

Regulatory Guide Periodic Review

Regulatory Guide Number: 1.141, Revision 1
Title: Containment Isolation Provisions for Fluid Systems
Office/Division/Branch: NRR/DSS/SCPB
Technical Lead: Brian Lee
Staff Action Decided: Revise

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

RG 1.141, Revision 1, was issued in July 2010. This RG describes methods the Nuclear Regulatory Commission (NRC) staff finds acceptable for complying with Title 10 of the *Code of Federal Regulations* Part 50, Appendix A, "General Design Criteria (GDC) for Nuclear Power Plants."

Revision 1 of this RG endorses the American Nuclear Society (ANS)/American National Standards Institute (ANSI) standard ANS 56.2/ANSI N271-1976 with certain regulatory positions and recommendations. The ANS 56.2 working group has recently developed a revision to ANS-56.2 for the purpose of incorporating RG 1.141 Revision 1 recommendations, incorporate editorial updates, and restore the standard to current status. The purpose of the ANS 56.2 revision is to specify minimum design requirements for fluid systems which penetrate the primary containment boundary of light water reactors to provide for isolation of the containment. Additionally, the ANS 56.2 revision includes provisions for the potential to use deterministic or probabilistic alternatives where the General Design Criteria is found to be insufficient, based upon the design.

As such, the current version of the RG does not consider the revised ANS 56.2 industry standard, therefore the RG should be revised to adopt the most recent revision to ANS 56.2, with associated exceptions and clarifications.

As part of the recommended revision to RG 1.141, the staff has identified these items below for consideration:

- Revised ANS 56.2 has deleted phrases that stated that definitions in it are applicable to this (ANS 56.2) guidance only. Even when some of the definitions proposed may be appropriate for ANS 56.2, they may not be appropriate for other agency-wide applications. For example, the current definition of LOCA was deleted, which is consistent with the NRC glossary, and a different definition was included that may be appropriate for this guidance document. The definition section should be dispositioned such that they are applicable to ANS 56.2 only.
- While the revised ANS 56.2 guidance correctly points out that an applicant may deviate from the GDCs with an exemption, the text proposed in Section 8 is

incorrect. Section 52.7 applies to “specific exemptions” applicable to applicants who use Part 52 licensing pathway. More general language should be used that could assist both Part 50 and Part 52 (or future Part 53 or 57 applicants) applicants who may choose to adopt this guide.

- NRC staff has concerns with the changes made to Section 3.7 regarding the design criteria for piping, as it pertains to potential postulated break locations. For containment isolation designs that move the inner isolation valve out of containment, the staff is concerned that applicants will interpret that this short penetration line cannot be called a “pipe” and hence 50.46 is not applicable since it only applies to a “pipe break”. The staff is concerned that a postulated double-ended guillotine break right at the containment penetration will not isolate the break flow. The staff will clarify its position as part of the revision to RG 1.141.

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?

The staff is currently engaged in the review of several advance and small modular reactors of light-water reactor (LWR) designs and anticipate several more submittals in the near future. These licensing activities will benefit from updating RG 1.141 guidance because it will provide clarity on complying with the Commission’s requirements for isolation of fluid systems that penetrate containment and offer other alternative design guidance.

There will be no impact on the existing U.S fleet of operating LWRs because the RG provides methods for meeting GDCs 54, 55, 56, and 57, and the plants have already shown compliance with those requirements.

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?

0.15 FTE for the revision including DG and public comment resolution

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)?

Revise.

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

Revise RG 1.141 Revision 1 to address issues as identified above in the answer to Question 1. The target date for issuance of RG 1.141 Revision 2, which includes addressing the public comments, is anticipated by the end of NRC fiscal year 2027. This timeline will help to support the staff review of upcoming advanced reactor design applications.

NOTE: This review was conducted in March 2026 and reflects the staff’s plans as of that date. These plans are tentative and subject to change.