



U.S. NUCLEAR REGULATORY COMMISSION
STANDARD REVIEW PLAN

BRANCH TECHNICAL POSITION 7-5**GUIDANCE ON SPURIOUS WITHDRAWALS OF SINGLE CONTROL RODS IN PRESSURIZED WATER REACTORS****REVIEW RESPONSIBILITIES**

Primary - Organization responsible for the review of instrumentation and controls

Secondary - None

A. BACKGROUND

The operating experience with pressurized water reactors (PWRs) and subsequent reviews of PWR designs with regard to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criteria 20, "Protection System Functions," and 25, "Protection System Requirements for Reactivity Control Malfunctions," have shown that single failures can cause inadvertent single-rod withdrawals. The intent of this branch technical position is to provide specific guidance toward an acceptable interpretation and application of General Design Criteria 20 and 25.

Revision 6 - August 2016

USNRC STANDARD REVIEW PLAN

This Standard Review Plan (SRP), NUREG-0800, has been prepared to establish criteria that the U.S. Nuclear Regulatory Commission (NRC) staff responsible for the review of applications to construct and operate nuclear power plants intends to use in evaluating whether an applicant/licensee meets the NRC's regulations. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide an acceptable method of complying with the NRC regulations.

The standard review plan sections are numbered in accordance with corresponding sections in Regulatory Guide (RG) 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)." Not all sections of RG 1.70 have a corresponding review plan section. The SRP sections applicable to a combined license application for a new light-water reactor (LWR) are based on RG 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."

These documents are made available to the public as part of the NRC's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Individual sections of NUREG-0800 will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience. Comments may be submitted electronically by email to NRO_SRP@nrc.gov.

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B. BRANCH TECHNICAL POSITION

General Design Criterion (GDC) 20 requires that the protection system shall be designed to initiate automatically the operation of appropriate systems, including the reactivity control systems, to ensure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences. GDC 25 requires that these limits shall not be exceeded for any single malfunction of the reactivity control systems, such as accidental withdrawal (not ejection) of control rods. Within the context of GDC 20 the staff considers operator error to be an anticipated operational occurrence, in addition to the consideration of single malfunction requirements of GDC 25, for which conformance to these requirements is to be evaluated. The applicant should perform analyses of the reactivity control systems¹ and analyze the consequences of operator error to assess the impact of these events on fuel design limits. If the results of these analyses show that specified acceptable fuel design limits may be exceeded for these events, the protection system must be designed to detect and terminate these events prior to exceeding these limits. With regard to the evaluation of malfunctions within the reactivity control systems, consideration should be given to failures that cause actions as well as prevent actions, such that all possible effects are examined. Further, failures that could lead to single or multiple rod position changes or out-of-sequence rod patterns should be analyzed, as well as failures that could lead to reactivity changes by boron control systems.

¹Reactivity control systems include interlocks within the system that limit the consequences of control system failures.

PAPERWORK REDUCTION ACT STATEMENT

The information collections contained in the Standard Review Plan are covered by the requirements of 10 CFR Part 50, and were approved by the Office of Management and Budget, approval number 3150-0011.

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

**BTP Section 7-5
Description of Changes**

**BTP 7-5, “Guidance on Spurious Withdrawals of Single Control
Rods in Pressurized Water Reactors”**

This BTP Section affirms the technical accuracy and adequacy of the guidance previously provided in BTP 7-5, Revision 5, dated March 2007. See ADAMS Accession No. ML070550094.

All changes to this BTP section in this revision were editorial.