 Recommendations of ICRP,'' December 18, 2008.	ML083360555
SRM–SECY–08–0197, ''Options To Revise Radiation Protection Regulations and Guidance With Respect to the 2007 Recommendations of ICRP,'' April 2, 2009.	ML090920103
SECY–12–0064, ''Recommendations For Policy and Technical Direction To Revise Radiation Protection Regulations and Guidance,'' April 25, 2012.	ML121020108
SRM–SECY–12–0064, ''Recommendations For Policy And Technical Direction To Revise Radiation Protection Regulations And Guidance,'' December 17, 2012.	ML12352A133
Regulatory Guide 1.21, ''Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power, Rev. 2,'' June 2009.	ML091170109
Regulatory Guide 1.109, ''Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I, Rev. 1,'' October 1977.	ML003740384
Regulatory Guide 1.110, ''Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear Power Reactors, Rev. 1,'' October 2013.	ML13241A052
Regulatory Guide 1.111, ''Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors, Rev. 1,'' July 1977.	ML003740354
Regulatory Guide 1.112, ''Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Nuclear Power Reactors, Rev. 1,'' March 2007.	ML070320241
Regulatory Guide 1.113, ''Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I, Rev. 1,'' April 1977.	ML003740390
Regulatory Guide 1.206, ''Combined License Applications for Nuclear Power Plants (LWR Edition),'' June 2007	ML070720184
Regulatory Guide 4.15, ''Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination)—Effluent Streams and the Environment, Rev. 2,'' July 2007.	ML071790506
Docket RM–50–2, ''Guides on Design Objectives for Light-Water-Cooled Nuclear Power Plants''	ML14071A275
NUREG–0133, ''Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants: A Guidance Manual for Users of Standard Technical Specifications,'' October 1978.	ML091050057
NUREG–0172, ''Age-Specific Radiation Dose Commitment Factors for a One-Year Intake,'' November 1977	ML14083A242
NUREG–0543, ''Methods for Demonstrating LWR Compliance With the EPA Uranium Fuel Cycle Standard (40 CFR Part 190),'' February 1980.	ML081360410
NUREG–0800, ''Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,'' March 2007.	ML070660036
NUREG/CR–1276, ''User's Manual for LADTAP II—A Computer Program for Calculating Radiation Exposure to Man from Routine Releases of Nuclear Reactor Liquid Effluents,'' May 1980.	Not In ADAMS [17]
NUREG–1301, ''Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors,'' April 1991.	ML091050061

Cited documents	ADAMS Accession No.
NUREG–1302, ''Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors,'' April 1991.	ML091050059
NUREG–1555, ''Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan (with Supplement 1 for Operating Reactor License Renewal),'' June 2013.	ML12335A667
NUREG/CR–4013, ''LADTAP II, ''Technical Reference and User Guide,'' April 1986	Not In ADAMS [18]
NUREG/CR–4653, ''GASPAR II—Technical Reference and User Guide,'' March 1987	Not In ADAMS [19]

The NRC may post additional materials to the Federal rulemaking Web site at *www.regulations.gov,* under Docket ID NRC–2014–0044. The Federal rulemaking Web site allows you to receive alerts when changes or additions occur in a docket folder. To subscribe: (1) Navigate to the docket folder (NRC–2014–0044), (2) click the ''Email Alert'' link; and (3) enter your email address and select how frequently you would like to receive emails (daily, weekly, or monthly).

IX. Rulemaking Process

The NRC will consider comments received or other information submitted in response to this ANPR in the development of the proposed draft regulatory basis or any other documents developed as a part of any potential revisions to the 10 CFR part 50, appendix I, regulations. The NRC, however, does not intend to provide responses to comments or other information submitted in response to this ANPR. If the NRC develops a regulatory basis sufficient to support a proposed rule, then there will be an opportunity for public comment when the proposed rule is published and the NRC will respond to such comments if and when it publishes a final rule. If the NRC develops draft supporting guidance or proposes revisions to existing guidance documents associated with the 10 CFR part 50, appendix I regulations, then the public, the regulated community, and other stakeholders will have an opportunity to provide comment on the draft guidance. If NRC decides not to pursue a 10 CFR part 50, appendix I rulemaking, as described in this ANPR, the NRC will publish a document in the **Federal Register** that will generally address public comments and withdraw this ANPR.

Dated at Rockville, Maryland, this 17th day of April, 2015.

For the Nuclear Regulatory Commission.

Mark A. Satorius,

Executive Director for Operations.

[FR Doc. 2015–10408 Filed 5–1–15; 8:45 am]

BILLING CODE 7590–01–P

[17] NUREG/CR–1276, NUREG/CR–4013, and NUREG/CR–4653 are available through the Radiation Safety Information Computational Center at *https://rsicc.ornl.gov/Default.aspx.*

[18] See footnote 17.

[19] See footnote 17.

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA–2015–0933; Directorate Identifier 2014–NM–098–AD]

RIN 2120–AA64

Airworthiness Directives; Fokker Services B.V. Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: We propose to adopt a new airworthiness directive (AD) for all Fokker Services B.V. Model F.27 Mark 200, 300, 400, 500, 600, and 700 airplanes. This proposed AD was prompted by a design review, which revealed that no controlled bonding provisions are present on a number of critical locations inside the fuel tank or connected to the fuel tank wall; and no anti-spray cover is installed on the fuel shut-off valve (FSOV) in both wings. This proposed AD would require installing additional bonding provisions in the fuel tank, installing an anti-spray cover on the FSOV, and revising the airplane maintenance program by incorporating fuel airworthiness limitation items and critical design configuration control limitations. We are proposing this AD to prevent an ignition source in the fuel tank vapor space, which could result in a fuel tank explosion and consequent loss of the airplane.

DATES: We must receive comments on this proposed AD by June 18, 2015.

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov*. Follow the instructions for submitting comments.
- *Fax:* 202–493–2251.
- *Mail:* U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- *Hand Delivery:* U.S. Department of Transportation, Docket Operations, M–30, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Examining the AD Docket

You may examine the AD docket on the Internet at *http://www.regulations.gov* by searching for and locating Docket No. FAA–2015–0933; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the regulatory evaluation, any comments received and other information. The street address for the Docket Operations office (telephone 800–647–5527) is in the **ADDRESSES** section. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Tom Rodriguez, Aerospace Engineer, International Branch, ANM–116, Transport Airplane Directorate, FAA, 1601 Lind Avenue SW., Renton, WA 98057–3356; telephone 425–227–1137; fax 425–227–1149.

SUPPLEMENTARY INFORMATION:

Comments Invited

We invite you to send any written relevant data, views, or arguments about this proposed AD. Send your comments to an address listed under the **ADDRESSES** section. Include ''Docket No. FAA–2015–0933; Directorate Identifier 2014–NM–098–AD'' at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the