UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

April 2, 2001

# NRC REGULATORY ISSUE SUMMARY 2001-09
# CONTROL OF HAZARD BARRIERS

## ADDRESSEES

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

## INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to inform addressees that recent changes to the maintenance rule (Section 50.65, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.65)) have a bearing on plant hazard barriers. In addition, the recent major revision of 10 CFR 50.59, "Changes, tests, and experiments," contains a new provision, which modifies its applicability to the removal of hazard barriers. This RIS requires no action or written response on the part of an addressee.

## BACKGROUND INFORMATION

Hazard barriers are plant features or structures that are credited with protecting plant equipment from external and internal hazards such as flooding, tornado missiles, turbine missiles, and the effects of design basis events such as a loss-of-coolant accident (LOCA) or a high energy line break (HELB). Licensees and NRC inspectors have previously raised questions about how hazard barriers should be controlled during plant maintenance and modification activities. For example, may a barrier be removed for a short time to facilitate access to an area that contains safety-related equipment in order to perform corrective maintenance, or may a control room door that is credited with providing protection from a HELB be removed and repaired while the plant is operating at full power? In the second case, two units share the same control room, making it difficult to schedule maintenance on the door during a time when the hazard does not exist.

The NRC amended the maintenance rule (10 CFR 50.65) on July 19, 1999 (64 FR 38551). Paragraph (a)(4) of the amended regulation requires nuclear power plant licensees to assess and manage the increase in risk associated with the performance of maintenance activities. The guidance on assessing and managing increases in risk associated with maintenance activities is provided in NRC Regulatory Guide (RG) 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," dated May 2000, which endorses the February 22, 2000, revision of Section 11, "Assessment of Risk Resulting From Performance of

Maintenance Activities," of Nuclear Management and Resource Council (NUMARC) 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." In a June 1, 2000, *Federal Register* notice (65 FR 34913), the NRC announced the availability of RG 1.182 and that the amended maintenance rule would become effective on November 28, 2000.

New paragraph (c)(4) of 10 CFR 50.59 states that the provisions of the regulation do not apply to changes to the facility when the applicable regulations establish more specific criteria for accomplishing such changes. For the removal of hazard barriers, 10 CFR 50.65(a)(4) is the applicable regulation under certain circumstances. The industry guidance for the implementation of the revised 10 CFR 50.59 is contained in Nuclear Energy Institute (NEI) 96-07, "Guidelines for 10 CFR 50.59 Implementation," Revision 1, dated November 2000. NEI 96-07, Revision 1, has been endorsed by the NRC in RG 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes Tests and Experiments."

This RIS provides guidance on the control of hazard barriers that is consistent with the provisions of the maintenance rule, RG 1.182, Section 11 of NUMARC 93-01, 10 CFR 50.59, RG 1.187, NEI 96-07, Revision 1, Generic Letter (GL) 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability," and GL 91-18, Revision 1, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions."

SUMMARY OF ISSUE

A hazard barrier may be removed on a temporary basis to facilitate plant maintenance, the implementation of a design change, or the implementation of compensatory measures to address degraded or nonconforming conditions. The revised Section 11 of NUMARC 93-01 states that maintenance may involve temporary alterations for the duration of the maintenance activity. The examples given of such temporary alterations include barrier removal. It further provides that the risk assessment [required by 10 CFR 50.65(a)(4) for the maintenance activity] should include consideration of the impact of these alterations on plant safety functions. One of the factors that should be considered in the risk assessment is the actual duration of the maintenance activity. In addition, NUMARC 93-01 points out that *during power operations,* if temporary alterations associated with maintenance are expected to be in effect for more than 90 days, the temporary alteration should be screened and, if necessary, evaluated in accordance with 10 CFR 50.59 prior to implementation. (Section 4.1.2 of NEI 96-07, Revision 1, provides that temporary alterations in support of maintenance activities are treated as maintenance activities that are governed by 10 CFR 50.65(a)(4); therefore, consistent with paragraph (c)(4) of 10 CFR 50.59, evaluation of such maintenance-related temporary alterations under §50.59 is not required unless (1) during power operations, the temporary alteration will remain in effect for more than 90 days, or (2) the temporary alteration is not removed and the plant fully restored upon completion of the maintenance.)

Note that as long as the plant is shut down, the 90-day time limit does not apply with regard to §50.59. However, should the maintenance activity need to be prolonged beyond the time period considered in the original risk assessment performed in accordance with 10 CFR 50.65(a)(4), the risk assessment must be updated to reflect the prolonged maintenance activity and risk management actions updated accordingly. Note also that treatment of the maintenance activity and any associated temporary alterations under 10 CFR 50.65 may not require any risk assessment because it may not involve or impact plant structures, systems or components (including hazard barriers) that are within the limited risk assessment scope allowed by paragraph 10 CFR 50.65(a)(4). Therefore, it is conceivable that removal of a certain hazard barrier in support of maintenance may require neither a 10 CFR 50.59 evaluation nor a 10 CFR 50.65(a)(4) risk assessment.

With regard to removal of hazard barriers to facilitate implementation of a design change, Section 4.1.2 of NEI 96-07, Revision 1, also states that the implementation of a design change is considered to be a maintenance activity. Therefore, as part of that maintenance activity, the same rules would apply to temporary alterations (including hazard barrier removal) associated with that design change implementation.

However, Section 4.1.2 further provides that temporary alterations that are implemented as compensatory measures for degraded or nonconforming conditions (i.e., not associated with maintenance, and regardless of duration) should be screened and, if necessary, evaluated under 10 CFR 50.59. In addition to these considerations, provisions of the operating license and other regulations may also apply.

Prior to removing a hazard barrier for maintenance purposes (either to facilitate plant maintenance or to perform maintenance on the barrier), the risk associated with the maintenance activity must be controlled and managed in accordance with paragraph 50.65(a)(4) of the maintenance rule. The resultant risk management actions may impose time limits for barrier removal. In addition, other considerations, such as the administrative provisions for controlling fire barriers and the plant technical specifications (TS), may place limitations on continued reactor operation with a hazard barrier removed. For example, an auxiliary feedwater (AFW) pump that is credited with mitigating a HELB event would be rendered inoperable if a barrier that is credited with protecting the AFW pump from the effects of the postulated HELB event is removed to allow maintenance to be performed in the AFW pump room. The AFW pump would not be able to mitigate the HELB event with the barrier removed and, consistent with the guidance provided in GL 91-18,[1] the TS limiting condition for operation for the AFW pump would apply. It may be possible to take compensatory measures to maintain pump operability and avoid entering the TS action statement for shutting down the reactor (e.g., installing a temporary barrier that provides equivalent protection[2]). Also, if the hazard does not exist at the time (e.g., if the high energy line is isolated and depressurized), the pump would remain operable.

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1 Reference is made to GL 91-18 (here and in the attachment) to demonstrate consistency of the regulatory approach; it is not meant to imply that GL 91-18 should be invoked for conditions other than degraded or non conforming conditions that have been discovered.

2 Temporary modifications that are credited with restoring or maintaining operability of TS equipment should be assessed in accordance with 10 CFR 50.59 requirements; implementation of the temporary modifications should be assessed in accordance with the requirements of the maintenance rule.

GL 91-18 provides guidance for assessing and resolving nonconforming and degraded conditions, and this guidance is applicable to hazard barriers that are discovered to be degraded. The operability guidance in GL 91-18, allows continued operation of the reactor in this situation provided the degraded barrier does not cause TS equipment to be inoperable. In addition to these considerations, the provisions of the operating license and other applicable regulations, such as the administrative requirements that have been established for controlling fire barriers may also apply and should be considered.

Attachment 1 provides several examples that illustrate the applicability of TS requirements with respect to hazard barriers. Although other requirements may also apply, the examples primarily focus on TS considerations.

BACKFIT DISCUSSION

This RIS requires no action or written response. Consequently, the staff did not perform a backfit analysis.

*FEDERAL REGISTER* NOTIFICATION

The staff did not publish a notice of opportunity for public comment in the *Federal Register* because the RIS is informational and pertains to a staff position that does not represent a departure from current regulatory requirements and practice.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not request any information collection.

If there are any questions about this matter, please contact the person listed below.

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Attachments:
1. Examples of Hazard Barrier Control
2. List of Recently Issued NRC Regulatory Issue Summaries

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**Examples of Hazard Barrier Control**

Example 1

An entry door to the control room must be removed for repair. The door forms part of the control room envelope, and for this example, is credited with protecting control room equipment and personnel from the effects of a main steam line break in the vicinity of the control room. A technical specification (TS) limiting condition for operation (LCO) specifies allowed outage times (AOTs) and action requirements for the control room emergency ventilation system, which maintains the control room at a positive pressure of greater than or equal to 1/4-inch water gauge relative to atmospheric pressure.

In this situation, not only is it necessary to assess the increase in risk associated with doing maintenance on the control room door and implement appropriate compensatory measures to manage this risk in accordance with paragraph 50.65(a)(4) of the maintenance rule, but also to adhere to TS requirements for the control room emergency ventilation system. With the control room door removed, both trains of the control room emergency ventilation system are inoperable because the system can not maintain the required positive pressure in the control room. Consequently, the corresponding ACTION statement would apply and, if the maintenance could not be performed within the COMPLETION TIME, the maintenance activity should be deferred to a more appropriate time.

An alternative approach would be to install a temporary barrier to preserve the control room envelope and allow the required pressurization of the control room. If the temporary barrier provides equivalent protection (i.e., ensures control room integrity for postulated design basis accidents, including the main steam line break accident), the control room emergency ventilation system remains operable.

While it is obvious the control room emergency ventilation system TS applies to this situation, it is likely that other TS requirements would need to be considered since essentially all safety-related systems interface with the control room. Consistent with the guidance of GL 91-18, the licensee should also evaluate whether control room equipment that is relied upon to mitigate a main steam line break could function in the harsh environment with the control room door removed — and whether the reactor operators could perform their duties in accordance with the facility Emergency Operating Procedures.

Example 2

An inspection port in the ventilation duct for the electrical area heating, ventilation and air conditioning (HVAC) system must be removed for about 10 hours to inspect a damper as part of the recommended preventive maintenance for the damper. The ventilation duct serves as a pressure boundary in the event of a HELB in an auxiliary steam line, but has no other safety function and has no TS operability requirements. The only piece of equipment that would be exposed to the HELB environment with the inspection port removed is the Train A safety injection (SI) pump. The licensee has determined that the auxiliary building filtered ventilation

exhaust system (which must be able to maintain a negative pressure in the emergency core cooling pump rooms) will be able to perform its function with the inspection port removed, and that the relevant TS requirements for this system will not be affected by this activity. The SI pump is not required to mitigate an auxiliary steam line break, and the auxiliary steam line break is not mentioned in the TS bases for the SI pumps.

Removing the inspection port in the ventilation duct does not render the Train A SI pump inoperable because the SI pump is not credited with mitigating a break in the auxiliary steam line. No TS requirements are affected because (1) the electrical area HVAC system has no TS operability requirements, (2) the electrical area HVAC system is not credited with cooling safety-related equipment during postulated accident conditions, and (3) the auxiliary building filtered ventilation exhaust system is able to perform its function with the inspection port removed. The only remaining applicable requirements is paragraph 50.65(a)(4) of the maintenance rule. However, if the inspection port will remain open for more than 90 days while the plant is operating at power, a 10 CFR 50.59 review should also be completed.

Example 3

To perform a required surveillance on the main steam isolation valves, it is necessary to run a temporary air line through a door into an area that is credited with protecting both motor-driven auxiliary feedwater (AFW) pumps from a HELB. From past experience, the licensee expects the door to be blocked open for less than 60 minutes. The TS provide AOTs and action requirements for the AFW system, and the TS bases state that a safety function of the AFW system is to mitigate HELB events. The licensee has concluded that the motor-driven AFW pumps will not be able to function during a HELB with the door blocked open, but that the turbine-driven AFW pump and its flow paths would be unaffected.

According to GL 91-18, both motor-driven AFW pumps are inoperable because neither pump can mitigate a HELB when the door is blocked open. In this case, with only the turbine-driven AFW pump operable, the TS require the plant to be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the next 6 hours, unless the licensee can maintain or restore operability of the AFW system by implementing compensatory measures to provide equivalent protection or by removing the hazard (i.e., isolating and depressurizing high-energy piping sections that pose the threat). Therefore, in this case, even after performing a risk assessment in accordance with paragraph 50.65(a)(4) of the maintenance rule and considering compensatory measures, TS requirements that would require an orderly plant shutdown and place specific time limitations on the maintenance activity apply.

Example 4

The licensee must remove the door to the emergency service water (ESW) pump house to facilitate the installation of a design change. The door protects the safety-related equipment in the ESW pump house from possible flooding during a hurricane. Although there are TS requirements that pertain to the ESW system, there are no TS requirements that specifically apply to the door. To eliminate the threat of flooding, the design change is being implemented during a time of year when a hurricane is not likely to occur.

Consistent with the guidance of GL 91-18, the licensee should use judgment in deciding whether the removal of a barrier is limited by a TS requirement. In this case, since the door will be removed when a hurricane is not a valid threat, the operability of the ESW system will not be affected and the TS requirement for the ESW system do not apply. Therefore, the remaining applicable requirement is paragraph 50.65(a)(4) of the maintenance rule. However, if the door will be removed for more than 90 days while the reactor is operating at power, a 10 CFR 50.59 review should be completed (in addition to the 10 CFR 50.59 evaluation of the design change itself).

LIST OF RECENTLY ISSUED
NRC REGULATORY ISSUE SUMMARIES

| Regulatory Issue Summary No. | Subject | Date of Issuance | Issued to |
|---|---|---|---|
| 2001-08 | Operating Reactor Licensing Action Estimates | 04/02/01 | All power reactor licensees |
| 2000-11, Supp. 1 | NRC Emergency Telecommunications System | 03/22/01 | All holders of operating licenses for nuclear power reactors |
| 2001-07 | 10 CFR 50.75(f)(1) Reports on the Status of Decommissioning Funds (Due March 31, 2001) | 02/23/01 | All holders of operating licenses for nuclear power reactors |
| 2001-06 | Criteria for Triggering a Review Under 10 CFR 50.80 for Non-Owner Operator Service Companies | 02/15/01 | All holders of operating licenses for nuclear power reactors |
| 2001-05 | Guidance on Submitting Documents to the NRC by Electronic Information Exchange or on CD-ROM | 01/25/01 | All holders of operating licenses for nuclear reactors and all vendors who are required to make submittals to the U.S. Nuclear Regulatory Commission (NRC) pursuant to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR Part 50), “Domestic Licensing of Production and Utilization Facilities.” |
| 2001-04 | Issuance of Updated Guidance on the Transfer of Ownership or Control of Licensed Activities (NUREG-1556, Volume 15) | 01/24/01 | All material and fuel cycle licensees. |
| 2001-03 | Changes, Tests, and Experiments | 01/23/01 | All U.S. NRC Part 50 and Part 72 licensees and Part 72 Certificate of Compliance holders. |

OL = Operating License
CP = Construction Permit