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Potential Changes to Radiation Protection Regulations; Solicitation of Public Comment

**Comment On:** NRC-2009-0279-0019  
Radiation Protection Regulations and Guidance; Public Meetings and Request for Comments

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## General Comment

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## Attachments

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## Comments

Federal Register, Vol. 75, No. 186, September 27, 2010

Radiation Protection Regulations and Guidance

Public Meetings and Request for Comments [NRC-2009-0279]

Comments Provided by

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(January 28, 2011)

We are providing comments toward the potential updates on the U.S. Nuclear Regulatory Commission's (NRC's) radiation protection regulations, specifically pertaining to the recommendations presented in the International Commission on Radiological Protection (ICRP) Publication 103 (2007). Two main subjects were presented in the Federal Register for review: (1) NRC staff-identified technical issues and options associated with the potential revision of NRC's radiation protection regulations and guidance, and (2) NRC staff-identified technical issues and options associated with the possible revision of 10 CFR Part 50, Appendix I regulations and guidance.

In our review of the NRC proposed options, our objective is focused on the following considerations:

1. Continue to provide assurance of public health and safety, as demonstrated by the current regulatory system,
2. Maintain consistency with international trend and standards in radiation protection (i.e., ICRP Publication 103),
3. Develop sound technical approach for implementing the guidance.

Based on these considerations we offer the following comments. For lack of specifics and technical details as available to date, we only offer our comments in a general manner on some of the issues. It is our opinion that more specifics and technical details are needed in order to comprehensively address all the NRC questions as laid out.

A. Effective dose methodology and implications (Issues related to revision to NRC's radiation protection regulations and guidance regarding 10 CFR Part 20)

We believe that current standards provide reasonable assurance of public health and safety. The change in dose calculation methodologies will likely yield different numerical results for the same exposure situation but will not affect the overall safety conclusion on operation. Thus any proposed options may not alter such a conclusion in any substantial manner.

However, dose calculation parameters, which are updated as part of a continual application of new technical and biological information, are in a constant state of flux, thus posing potential considerable interference with a rulemaking effort. We therefore suggest that the availability of the most recent dose factors as well as any other technical parameters (such as to accompany the ICRP Publication 103 methodology) should be outside of the rulemaking scope, thereby decoupling the frequent technical updates from the time-consuming rule change process (the technical approach and contents can thus be deferred to such documents as regulatory guides)..

Nevertheless, it will be necessary to understand the implications of the proposed options by a meaningful comparison. Prior to formally adopting any updated methodologies or dose parameters, there must be an understanding of the implications of the inevitable different numerical results produced by different modeling assumptions. First critical step is to observe and understand the differences in end results with the application of current and proposed new models. Specifically, evaluate conclusions determined by several different starting points such as TEDE vs. TED (i.e., ICRP 60 vs. ICRP 103), older vs. newer dose factors, older vs. updated environmental transfer factors, plus other major parameters.

Based on calculated results, the potential impacts of changing dose models can be evaluated to address a wide range of concerns. Will safety be improved measurably? If workers' livelihoods be negatively impacted? Or will there be a net worthwhile safety benefit? If public safety is protected by current standards, how much is gained by frequently updating the methodologies? What is the cost to the impacted industries to update procedures in order to accommodate new standards?

Obviously, the second objective of conforming to international standards as stated above may remain an important consideration even if there is no discerning improvement in the health and safety issues. We believe NRC should integrate ICRP Publication 103 guidance into the proposed regulation to any extent possible.

B. Use of dose assessment in Appendix I, 10 CFR Part 50 (issues related to Proposed Revision to the Basis of 10 CFR Part 50, Appendix I, Design Objectives)

Appendix I of 10 CFR Part 50 (and also Part 100, Reactor Site Criteria) use dose surrogates as part of their design acceptance criteria. In determining the acceptability of a design for a specific site, dose calculations are performed that use site-specific parameters such as wind speeds and directions. The “doses” calculated are delivered to hypothetical humans standing at an off-site location where the highest anticipated “dose” can occur. In reality, the calculation is simply used to size the final stages of effluent filtration and other radionuclide control equipment to ensure that the facility, as designed, is capable of meeting all design objectives for effluent release during normal and emergency conditions. The requirements that appear in 10 CFR Part 50 (and also Part 100) were developed to establish specific final design capabilities for controlling effluent releases by a system such as gaseous hold-up and filtration equipment. For Appendix I, 10 CFR Part 50, the derived partial doses are specifically intended to show that such a control can be achieved to meet the offsite ALARA requirement per the NRC evaluation. **Thus applying updated, more rigorous dose calculation methods to these dose surrogates do not necessarily improve in meeting the safety-related intent.** For example, removal of radioiodines from the effluent airstreams is controlled by installation of charcoal-activated filters. The required filter efficiencies for a final site-specific design can be inferred, in part, by the surrogate thyroid doses calculated at property boundaries. If the such doses are based on the entire spectrum of the anticipated radionuclides (instead of using I-131 alone), then the very purpose for determining the final design site-specific radioiodine filtration efficiency could be lost (due to the fact that I-131 would be the only major contributor to the dose; and there would be no “improvement” made by simply upgrading the dose calculation methodology). Likewise, final plant design features that are critical to respond to a major accident (i.e., 10 CFR Part 100 for site criteria) are also determined in a similar manner, namely by calculating site-specific hypothetical doses. **It is thus recommended that dose surrogates be changed to equivalent nuclide specific air ionization or other equivalent standards not directly linked to human doses.** This would effectively eliminate a need to update Appendix I, 10 CFR Part 50 (or Part 100) from any future update to the dose calculation methodology.

SUMMARY

In summary, we believe the issues presented by the NRC staff in the Federal Register are not easily if at all separable. It would be difficult to recommend adoption of certain sections of ICRP 103 and rejection of others. We therefore recommend that a comprehensive assessment of the actual implications/consequences of an adoption of

the current global standard, ICRP 103 or other proposed options be undertaken. Specifically, side-by-side comparisons of the results from current and proposed methodologies must be available. Only through such a rigorous approach can relevant and valid information and basis be developed for making critical decisions for this important rulemaking effort.

We believe it is time for NRC to incorporate ICRP 103 recommendations to the extent possible in order to keep abreast with international guidance and standards, despite the fact that current regulations may seem effective in maintaining safety and protection. There has been abundance of scientific advancements made in the past few decades since the NRC's last update of radiation protection regulation. By not upgrading the regulations accordingly will likely place NRC in an awkward position of having to face challenges in the coming decades when advanced nuclear technologies (including new applications of power reactors) are expected to be introduced to the society. In order for the United States to continue its leadership role in the world, there is simply no other choice by to keep up with the international trend.

We strongly suggest **removing specific technical provisions involved in dose calculation (such as organ weighting factors or other parameters) from the regulations and placing them in technical documents only for reference by regulations.** Such technical information can receive the benefit of frequent update without imposing undue burden on future rulemaking efforts.

Finally, the use of dose surrogates in Part 50 (and also Part100) should be **changed to an engineering-based standard** in order to correctly reflect the intent of meeting the safety design objectives for offsite releases. . Otherwise, a lingering conflict will remain between the use of updated dose methodologies and regulatory design intents.

Please address any questions related to this comment to:

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