

REGULATORY ANALYSIS

DRAFT REGULATORY GUIDE DG-1299 REGULATORY GUIDANCE ON THE ALTERNATE PRESSURIZED THERMAL SHOCK RULE

1. Statement of the Problem

The U.S. Nuclear Regulatory Commission (NRC) is issuing a new regulatory guide to describe a method that the NRC staff considers acceptable to meet the alternate fracture toughness requirements for protection against pressurized thermal shock (PTS) events for pressurized water reactor (PWR) reactor pressure vessels (RPVs) in Title 10 of the *Code of Federal Regulations* (CFR), Part 50, “Domestic Licensing of Production and Utilization Facilities,” Section 50.61a, “Alternate Fracture Toughness Requirements for Protection against Pressurized Thermal Shock Events” (10 CFR 50.61a). The alternate PTS requirements are based on updated analysis methods, and are desirable because the requirements in 10 CFR 50.61, “Fracture Toughness Requirements for Protection against Pressurized Thermal Shock Events,” are based on conservative probabilistic fracture mechanics (PFM) analyses.

2. Objective

10 CFR 50.61a resulted from the completion of NRC staff research to update the PTS regulations. The results of this research program concluded that the risk of through-wall cracking due to a PTS event is much lower than previously estimated. This finding indicated that the screening criteria in 10 CFR 50.61 are overly conservative and may impose an unnecessary burden on some licensees. Therefore, the NRC issued the new alternative rule, 10 CFR 50.61a to provide alternative screening criteria and corresponding embrittlement correlations for licensees seeking regulatory relief from the overly conservative requirements of the current PTS regulation, 10 CFR 50.61.

The objective of this regulatory guide is to provide NRC implementing guidance on the new alternative PTS rule in 10 CFR 50.61a. This guidance seeks to provide applicants with a method that the NRC staff considers acceptable to permit use of the alternate fracture toughness requirements for protection against PTS events for PWR RPVs in 10 CFR 50.61a.

3. Alternative Approaches

The NRC staff considered the following alternative approaches:

1. Do not issue draft Regulatory Guide DG-1299.
2. Issue draft Regulatory Guide DG-1299 to address the current methods and procedures.

Alternative 1: Do Not Issue Draft Regulatory Guide DG-1299

Under this alternative, the NRC would not issue guidance for the use of 10 CFR 50.61a. If NRC does not take action, there would not be any changes in costs or benefit to the public, licensees or NRC. However, the “no-action” alternative would not address identified concerns with the absence of NRC guidance, which may lead to inconsistent and less unified applications of the alternate PTS rule, thereby promoting less regulatory efficiency during reviews of those applications. The NRC would continue to

review each application on a case-by-case basis. This alternative is considered the “no-action” alternative and provides a baseline condition from which the other alternative was assessed.

Alternative 2: Issue Draft Regulatory Guide DG-1299

Under this alternative, the NRC would issue draft Regulatory Guide DG-1299. This revision would incorporate the information in NUREG-2163, “Technical Basis for Regulatory Guidance on the Alternative PTS Rule, 10 CFR 50.61a” (available in the Agencywide Documents Access and Management System (ADAMS) at Accession No. ML15058A677), supporting guidance, and review practices. By doing so, the NRC would ensure that the RG guidance available in this area is current, and accurately reflects the staff’s position.

The impact to the NRC of issuing this Regulatory Guide would be the costs associated with preparing and issuing the regulatory guide. The costs associated with NRC review of the analysis required by 10 CFR 50.61a were evaluated in the regulatory analysis for the alternate PTS rule (available in ADAMS at Accession No. ML081440673).

Licensees may select the option that is most suitable for their situation without affecting public health and safety or common defense and security. The guidance allows for more consistent and unified applications of the alternate PTS rule, thereby promoting further regulatory efficiency during reviews of license applications.

Issuance of this guidance could lead to cost savings for the industry, especially with regard to the compensatory actions in 10 CFR 50.61, including performing flux reduction, vessel annealing, and other analyses. Further, the cost of ceasing operation and purchasing replacement power would exceed the cost of implementing the alternate PTS rule, because the replacement energy cost is estimated at \$1 million per day. Therefore, implementing 10 CFR 50.61a would provide savings to licensees projected to exceed the 10 CFR 50.61 PTS screening criteria during their plant lifetimes. For licensees not projected to exceed the 10 CFR 50.61 PTS screening criteria within their plant lifetime, the NRC staff does not expect that any licensees would benefit from implementing 10 CFR 50.61a, due to the additional costs associated with the required implementation analyses.

The impact to the public of issuing this Regulatory Guide would be the voluntary costs associated with reviewing and providing comments to NRC during the public comment period. The value to NRC staff and its applicants would be the benefits associated with enhanced efficiency and effectiveness in using a common guidance document as the technical basis for license applications and other interactions between the NRC and its regulated entities.

Conclusion

Based on this regulatory analysis, the NRC staff concludes that issuance of a new regulatory guide is warranted. The action will enhance some licensees’ ability to meet PTS requirements and would result in a burden reduction for those licensees with no increase in risk to the public’s health and safety.