



U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

BRANCH TECHNICAL POSITION (BTP) 8-7

CRITERIA FOR ALARMS AND INDICATIONS ASSOCIATED WITH DIESEL-GENERATOR UNIT BYPASSED AND INOPERABLE STATUS

REVIEW RESPONSIBILITIES

Primary - Organization responsible for electrical engineering

Secondary - None

A. BACKGROUND

RG 1.47 and IEEE Std. 603, as endorsed by RG 1.153, describe acceptable methods for complying with the requirements of IEEE Std. 279 with respect to indicating the bypass or inoperable status of portions of the protection system, systems actuated or controlled by the protection system, and auxiliary or supporting systems that must be operable for the protection system and the system it actuates to perform their safety-related functions. BTP 8-5 describes supplemental guidance for ESF system bypass or inoperable status indication. This BTP 8-7 provides more specific guidance on meeting the provisions of RG 1.47 as they pertain to diesel-generator units. Diesel-generator units, as reflected in RG 1.9, consist of the engine, governor, exhaust system, generator, associated excitation and voltage regulation system, combustion air system, cooling water system up to the supply, fuel supply system, lubricating oil system, starting energy sources, starting system and autostart/load features, automatic and manual controls, test features, protective trip and lockout features, local/remote control transfer features, and the diesel-generator breaker.

Revision 3 - March 2007

USNRC STANDARD REVIEW PLAN

This Standard Review Plan, NUREG-0800, has been prepared to establish criteria that the U.S. Nuclear Regulatory Commission 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 Standard Review Plan 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 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)." Not all sections of Regulatory Guide 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 Regulatory Guide 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 NRR_SRP@nrc.gov.

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Operating experience (see Ref. 5) has shown that there have been incidents in which diesel-generator units failed to respond to an automatic start signal because control switches or lockout and shutdown relays (which require manual reset) were left in the shutdown condition without control room operators being aware of their status. The principal reasons for this lack of awareness were (1) sharing of annunciator stations for both disabling and nondisabling alarm conditions, (2) wording on annunciator windows for disabling conditions that did not specifically say a diesel-generator unit was unavailable for an emergency demand, and (3) disabling conditions that were not annunciated in the control room.

Examples of bypass or deliberately induced inoperable conditions that can render diesel-generator units incapable of adequately responding to an emergency demand include nonreset of trips/lockouts, improper mode or control switch positioning, loss of control voltage, and low starting air pressure.

For the operator to act appropriately to supply emergency power when required in the operation of diesel-generator units, it is essential that accurate and sufficient information about the status of the units (e.g., a unit is under test, a unit is locked out for repair, maintenance, or otherwise unavailable) be available upon which to base decisions.

B. BRANCH TECHNICAL POSITION

1. Diesel-generator unit bypass or deliberately induced inoperability status should be automatically indicated in the control room when the bypass or deliberately induced inoperable condition can be expected to occur more frequently than once per year and can render the unit unavailable to adequately respond to an automatic or operator-initiated emergency demand. Manually induced indication may be desirable and is permitted for diesel-generator unit bypass or deliberately induced inoperability status for those conditions expected to occur less frequently than once per year.
2. All status indication should be sufficiently precise to prevent misinterpretation. Furthermore, disabling or bypass indicators should be separate from nondisabling indicators and should be physically arranged to enable the operator to clearly determine the status of each diesel-generator unit. An acceptable design includes a separate alarm for each disabling condition or a single shared alarm with reflash capability. The alarms should be displayed in the control room and at the diesel-generator unit for all disabling conditions, with wording that indicates that the diesel-generator unit is incapable of adequately responding to an emergency demand.
3. When a shared diesel-generator unit can be bypassed, indication of that bypass condition should be provided in the control room of each affected unit.
4. The indication system should be designed and installed to preclude the possibility of adverse effects on the diesel-generator units. Failures in the indication equipment should not result in diesel-generator unit failure or bypass of the diesel-generator unit, and the bypass indication should not reduce the required independence between redundant diesel-generator units.
5. The indication system should be capable of ensuring its operable status during normal plant operation to the extent that the indicating and annunciating function can be verified.
6. RG 1.9, positions C.1.6 through C.1.8, contains further guidance to be addressed regarding status and anomalous conditions indication and alarms for diesel-generators.

C. REFERENCES

1. Regulatory Guide 1.9, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used As Class 1E Onsite Electric Power Systems at Nuclear Power Plants."
2. Regulatory Guide 1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems."
3. Regulatory Guide 1.153, "Criteria for Power, Instrumentation, and Control Portions of Safety Systems."
4. Branch Technical Position 8-5, "Supplemental Guidance for Bypass and Inoperable Status Indication for Engineered Safety Features Systems," Appendix 8-A to Standard Review Plan Chapter 8 and Appendix 7-A to Standard Review Plan Chapter 7.
5. IE Circular 77-16, "Emergency Diesel Generator Electrical Trip Lock-Out Features," December 13, 1977.
6. IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Stations."
7. IEEE Std. 603-1991, "Criteria for Safety Systems for Nuclear Power Generating Stations."

PAPERWORK REDUCTION ACT STATEMENT

The information collections contained in the Standard Review Plan are covered by the requirements of 10 CFR Part 50 and 10 CFR Part 52, and were approved by the Office of Management and Budget, approval number 3150-0011 and 3150-0151.

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