

Regulatory Guide Periodic Review

Regulatory Guide Number: 1.190, Revision 0

Title: Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence

Office/division/branch: NRR/DSS/SFNB
Technical Lead: Benjamin Parks

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)?

Known issues include:

1. Lack of guidance, Regulatory Position 1.4, for appropriate qualification of a synthetic method whereby fluence from two or more calculational methods is added together.
 - a. Could be resolved by clarifying that RG does not address such an approach, and that such an approach would need to be justified on an application-specific basis.
2. Lack of guidance clarifying what is an “approved” fluence method, and what elements comprise an acceptable reactor vessel neutron fluence calculational framework.
 - a. Could be clarified by adding a statement in the introduction to Regulatory Position 1 clarifying that all items addressed in Reg. Position 1 comprise required elements of the calculational framework, and additional language limiting “approved” finding to generically approved or approved on a calculation-specific basis.
3. Lack of reflection that most recent nuclear data set no longer includes ENDF/B-VI and BUGLE-96, as asserted by RG 1.190.
 - a. Could be addressed by adding reference to ENDF/B-VII and BUGLE-B7 (or more recent releases of the Evaluated Nuclear Data File – Brookhaven) and stating that prior nuclear data sets may still be considered acceptable, provided they are adequately justified.
4. Lack of guidance for methods and qualification approaches for extended beltline (i.e., areas of the reactor vessel above or below the active core whose predicted exposure exceeds 10^{17} neutrons per square centimeter) or reactor vessel internals.
 - a. Could be addressed by referencing American National Standards Institute (ANSI)/American Nuclear Society (ANS) Standard 19.10, “Methods for

Determining Fluence in BWR and PWR Pressure Vessel and Reactor Internals,” which is under development and expected to be released in the next 1-5 years.

- 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?**

Internal stakeholder impacts include more staff effort to review newer methods and applications that address the issues identified above, for which RG 1.190 does not provide guidance. External stakeholder impacts include licensee adoption of methods that a licensee may believe is adherent to RG 1.190, but actually is not. Staff and stakeholders alike are continuing to build experience in these areas, particularly in review activities associated with subsequent license renewal safety review. Based on this experience, the staff has observed a high degree of consistency in applications submitted to the NRC and believes therefore that the overall impact of not addressing the issues identified above is minor.

- 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?**

200 staff hours for development and obtaining stakeholder feedback on draft document. Upon final issuance of ANSI/ANS 19.10, this effort could be reduced by referencing or endorsing this standard within RG 1.190, as the standard addresses many of these issues based on NRC-sponsored research.

- 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.**

Initiate a revision once ANSI/ANS 19.10 is published in final.

NOTE: This review was conducted in June 2023 and reflects the staff's plans as of that date. These plans are tentative and subject to change.