

NRC INSPECTION MANUAL

OTSB

PART 9900: TECHNICAL GUIDANCE

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MAINTENANCE - VOLUNTARY ENTRY INTO LIMITING CONDITIONS FOR OPERATION ACTION STATEMENTS TO PERFORM PREVENTIVE MAINTENANCE

A. PURPOSE

To provide a set of safety principles for guiding the performance of preventive maintenance (PM) at licensed nuclear reactor facilities when the performance of the PM requires rendering the affected system or equipment inoperable (on-line PM). Although these principles apply primarily to PM during power operation, they also apply to PM on equipment that must be OPERABLE during shutdown evolutions such as fuel handling or mid-loop operation. This guidance provides qualitative criteria to assist in recognizing abuses of on-line PM. If such abuses are noted, they should be discussed with NRC management before they are discussed with the licensee. This should ensure that the guidance is applied in a reasonable and consistent manner for all licensees.

B. BACKGROUND

Performing on-line PM (e.g., emergency diesel generator overhaul at power) requires intentionally entering the technical specifications (TS) limiting conditions for operation (LCO) for the affected system. If a licensee does this, it must complete the PM and restore operability within the time specified in the appropriate action statement of the LCO (i.e., the allowed outage time (AOT)¹). Intentional entry into an action statement of an LCO is not a violation of the TS (except in certain cases, such as intentionally creating a loss of function situation or entering LCO 3.0.3 simply for operational convenience). For example, TS allow licensees to perform surveillance testing during power operation, even though such testing requires entry into LCO action statements. TS permit entry into LCO action statements to perform surveillance testing for a number of reasons. One reason is that the time needed to perform most surveillances is usually only a small fraction of the AOT associated with the action statement. Another reason is that the benefit to safety (increased level of assurance of reliability and verification of OPERABILITY) derived from

¹Section 1.3 of the Standard Technical Specifications does not define allowed outage time but describes the Completion Time as the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., inoperable equipment or variable not within limit) that requires entering an ACTIONS Condition unless otherwise specified, providing the unit is in a MODE or specified condition stated in the Applicability of the LCO. Allowed outage time is a vernacular term for completion time.

meeting surveillance requirements is considered to more than compensate for the risk to safety from operating the facility in an LCO action statement for a small fraction of the AOT.

The Maintenance Rule, 10 CFR 50.65, provides requirements for monitoring the effectiveness of maintenance at nuclear power plants. The underlying objective is to help maintain plant safety by trending the performance and condition of structures, systems, and components (SSCs) within the scope of the rule in terms of reliability and availability to predict their future performance and condition and to assess the effectiveness of maintenance. Specifically, 10 CFR 50.65(a)(3) requires that licensees ensure that the objective of preventing failures of SSCs through maintenance, i.e., reliability, is appropriately balanced against the objective of maximizing availability (or minimizing unavailability) of SSCs due to monitoring or PM. Additionally, 10 CFR 50.65(a)(4) requires that licensees perform risk assessments before maintenance activities involving SSCs covered by paragraph (a)(4) and manage the increase in risk that may result from the proposed activities.

C. DISCUSSION

A licensee may take equipment out of service to perform PM during power operation of the facility (on-line PM), but must meet the requirements of 10 CFR 50.65 in addition to (and not as a substitute for) the TS. This is true for maintenance activities under all modes of plant operation. When performing PM on equipment not in TS (i.e., equipment that has no TS AOT), licensees should be sensitive to the principles embodied by the TS definition of OPERABILITY and the effect upon the OPERABILITY of TS equipment.

If a licensee has a reasonable expectation that an on-line PM program will improve safety by making equipment more reliable, then the licensee may implement that program even though it may increase the unavailability of equipment. The periodic evaluation performed by the licensee in accordance with 10 CFR 50.65(a)(3) should adjust the objectives of availability and reliability to the extent practicable.

The risk assessment performed by the licensee per 10 CFR 50.65(a)(4) should reflect the unavailability of the affected equipment during the performance of the on-line PM. However, the subsequent performance of the equipment, as monitored under the Maintenance Rule or as tracked for the Reactor Oversight Process (ROP) Performance Indicators (if applicable) should be trended and failure probabilities in the PRA adjusted accordingly in order to justify the expectation of improved safety from the performance of on-line PM. Performing the 10 CFR 50.65(a)(4) risk assessment, however, does not relieve the licensee from compliance with its license (including TS) and other applicable regulations.

Increasingly, licensees are requesting one-time relaxations of license conditions or TS (typically AOT extensions via notice of enforcement discretion (NOED)) citing the risk assessment(s) performed pursuant to 10 CFR 50.65(a)(4) as justification. There are then three cases of interest: (1) The risk assessment may show that the risk associated with the AOT extension is negligible, thus requiring no additional risk management actions; (2) the licensee may commit (or be required to commit) to certain risk management actions similar to those prerequisites or compensatory measures that were specified in the TS or license

condition being relaxed, or (3) the risk assessment may show that the prolonged maintenance-related plant configuration that necessitated the AOT extension puts the plant into a risk category for which plant procedures require certain risk management actions (or a specific risk management plan). But in any case, (1) it must be noted that the 10 CFR 50.65(a)(4) risk assessment only covers the specific plant configuration(s) that is(are) expected to exist during the maintenance activity and (2) it is important that any prescribed (or committed to) risk management actions be effectively implemented to preserve the key safety functions. In particular, where on-line PM is involved, the safety principles discussed below should be considered.

Ideally, the licensee's general risk management practices (including maintenance planning and scheduling) or specific risk management actions prescribed by its procedures and/or in a particular risk management plan for a given maintenance-related plant configuration will reflect the following conservative safety principles:

1. The election to perform a PM action on-line rather than during shutdown should be based on the reasonable expectation of increased system and plant reliability and reduced plant equipment and system material condition deficiencies that could adversely impact plant operations.
2. The licensee should not abuse the allowance to perform a PM action on-line by repeatedly entering and exiting LCO action statements. The licensee should carefully plan the PM action to prevent such abuse.
3. While performing an on-line PM action, the licensee should be guided by risk insights in deciding whether to remove other equipment from service. Confidence in the OPERABILITY of the independent equipment that is redundant (or diverse) to the affected equipment should be high and bolstered by positive risk management actions such as administrative controls (protected equipment). If a piece of equipment is OPERABLE, but is degraded, or is trending towards a degraded condition, the licensee should, in general, avoid removing its redundant counterpart equipment from service for a routine PM action.
4. While performing an on-line PM action, the licensee should avoid performing other testing or maintenance that would increase the likelihood of a transient. The licensee should have reason to expect that the facility will continue to operate in a stable manner. (The basis of this expectation should include a consideration of degraded or out of service balance of plant equipment).

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