



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 23, 2015

MEMORANDUM TO: Brian E. Thomas, Director  
Division of Engineering  
Office of Nuclear Regulatory Research

FROM: Scott C. Flanders, Director */RA/*  
Division of Site Safety and Environmental Analysis  
Office of New reactors

SUBJECT: RESULTS OF PERIODIC REVIEW OF REGULATORY GUIDE  
(RG) 1.194

This memorandum documents the US Nuclear Regulatory Commission's (NRC) periodic review of regulatory guide (RG) 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants." The RG provides guidance on determining atmospheric relative concentration values in support of design basis control room radiological habitability assessments at nuclear power plants, published in June, 2003. As discussed in Management Directive 6.6, "Regulatory Guides," the NRC staff reviews RGs approximately every 5 years to ensure that the RGs continue to provide useful guidance. Documentation of the NRC staff review is enclosed.

Based on the results of the periodic review, the staff concludes that no changes to RG 1.194 Revision 0 are warranted at this time. However, the staff identified some technical or regulatory issues in the review that could warrant addressing in a future revision

Enclosure:  
As Stated

CONTACT: Ken Erwin, NRO/DSEA  
(301)-415-7559

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OFFICE	NRO/DSEA/RMOT	RES/DE/RGGIB	SUNSI Review	NRO/DSEA/RHM2	NRO/DSEA	RES/DE/RGGIB
NAME	K. Erwin	S. Burton	S. Burton	A. Rivera-Varona	S. Flanders	T. Boyce
DATE	09/22/2015	09/28/2015	09/28/2015	09/11/15	09/23/2015	09/24/2015

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## Regulatory Guide Periodic Review

**Regulatory Guide Number:** 1.194  
**Revision number** 0  
**Title:** Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants  
**Office/Division/Branch** NRO/DSEA/RMOT  
**Technical Lead:** Kenneth Erwin  
**Staff Action Decided:** Reviewed with issues identified for future consideration

1. **What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?**
  - Section 3.2.4.8 has "horizontal" and "vertical" interposed. These terms related to is determining a  $x/O$  va Section 3.2.4.8 has "horizontal" and "vertical" interposed. These terms related to is determining a  $x/O$  value for large louvered panels or large openings on vertical walls (e.g., railway doors on BWR Mark I plants).
  - Equation 10 seemed to be in error because it did not result in the correct units for  $x/O$  (s/m<sup>3</sup> instead of s<sup>-1</sup>m<sup>-3</sup>). This issue can be resolved by replacing the integral in the denominator by the average control room intake flow rate over the period 0 to T seconds.
  - The diffusion coefficients used in Equation 10 should be representative of instantaneous releases instead of continuous releases.
  - Equation 10 should use z (receptor elevation) and h (source height) instead of h (difference between z and h). The current approach in Equation 10 essentially assumes either z or h are at ground level, which tends to be conservative and consistent with ARCON96 (but inconsistent with EXTRAN).
  - This RG and RG 1.183 should be in alignment.
  - Other minor known editorial, formatting, and content changes are known; however, these changes have not been documented for inclusion in this review.

2. **What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?**

- There is no impact of not correcting the interposed terms in Section 3.2.4.8. The item has limited application. No known license amendments or changes are pending or anticipated relative to this issue. The staff reviewing any applications or amendments that would use this section of the RG is aware of the problem and would identify any applications that could use the process incorrectly.
- There is minimal impact of not correcting Equation 10. The staff reviewing any applications or amendments that would use this section of the RG is aware of the problem and would identify any applications that could use the process incorrectly.

3. **What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?**

- It is estimated that approximately 0.25 FTE and no contractor support is needed to complete this project.

4. **Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?**

- Reviewed with issues identified for future consideration.

5. **Provide a conceptual plan and timeframe to address the issues identified during the review.**

- The staff plans to reassess the need for a revision as issues arise or during the next periodic review.

NOTE: This review was conducted in September 2015 and reflects the staff's plans as of that date. These plans are tentative and are subject to change