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Office of Nuclear Reactor Regulation
Office of New Reactors

Possible Revision of 10 CFR Part 50, Appendix I Regulations and Guidance

10 CFR Part 50, Appendix I Background

- Outdated Appendix I numerical guides for design objectives
  - dose criteria based on ICRP 2 dosimetry concepts
  - criteria inconsistent with current Part 20 (ICRP 26/30)
  - criteria inconsistent with ICRP 60 and current 103 recommendations
- Inefficient for licensees and NRC (two different methods applied in assessing doses to the public)
- Inconsistent with global approach in licensing new plants and operating existing plants
- Potential challenges in design certifications & new plant licensing

10 CFR Part 50, Appendix I Background Cont.

- **Commission believes that the current NRC regulatory framework of 10 CFR Part 50, Appendix I, and reactor oversight program is working properly.**

- **The alignment of 10 CFR Part 50, Appendix I regulations and design objectives with ICRP Publication 103 recommendations would not change the design objective criteria and core of regulatory guidance used by the nuclear power industry in demonstrating compliance with these requirements.**

Basis of 10 CFR Part 50, Appendix I Design Objectives Options

Options:

1.a: No change to the basis of 10 CFR Part 50, Appendix I design objectives and continue to apply the requirement under existing NRC guidance and industry practices.

1.b: Align dose definitions and quantities of 10 CFR Part 50, Appendix I criteria with the ICPR 103 recommendations, given a revision of 10 CFR Part 20.

1.c: Align dose definitions and quantities of 10 CFR Part 50, Appendix I design objectives with the current framework of 10 CFR Part 20 based on ICRP Publication 26, if 10 CFR Part 20 were not revised.

Basis of 10 CFR Part 50, Appendix I Design Objectives

Q1-1: What are the benefits and impacts of each option identified above?

- **Is there a single prime option?**
- **Is there a preferred ranking of the options?**

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Basis of 10 CFR Part 50, Appendix I Design Objectives

Q1-2: What is the scope of operational impacts and costs in updating programs and procedures given a revision of 10 CFR Part 50, Appendix I design objectives and NRC guidance?

- **Please identify specific types of impacts that the NRC should consider in implementing a revision of 10 CFR Part 50, Appendix I design objectives and NRC guidance to ICRP Publication 103 recommendations.**

Basis of 10 CFR Part 50, Appendix I Design Objectives

Q1-3: Are there estimates available for the costs to revise operational programs, implementing procedures, computer codes, and personnel training for a typical pressurized water reactor (PWR) and boiling water reactor (BWR) power plant or for a generic power plant?

- **Is there an estimate of the aggregate cost for the operating fleet of nuclear power reactors?**

Basis of 10 CFR Part 50, Appendix I Design Objective Question 4

Q1-4: Should the NRC combine both 10 CFR Part 20 and Part 50, Appendix I update into one rulemaking effort or consider two parallel rulemaking efforts, with the implementation of the revised rules synchronized to a common implementation date?

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Voluntary or Required Implementation Options

Options:

2.a: No change. Continue with current requirements and guidance for all currently licensed and operating plants under 10 CFR Parts 50 and 52.

2.b. Make the implementation of new requirements voluntary for all currently licensed and operating plants under 10 CFR Parts 50 and 52 using a separate set of revised 10 CFR Part 50, Appendix I regulations and guidance.

2.c. Require the implementation of revised 10 CFR Part 50, Appendix I regulations and guidance for all operating plants and applicants over time with a mandated common implementation date.

Voluntary or Required Implementation

Q2-1: If 10 CFR Part 50, Appendix I were revised, should the NRC make the implementation of the revised requirements voluntary or mandatory on all nuclear power plant licensees?

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Voluntary or Required Implementation

Q2-2: If 10 CFR Part 50, Appendix I were revised and became mandatory, what should be the duration of the implementation phase for power plant licensees, e.g., 2, 4, or 6 years?

Approaches and Considerations Options

Options:

3.a: Limited Scope Revision – Target only those elements of the guidance dealing with dose conversion factors and, if necessary, directly supporting radiological parameters.

3.b: Expanded Scope Revision – In addition to the above, evaluate the basis of specific parameters used in dose calculations, and assess the need to update or retain specific default assumptions and values.

Approaches and Considerations Options (Continued)

Options:

3.c: Full Scope Revision – Conduct a full review of the guidance, including a complete update of models addressing liquid and gaseous treatment options and development of radiological effluent source terms, atmospheric and aquatic dispersion, and environmental transport using the current literature and industry standards.

Approaches and Considerations

Q3-1: Which above option should the NRC apply in aligning 10 CFR Part 50, Appendix I regulations with ICRP Publication 103 if 10 CFR Part 20 were revised, or with ICRP Publications 26 and 30 if 10 CFR Part 20 were not revised?

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Approaches and Considerations

Q3-2: What are the impacts and benefits in the implementation of revised 10 CFR Part 50, Appendix I regulations that the NRC should consider?

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Approaches and Considerations

Q3-3: If significant impacts in the implementation of revised 10 CFR Part 50, Appendix I regulations are envisioned, what types of issues should the NRC evaluate and consider in revising 10 CFR Part 50, Appendix I regulations?

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Scope of Revisions

Provisions That May Need to be Reviewed and Updated:

- **4.1: Numerical design objectives**
- **4.2: Organ numerical design objectives**
- **4.3: Annual gamma and beta air dose for gaseous effluents**
- **4.4: Light-water-cooled reactor provisions of Appendix I to 10 CFR Part 50**
- **4.5: Compliance with requirements for "licensed operation" under 10 CFR Part 20**

Scope of Revisions

Q4-1: Should the NRC evaluate all above provisions, or focus instead only on those necessary to align 10 CFR Part 50, Appendix I regulations with ICRP Publication 103 if 10 CFR Part 20 were revised, or with ICRP Publication 26 and 30 if 10 CFR Part 20 were not revised?

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Scope of Revisions

Q4-2: Are there any significant impacts in the implementation of revised 10 CFR Part 50, Appendix I regulations that the NRC should consider if it were to proceed with a rulemaking?

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Scope of Revisions

Q4-3: If significant impacts in the implementation of revised 10 CFR Part 50, Appendix I regulations are envisioned, what types of issues should the NRC evaluate and consider in revising 10 CFR Part 50, Appendix I regulations?

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Questions ?

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