

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
OFFICE OF NEW REACTORS
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NRC REGULATORY ISSUE SUMMARY 2013-05
NRC POSITION ON THE RELATIONSHIP BETWEEN GENERAL
DESIGN CRITERIA AND TECHNICAL SPECIFICATION OPERABILITY

ADDRESSEES

All holders of, and applicants for, power reactor operating licenses issued under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those that 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 clarify the relationship between Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, and 10 CFR 50.36, "Technical Specifications." In addition, the RIS is clarifying the process for addressing any structure, system, or component (SSC) nonconforming condition with general design criteria (GDC) as incorporated into a plant's current licensing basis (CLB). This RIS does not transmit any new requirements and does not require any specific action or written response on the part of an addressee.

BACKGROUND INFORMATION

Recently, the NRC has received questions about the relationship between licensing basis design requirements, such as the GDC as incorporated into the plant CLB, and technical specification (TS) operability requirements. The relationship between CLB design requirements and the TS was addressed in a memorandum from Thomas E. Murley, Director, Office of Nuclear Reactor Regulation (NRR) to the NRR staff, dated January 24, 1994 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12115A279). The positions described in this memo were incorporated into Appendix C.1, Relationship between the General Design Criteria and the Technical Specifications, Inspection Manual Part 9900 Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety (Operability Determination Process)," which was issued as the attachment to RIS 2005-20, Revision 1, "Revision to NRC Inspection Manual Part 9900 Technical Guidance, 'Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety'" (ADAMS Accession No. ML073531473). The Inspection Manual Part 9900 (Part 9900) guidance is in the process of being relocated to Inspection Manual Chapter 0326, "Operability Determinations & Functionality Assessments for Conditions Adverse to Quality or Safety" (ADAMS Accession No. ML12346A480).

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SUMMARY OF THE ISSUE

The GDC, or a plant-specific equivalent¹ as incorporated into the CLB, have an important relationship to the operability requirements of the TS. Comprehending this relationship is critical to understanding how licensees should address nonconformance with CLB design requirements. This RIS discusses these relationships to promote a more comprehensive understanding of how the NRC requirements work in concert to ensure plant safety consistent with TS controlling decisions on plant operations to ensure that the most safety significant design features of a plant maintain their capability to perform their safety functions.

The GDC and the TS differ from each other in that the GDC specify NRC's requirements for the *design* of nuclear power reactors, whereas the TS are included in the license and specify requirements for the *operation* of nuclear power reactors. As such, the GDC cover a broad category of SSCs that are important to safety, including those SSCs that are covered by TS. It is the staff's position that failure to meet GDC, as described in the licensing basis (e.g., nonconformance with the CLB for protection against flooding, seismic events, tornadoes) should be treated as a nonconforming condition and is an entry point for an operability determination if the nonconforming condition calls into question the ability of SSCs to perform their specified safety function(s) or necessary and related support function(s). If the licensee determination concludes that the TS SSC is nonconforming but operable or the necessary and related support function is nonconforming but functional, it would be appropriate to address the nonconforming condition through the licensee's corrective action program. However, if the licensee's evaluation concludes that the TS SSC is inoperable, then the licensee must enter its TS and follow the applicable required actions.

Relationship of the GDC to the Technical Specifications

Design requirements, such as GDC or similar requirements, are typically included in the licensing basis for every nuclear power plant. The GDC, according to Appendix A to 10 CFR Part 50, "establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety." As such, the GDC cover a broad category of SSCs that are important to safety, including those SSCs that are covered by TS. The safety analysis report describes the design capability of the facility to meet the GDC (or a plant-specific equivalent). The staff safety evaluation report documents the acceptability of safety analysis report analyses. The analyses and evaluation included in the safety analysis serve as the basis for TS issued with the operating license. The TS limiting conditions for operation, according to 10 CFR 50.36(c)(2)(i), "are the lowest functional capability or performance levels of equipment required for safe operation of the facility." Section 182 of the Atomic Energy Act of 1954, as amended and as implemented by 10 CFR 50.36, requires that those design features of the facility that, if altered or modified, would have a significant effect on safety, be included in the TS. Thus, TS are intended to ensure that the most safety significant design features of a plant, as determined by the safety analysis, maintain their capability to perform their safety functions, i.e., that SSCs are capable of performing their specified safety functions or necessary and related support functions.

¹ For example, plants with construction permits issued prior to May 21, 1971, may have been approved for construction based on the proposed General Design Criteria published by the Atomic Energy Commission (AEC) in the Federal Register (32 FR 10213) on July 11, 1967, sometimes referred to as the AEC Draft GDC.

Technical Specification Operability Determinations and the GDC

Recently, the NRC staff learned that some licensees follow their corrective action program for an identified nonconformance with a CLB design requirement without applying the Part 9900 operability determination process for determining whether action under TS is required. To the NRC staff it appears that not every licensee understands the relationship between CLB design requirements and TS requirements or that the Part 9900 operability determination process also applies to identified nonconforming conditions with design requirements.

As noted in the January 24, 1994, memo, not all GDC that are included in the CLB are explicitly identified in TS. However, those that are not explicitly identified may still need to be considered when establishing the basis for operability of TS SSCs. It is the staff's position that any nonconformance with a GDC included in the CLB should be considered a nonconforming condition and evaluated to determine if it affects or alters the operability status of a TS SCC.

Inspection Manual Part 9900

As set forth in Part 9900, the NRC staff expectation is that the licensee would document the basis for the licensee's conclusion that an SSC required to be operable by TS remains capable of performing its TS safety function in the presence of the nonconforming condition. Part 9900 defines a nonconforming condition as "a condition of an SSC that involves a failure to meet the CLB or a situation in which quality has been reduced because of factors such as improper design, testing, construction, or modification." Examples of nonconforming conditions include: (1) an SSC that fails to conform to one or more applicable codes or standards (e.g., the CFR, operating license, TS, updated final safety analysis report, or licensee commitments), (2) an as-built or as-modified SSC that does not meet the current licensing basis, (3) operating experience or engineering reviews that identify a design inadequacy, or (4) documentation required by NRC requirements such as 10 CFR 50.54, "Conditions of licenses" is unavailable or deficient.

Section 3.8 of Part 9900 includes Operable/Operability as a defined term and discusses its meaning in the context of the CLB design by the following statement:

In order to be considered operable, an SSC must be capable of performing the safety functions *specified by its design, within the required range of design physical conditions*, initiation times, and mission times. [Emphasis added]

Section 4.0 of Part 9900 states the following:

Determinations of operability are appropriate whenever a review, TS surveillance, or other information calls into question the ability of SSCs to perform specified safety functions. The operability determination process is used to assess operability of SSCs and support functions for compliance with TS when a degraded or nonconforming condition is identified for a specific SSC described in TS, or when a degraded or nonconforming condition is identified for a necessary and related support function. [Emphasis added]

Section 3.10 of Part 9900 further defines “specified function/specified safety function” as follows:

The specified function(s) of the system, subsystem, train, component, or device (required by the definition of operability) is that specified safety function(s) in the CLB for the facility. In addition to providing the specified safety function required by the TSs definition of operability, a system is expected to perform as designed, tested and maintained. When system capability is degraded to a point where it cannot perform with reasonable expectation or reliability, the system should be judged inoperable, even if at this instantaneous point in time the system could provide the specified safety function. [Emphasis added]

Thus, an operability determination (or functionality assessment) is appropriate upon identification of a degraded or nonconforming condition that calls into question the ability of SSCs to perform their specified safety function, including any nonconforming condition with a GDC included in either the CLB for an SSC described in TS or for a necessary and related support function required by the definition of operability. If the licensee determination concludes that the TS SSC is nonconforming but operable or the necessary and related support function is nonconforming but functional, it would be appropriate to address the nonconforming condition through the licensee’s corrective action program. As stated in Section 6.3 of Part 9900:

The purpose of an operability determination is to provide a basis for making a timely decision on plant operation when a degraded or nonconforming condition is discovered. Corrective actions taken to restore full qualification should be addressed through the corrective action process. The treatment of operability as a separate issue from the restoration of full qualification emphasizes that the operability determination process is focused on safe plant operation and should not be impacted by decisions or actions necessary to plan and implement corrective action (i.e., restore full qualification).

Nonconformance with GDC 2 for Natural Phenomenon

This discussion on GDC 2 is provided because the questions mentioned in the Background Information section, above, focused on design bases for protection against natural phenomena (GDC 2) and licensee operability determinations.

As indicated in the January 24, 1994, memo, the design bases for protection against natural phenomena, when included in the CLB, are inherently considered in the operability of safety related SSCs that satisfy the criteria for inclusion in the TS. The Part 9900 operability determination process is appropriate when a licensee identifies any nonconformance with GDC 2 or its equivalent, as incorporated into a plant licensing basis (e.g., nonconformance with the CLB for protection against flooding, seismic events, tornadoes, etc.) that calls into question the ability of SSCs to perform their specified safety function(s) or necessary and related support function(s). Criterion 2 of the GDC states:

Design bases for protection against natural phenomena. Structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. The design bases for these structures, systems, and components shall reflect: (1) Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and

period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena and (3) the importance of the safety functions to be performed.

Licensees can implement GDC 2 in the design by specifying design bases for combinations of normal and accident conditions to protect SSCs from the effects of natural phenomena. Failure to meet GDC 2, as described in the licensing basis should be treated as a nonconforming condition and is an entry point for an operability determination for any impacted TS-required SSC or a necessary and related support function if the nonconforming condition calls into question the ability of SSCs to perform their specified safety function(s) or necessary and related support function(s).

Example of a Nonconformance with GDC 2 for Natural Phenomenon

The following example discusses a nonconforming condition that involves a failure to meet the current licensing basis because of improper construction:

If a licensee with GDC 2 in its CLB identified that the exhaust stacks for the emergency diesel generators (EDGs) were not protected from the impact of tornado missiles, then this condition would call into question the operability of the EDGs. The EDG operability is called into question because the exhaust stacks are an integral component of the EDGs, which, if crimped by a missile, could prevent the EDGs from performing their specified safety function. Accordingly, the licensee should then enter the operability determination process to evaluate the impact of not meeting the CLB requirement for tornado missile protection. If the licensee's evaluation concludes that the EDGs are inoperable, then the licensee must enter its TS and follow the applicable required actions. As stated in Section 7.3 of Part 9900, the licensee may implement compensatory measures to restore "inoperable SSCs to an operable but degraded or nonconforming status. In general, these measures should have minimal impact on the operators or plant operations and should be relatively simple to implement." If the licensee successfully implements compensatory measures to restore the inoperable EDGs to an operable but nonconforming status or if the licensee's operability determination evaluation concludes that the EDGs are operable and nonconforming, then the licensee should use its corrective action program to bring the EDGs back into conformance with the CLB.

BACKFITTING AND ISSUE FINALITY

This RIS provides information concerning the NRC staff position on the relationship between Appendix A to 10 CFR Part 50 and 10 CFR 50.36. The staff position in the RIS does not represent a new or changed position with respect to the relationship between Appendix A to 10 CFR Part 50 and 10 CFR 50.36, and is the same as expressed in earlier staff documents (identified in the Background section of this RIS). Therefore, this RIS does not represent backfitting as defined in 10 CFR 50.109(a)(1), or is otherwise inconsistent with any issue finality provision in 10 CFR Part 52 relevant to design approvals, design certifications, or combined licenses under that part. Therefore, the NRC did not prepare a backfit analysis for this RIS.

FEDERAL REGISTER NOTIFICATION

The NRC published a notice of opportunity for public comment on this RIS in the *Federal Register* (77 FR 45282) on July 31, 2012. The Commission received comments from the Nuclear Energy Institute and the Technical Specifications Task Force. The final RIS reflects the

staff's consideration of these comments. The staff's resolution of these comments is publicly available under ADAMS Accession No. ML13085A189.

CONGRESSIONAL REVIEW ACT

The NRC has determined that this RIS is not a rule as designated by the Congressional Review Act (5 U.S.C. §§ 801-808) and, therefore, is not subject to the Act.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain any new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing collection requirements under 10 CFR Part 50 were approved by the Office of Management and Budget, control number 3150-0011.

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/RA/

Laura A. Dudes, Director
Division of Construction Inspection
and Operational Programs
Office of New Reactors

/RA/

Lawrence E. Kokajko, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Technical Contact: Carl S. Schulten, NRR/DSS
301-415-1192
carl.schulten@nrc.gov

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