



UNITED STATES
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September 17, 2020

MEMORANDUM TO: Louise Lund, Director
Division of Engineering
Office of Nuclear Regulatory Research

FROM: Michael Case, Director */RA/*
Division of System Analysis
Office of Regulatory Research

SUBJECT: RESULTS OF PERIODIC REVIEW OF REGULATORY GUIDE
(RG) 1.78

This memorandum documents the US Nuclear Regulatory Commission (NRC) periodic review of Regulatory Guide (RG) 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release." RG 1.78 describes guidance and technical assumptions acceptable to the NRC staff for use in assessing the habitability of a nuclear reactor control room (CR) during and after a postulated external release of hazardous vapors and gaseous chemicals from a stationary onsite or mobile sources offsite. As discussed in Management Directive 6.6, "Regulatory Guides," the NRC staff reviews RGs approximately every 10 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 concluded that a revision to RG 1.78, Revision 1 is warranted. Dr. Casper Sun, Technical Lead, will prepare the draft regulatory guide (DG), implement Federal Register Notice input, and then complete the final draft of the RG in three processing stages. Both milestones for the draft (i.e., DG) and final (i.e., RG) versions of RG 1.78, Revision 2, will be scheduled as actions items in the Office Nuclear Regulatory Research's (RES) User Need and Operating Plan.

Enclosure: As stated

CONTACT: Casper Sun, RES/DSA/RPB
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Regulatory Guide Number: 1.78, Revision 1 (2001)

Title: Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release

Office/Division/Branch: RES/DSA/RPB

Technical Lead: Casper Sun

Staff Action Decided: Revise

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

The User Need Request (UNR) NRO-2011-0007, (ADAMS Accession No. ML111020652) included a task to provide recommendations for updating RG 1.78 Revision 1 (ADAMS Accession No. ML013100014) in addition to improving the use of NUREG/CR-6210, "Computer Codes for Evaluation of Control Room Habitability (HABIT)," (ADAMS Accession No. ML063480558) and NUREG/CR-6210, Supp.1, "Computer Codes for Evaluation of Control Room Habitability (HABIT V1.1)," (ADAMS Accession No. ML20155K501). HABIT is an integrated set of computer codes that the NRC uses to evaluate control room (CR) habitability and estimate the control room personnel's exposure to a chemical release. Based on lessons learned from UNR NRO-2011-0007, the staff found that an update to RG 1.78 Revision 1 (ADAMS Accession No. ML013100014) was needed and published a periodic review in March 2017 (ADAMS Accession No. ML17096A731). As noted in that document, during the technical reviews of several combined license (COL) applications and interactions with stakeholders, the staff found that the toxic chemical release portion of HABIT could benefit from improvements that would allow the code to become a more useful tool for the staff in performing confirmatory analyses of the toxic gas control room habitability evaluations provided by applicants. However, due to limited internal resources, the staff was not able to fully perform the evaluation of improvements and benchmarks for the HABIT v2.2 code and pursue a RG revision at that time. In addition, the HABIT v2.2 code was still under development and only recently completed earlier in 2020. The staff is now ready to move forward with a comprehensive evaluation of the HABIT v2.2 code and a revision to RG 1.78 accordingly.

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?

A revision to RG 1.78 would incorporate the staff's endorsement and evaluation of the use of HABIT v2.2 for control room chemical release habitability evaluations. If no revision is made to the RG, then internal and external stakeholders would not be able to take advantage of the latest advances that have been incorporated into the HABIT code for performing confirmatory analyses in new applications or license amendment requests. Examples include; improvements in the assessment of chemical toxicity in the CR, advancements in the graphic user interface, improved chemical release methodologies, and enhancements to allow backwards compatibility with data generated from HABIT v1.1.

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?

The project for evaluating HABIT v2.2 and updating RG 1.78 accordingly has commenced and will be completed within two fiscal years timeframe using a total of 0.30 FTE. Both technical and regulatory issues were identified for updating RG 1.78, Revision 2, through the research conducted under the UNR NRO-2011-0007. Additional internal technical resources may be required, but the staff does not anticipate the need for contractor support.

4. Based on the answers to the questions above, what is the staff action for this guide?

Revise.

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

The NRC plans to develop the draft RG by the end of September 2020 and issue the draft RG for public comment by the end of January 2021.

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(RG) 1.78 DATED SEPTEMBER 17, 2020

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