

Basis for Withdrawal of a Regulatory Guide

Regulatory Guide Number: 1.77, Revision 0

Title: Assumptions Used for Evaluating a Control Rod Ejection Accident for Pressurized Water Reactors

Office/Division/Branch: NRR/DSS

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SUBJECT: Basis for Withdrawal

(1) What regulation(s) did the Regulatory Guide support?

Regulatory Guide 1.77 was published in 1974 to provide guidance on meeting requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 28, "Reactivity Limits." GDC-28 requires that the reactivity control systems be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures, or other reactor pressure vessel internals to impair significantly the capability to cool the core. GDC 28 also requires that these postulated reactivity accidents consider rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold-water addition. Plants whose construction permits were issued before the GDC in 10 CFR Part 50, Appendix A, were promulgated in February 1971 have similar design criteria associated with reactivity limits.

(2) What was the purpose of the Regulatory Guide?

Regulatory Guide 1.77 provided regulatory acceptance criteria and acceptable assumptions and evaluation models for analyzing a rod ejection accident in PWRs.

(3) How was the Regulatory Guide used in regulatory activities, particularly licensing reviews and inspections?

Fuel vendors followed the guidance to develop analytical models and methods for evaluating the control rod ejection. Licensees followed the guidance to demonstrate compliance with applicable regulations.

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- (4) **Is the Regulatory Guide referenced in other documents? What are the “ripple effects” on these documents if it is withdrawn?**

Regulatory Guide 1.77 is referred to in NUREG-0800, *Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition*, Chapter 4.2, *Fuel System Design*, Chapter 4.3, *Nuclear Design*, and Chapter 15.4.8, *Spectrum of Rod Ejection Accidents (PWR)*. No ripple effects are anticipated by withdrawal of Regulatory Guide 1.77 because these SRP chapters will be updated to reflect the new guidance in Regulatory Guide 1.236, *Pressurized Water Reactor Control Rod Ejection and Boiling Water Reactor Control Rod Drop Accidents*.

- (5) **Why is the Regulatory Guide no longer needed? What is the rationale for withdrawing this Regulatory Guide instead of revising it? What is the basis for believing that no guidance similar to that in the Regulatory Guide will be needed in the future?**

As a result of the operating experience and controlled experiments conducted since the issuance of RG 1.77 in the 1970s, the NRC staff concluded that RG 1.77 was no longer applicable or acceptable for contemporary analytical methods and fuel designs. Accordingly, the NRC staff decided to update and consolidate its guidance into a new guide, namely RG 1.236. This guide contains state-of-the-art guidance which replaces the legacy guidance from 1974 found in RG 1.77. In addition, RG 1.236 was expanded to include BWRs as well as PWRs whereas RG 1.77 was only applicable to PWRs. For those reasons, RG 1.77 was withdrawn concurrently with issuance of RG 1.236. Although withdrawn, current licensees with RG 1.77 in their licensing basis may continue to use it, and withdrawal does not affect any existing licenses or agreements.

- (6) **What guidance is available once the Regulatory Guide is withdrawn?**

Regulatory Guide 1.236 contains the guidance acceptable to NRC staff for performing PWR control rod ejection and BWR control rod drop accident analyses.

- (7) **Do other agencies rely upon the Regulatory Guide, e.g., the Agreement States, National Aeronautical and Space Administration, Department of Energy?**

The staff is unaware of any other agency that uses or relies on the guidance included in Regulatory Guide 1.77.