

**NUCLEAR REGULATORY COMMISSION**

**10 CFR Part 50**

**[NRC-2017-0151]**

**RIN 3150-AK07**

**Reactor Vessel Material Surveillance Program**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Regulatory basis; availability.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC) is publishing a regulatory basis to support a rulemaking that would amend the NRC's regulations for the light-water power reactor vessel material surveillance programs. The rulemaking would reduce the regulatory burden associated with the testing of specimens contained within surveillance capsules, and reporting the surveillance test results. The NRC has completed a regulatory basis that demonstrates there is sufficient justification to proceed with rulemaking. The NRC is providing the basis for rulemaking for public information, but is not seeking public comment on the regulatory basis at this time.

**DATES:** The regulatory basis is available **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

**ADDRESSES:** Please refer to Docket ID **NRC-2017-0151** 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-2015-0070**. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov). For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.

- **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 e-mail to [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov). The regulatory basis can be accessed in ADAMS at accession number ML18057A005.

- **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.

**FOR FURTHER INFORMATION CONTACT:** Stewart Schneider, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-4123, e-mail: [Stewart.Schneider@nrc.gov](mailto:Stewart.Schneider@nrc.gov).

**SUPPLEMENTARY INFORMATION:**

**I. Background**

Appendix H, “Reactor Vessel Material Surveillance Program Requirements” (Appendix H), to part 50 of title 10 of the *Code of Federal Regulations* (10 CFR), “Domestic Licensing of Production and Utilization Facilities,” requires light-water nuclear power reactor

licensees to have a reactor vessel (RV) material surveillance program to monitor changes in the fracture toughness properties of the RV materials adjacent to the reactor core. Unless it can be shown that the end of design life neutron fluence is below certain criteria, the NRC requires licensees to implement an [RV](#) materials surveillance program that tests irradiated material specimens that are located in ~~test surveillance~~ capsules in the RVs. The program evaluates changes in material fracture toughness and thereby assesses the integrity of the RV. For each capsule withdrawal, the test procedures and reporting requirements must meet the requirements of American Society for Testing and Materials (ASTM) E 185-82, "Standard Recommended Practice for Conducting Surveillance Tests for Light-Water Cooled Reactor Vessels," to the extent practicable for the configuration of the specimens in the capsule. The design of the surveillance program and the withdrawal schedule must meet the requirements of the edition of ASTM E 185 that is current on the issue date of the ASME Code to which the reactor vessel was purchased. Later editions of ASTM E 185, up to and including those editions through 1982, may be used. In sum, the surveillance program must comply with ASTM E 185, as modified by appendix H to 10 CFR part 50. The number, design, and location of these surveillance capsules within the RV are established during the design of the program, before initial plant operation.

Appendix H to 10 CFR part 50 also specifies that each capsule withdrawal and the test results must be the subject of a summary technical report to be submitted within one year of the date of capsule withdrawal, unless an extension is granted by the Director, Office of Nuclear Reactor Regulation. The NRC uses the results from the surveillance program to assess licensee submittals related to pressure-temperature limits in accordance with appendix G, ["Fracture Toughness Requirements,"](#) to 10 CFR part 50, ~~"Fracture Toughness Requirements,"~~ and to assess pressurized water reactor licensee's compliance with § 50.61, "Fracture toughness requirements for protection against pressurized thermal shock events," or § 50.61a,

“Alternate fracture toughness requirements for protection against pressurized thermal shock events.”

In 2001, the NRC began a rulemaking to revise appendix G to 10 CFR part 50 (RIN 3150-AG98; NRC-2008-0582) to eliminate the pressure-temperature limits related to the metal temperature of the RV closure head flange and vessel flange areas. The NRC expanded the rulemaking scope in 2008 to include revisions to appendix H to 10 CFR part 50, because the fracture toughness analysis required by appendix G to 10 CFR part 50 relies on data obtained from the RV material surveillance program established under appendix H to 10 CFR part 50.

In COMSECY-14-0027, “Rulemaking to Revise Title 10, *Code of Federal Regulations*, Part 50, Appendix H, ‘Reactor Vessel Material Surveillance Program Requirements,’” issued on June 25, 2014 (~~ADAMS Accession No. ML14077A472~~ (not publicly available)), the NRC staff requested Commission approval to separate the rulemaking activities to revise appendices G and H to 10 CFR part 50, and to proceed immediately with rulemaking for appendix H to 10 CFR part 50.

In staff requirements memorandum (SRM) to COMSECY-14-0027, dated August 8, 2014 (~~ADAMS Accession No. ML14220A184~~ (not publicly available)), the Commission approved the staff’s recommendation to proceed with a separate rulemaking for appendix H to 10 CFR part 50. The SRM to COMSECY-14-0027 directed the NRC staff to begin the appendix H to 10 CFR part 50 rulemaking independent of the completion date or conclusions of the appendix G to 10 CFR part 50 technical basis development activities.

## II. Discussion

The NRC has prepared a regulatory basis to support a rulemaking that would amend the NRC’s testing and reporting requirements in appendix H to 10 CFR part 50. In the regulatory

basis, the NRC concluded that it has sufficient justification to proceed with rulemaking to amend appendix H to 10 CFR part 50.

*Testing Requirements.* Appendix H to 10 CFR part 50 requires RV surveillance programs to include Charpy impact specimens from welds, base metal, and the weld heat-affected zone materials and tensile specimens from welds and base metal materials. The NRC is proposing to conduct a rulemaking to reduce the testing of some specimens and eliminate the testing of other specimens that do not provide meaningful information to assess RV integrity. This decision is based on substantial material data, knowledge, and experience attained through the many years of RV surveillance program implementation. Specifically, the requirements to test weld heat-affected zone specimens and examine thermal monitors would be eliminated. Also, the NRC is proposing to reduce the number of tensile specimens that require testing and specify that testing correlation monitor material is optional. The proposed changes would reduce the burden to licensees for specimen testing, without having an adverse effect on public health and safety and the environment.

*Reporting Requirements.* Appendix H to 10 CFR part 50 requires licensees to submit test results to the NRC no later than one year after capsule withdrawal. As stated in the 1983 rulemaking (48 FR 24008; May 27, 1983), the primary purposes of the requirement are timely reporting of test results and notification of any problems. At the time of the 1983 rulemaking, there was a limited amount of data from irradiated materials from which to estimate embrittlement trends of RVs at nuclear power plants; thus, making it crucial for the timely reporting of test results. An extensive amount of embrittlement data now exists, and embrittlement mechanisms are well-understood. The one-year reporting requirement has become a hardship for some licensees because of the implementation of integrated surveillance programs (which require significant coordination among multiple licensees and hot-cell laboratories) and because capsules with higher neutron fluence levels may need longer periods

of radioactive decay before capsule shipping and testing can be performed. As a result, licensees have been requesting an additional 6 months to submit reports. To reduce the burden on licensees to prepare these extension requests and for the NRC to review and approve these requests, the NRC is proposing rulemaking to increase the reporting period from one year to 18 months. This change would not have an adverse effect on public health and safety and the environment.

*Rulemaking Process.* The NRC has evaluated the planned amendments to appendix H to 10 CFR part 50 and has determined that, if implemented, there would not be an adverse effect on public health and safety and the environment. In addition, the NRC has analyzed the costs to conduct this rulemaking and has determined that the most efficient approach is to use the direct final rule process. This abbreviated process would minimize the use of agency resources and potentially allow the revised requirements to become effective sooner, thus providing licensees the benefits of the rule change sooner. Although the NRC does not anticipate receiving public comments that are significant and adverse, the NRC's rulemaking process for this action will provide the public an opportunity to comment on the direct final rule. Read more about the direct final rule process on the NRC's public Web site, at <https://www.nrc.gov/about-nrc/regulatory/rulemaking/rulemaking-process/direct-final-rule.html>.

### **III. Publically-Available Documents**

As the NRC continues its ongoing rulemaking effort to revise the requirements for a reactor vessel materials surveillance program, the NRC is making documents publicly available on the Federal rulemaking Web site, *www.regulations.gov*, under Docket ID NRC-2017-0151. The current status of this rulemaking effort, as well as other NRC planned rulemaking activities, can be found on the NRC public Web site at <https://www.nrc.gov/reading-rm/doc-collections/rulemaking-ruleforum/active/RuleIndex.html>.

The NRC may post additional materials relevant to this rulemaking at *www.regulations.gov*, under Docket ID NRC-2017-0151. Please take the following actions if you wish to receive alerts when changes or additions occur in a docket folder: (1) navigate to the docket folder (NRC-2017-0151); (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).

Dated at Rockville, Maryland, this      day of      , 201~~8~~9.

For the Nuclear Regulatory Commission.

Annette Vietti-Cook  
Secretary for the Commission.