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May 16, 2003

William D. Beckner, Program Director
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Clarifications of NRC Guidance in Regulatory Issue Summary 2001-09, "Control of Hazard Barriers"

Dear Dr. Beckner,

On behalf of the Nuclear Utility Group on Equipment Qualification ("NUGEQ" or "the Group"),[1] we provide a compilation of questions and answers intended to clarify and amplify certain points in Regulatory Issue Summary 2001-09, "Control of Hazard Barriers" ("RIS 2001-09"). Control of hazard barriers is an important element of a licensee's planned and emergent maintenance, and may impact equipment operability determinations. These clarifications would be of great benefit to Group members, and other power reactor licensees, in addressing these considerations in the context of the environmental qualification of electrical equipment that may be exposed to harsh environments (*e.g.*, high energy line break environments). We request that the NRC confirm the reasonableness and acceptability of these proposed questions and answers, perhaps in a letter responding to NUGEQ that could be employed when implementing the guidance in the RIS. We provide, below, a brief background discussion and a brief description of the basis for each of the suggested clarifications included in the attachment.

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[1] The NUGEQ is comprised of member electric utilities in the United States and Canada, including NRC licensees authorized to operate over 90 nuclear power reactors in the United States. The NUGEQ was formed in 1981 to address and monitor topics and issues related to equipment qualification, particularly with respect to the environmental qualification of electrical equipment pursuant to 10 C.F.R. § 50.49.

The NRC issued RIS 2001-09 to provide guidance to licensees on the planned removal of a hazard barrier to facilitate maintenance or other planned activities. RIS 2001-09 represented the NRC's generic response to a number of licensee initiatives which sought to establish methods, criteria, and needed flexibility when performing such maintenance activities. Soon after issuance of the RIS, questions were raised by NUGEQ members regarding ambiguities and varying potential interpretations of the RIS text and examples. Although a number of questions were raised, the most significant ambiguity related to the criteria to be used when performing Technical Specification ("TS") operability determinations for protected equipment that could be exposed to a hazard if the barrier was purposefully removed or degraded in support of maintenance.

The attached document – "Suggested Interpretations and Clarifications NRC Regulatory Issue Summary 2001-09, Control of Hazard Barriers" – has been developed in a question and answer ("Q&A") format. A summary of the intent and conclusions for each of the nine questions is provided below.

- **Q&A 1** reaffirms the RIS 2001-09 guidance that the planned removal of hazard barriers is permitted for maintenance, design change implementation, or as part of compensatory measures in response to a discovered degraded or nonconforming condition. For maintenance and design change implementation, 10 C.F.R. §50.65(a)(4) is used to manage risk and generally 10 C.F.R. §50.59 need not be applied. Importantly, licensees must continue to comply with the plant technical specifications, particularly the operability provisions applicable to the protected equipment. For barrier removal as a part of compensatory measures in response to a discovered condition, 10 C.F.R. §50.59, and not 10 C.F.R. §50.65(a)(4), applies.

- **Q&A 2** is intended to make clear that the criteria used to evaluate the operability of protected equipment are the same for planned (*e.g.,* in support of maintenance) and discovered barrier degradation/removal. The NRC has provided operability guidance in Inspection Manual Part 9900 – "Operable/Operability: Ensuring the Functional Capability of a System or Component." This guidance was originally transmitted to the industry as part of Generic Letter (GL) 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability." Although other GL 91-18 guidance related to discovered degraded and nonconforming conditions should not be applied to planned actions, the operability guidance in Inspection Manual Part 9900 – Operable/Operability can be applied for both discovered barrier degradation and planned barrier removal.

- **Q&A 3** clarifies a confusing footnote 2. It reaffirms prior NEI guidance that 10 C.F.R. §50.59 applies to compensatory measures implemented in response to <u>discovered</u> degraded/nonconforming conditions and that temporary modifications (*e.g.,* barrier removal and associated compensatory actions, if any) that are performed to support <u>planned</u> maintenance are generally assessed under 10 C.F.R. §50.65(a)(4) and not 10 C.F.R. §50.59.

- **Q&A 4** clarifies the "equivalent protection" term used in RIS Example 1. Equivalent protection, as it applies to a temporary barrier, does not require "full qualification" (*i.e.*, full compliance with all aspects of the current licensing basis). Equivalent protection means that the temporary barrier must be capable of performing the specified protective function(s) under assumed conditions as described in the current licensing basis. An analogy is drawn between a temporary barrier that provides equivalent protection and a permanent barrier that is degraded, but determined to be operable. The determination of barrier capability in both cases may be based on analysis, a test or partial test, experience with operating events, engineering judgment, or a combination of these factors.

- **Q&A 5** expands on the Q&A 4 clarifications. It concludes that a temporary barrier, or other compensatory measures implemented in support of maintenance to reduce risk or maintain operability, need not provide equivalent protection to the permanent hazard barrier that is being removed in order to facilitate a maintenance activity. However, the protected equipment operability evaluations must recognize that equivalent protection is not provided for all required events and conditions.

- **Q&A 6** is provided to clarify Example 2 of the RIS and to reaffirm that TS operability is unaffected for equipment not required by the TS or the TS bases to mitigate those events producing the hostile conditions.

- **Q&A 7** clarifies Example 3 of the RIS and indicates that licensees may either assume (as an analytical convenience) that the protected equipment is inoperable, or may perform a detailed evaluation to determine if the protect equipment is operable. Importantly, this Q&A reaffirms that protected equipment TS operability conclusions can limit planned maintenance actions in certain situations even though there is an insignificant risk due to hazard barrier removal.

- **Q&A 8** using Example 3 of the RIS states that the protected equipment operability evaluations need not demonstrate full qualification to 10 C.F.R. §50.49 requirements. It also illustrates that the operability evaluations can be based on high energy line break ("HELB") conditions that reflect realistic assumptions regarding the degraded/removed barrier and compensatory actions.

- **Q&A 9** clarifies that Example 4 of the RIS was not intended to permit risk considerations as a basis to establish TS operability. It reaffirms prior guidance that licensees may use judgment when determining if a hazard requiring the barrier is a "valid threat" during the maintenance interval. If a valid threat is not present, then TS operability is not affected by barrier removal. If a valid threat is present, then TS operability must be evaluated. Risk cannot be used to make the valid threat determination or as a basis for establishing operability. The example also notes that RITSTF Initiative 7a may provide risk-informed TS operability relief for certain situations.

We would be glad to meet with you to discuss the attached Q&A and we look forward to timely consideration of our request. Please contact me (whorin@winston.com or 202-371-5737) if you have any questions regarding the information discussed herein.

Sincerely,

William A. Horin
Counsel to the Nuclear Utility Group
On Equipment Qualification

Attachment (1)

cc: (with attachment)

Biff Bradley, NEI
Frank P. Gillespie, NRC
Thomas Koshy, NRC
James E. Tatum, NRC

Suggested Interpretations and Clarifications
NRC Regulatory Issue Summary 2001-09, "Control of Hazard Barriers"

The following questions and answers have been developed to clarify the information provided in NRC Regulatory Issue Summary 2001-09, "Control of Hazard Barriers" ("RIS 2001-09" or "RIS"). These interpretations and clarifications are consistent with RIS 2001-09 and its referenced documents (i.e.,10 CFR 50.65(a)(4), 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").

Question #1: RIS 2001-09 indicates that a hazard barrier can be altered/removed, on a temporary basis, to: 1) facilitate plant maintenance, 2) facilitate the implementation of a design change, or 3) facilitate the implementation of compensatory measures to address discovered degraded or nonconforming conditions. Do the same rules/guidance associated with barrier alteration/removal apply in these three cases?

Answer: According to both RG 1.182 and RIS 2001-09, the rules/guidance and licensee actions for temporary removal of a barrier to facilitate plant maintenance or to implement a design change are the same.[1] However, they differ from the rules/actions applicable to barrier removal as part of compensatory measures to address discovered degraded or nonconforming conditions.

As stated in the RIS, the implementation of a design change is considered to be a maintenance activity. Therefore, the same rules/actions apply to hazard barrier removal associated with design change implementation as would apply to maintenance. In summary, the rules/actions that apply for barrier removal to facilitate maintenance are:

(1) Licensees must continue to comply with the plant technical specifications, particularly the operability provisions applicable to the protected equipment, and other administrative requirements which may place limitations on continued reactor operation with a hazard barrier removed.

(2) The risk associated with the maintenance activity must be controlled and managed in accordance with 10 CFR 50.65(a)(4). The risk assessment should consider the impact of the barrier removal on plant safety functions and the resultant risk management actions may impose time limits for barrier removal.

(3) Barrier removal need not be evaluated per 10 CFR 50.59 unless it is expected to be in effect for more than 90 days during power operations.

[1] As a convenience, within the context of these Q&As, barrier "removal" includes both removal and alteration.

Barrier removal implemented as part of compensatory measures for discovered degraded or nonconforming conditions must be screened and, if necessary, evaluated under 10 CFR 50.59. The screen/evaluation applies to the compensatory measures (including barrier removal) and their impact on other aspects of the facility and does not apply to the degraded condition.

The three situations above, all involve planned barrier removal. For situations were a barrier is discovered to be degraded or nonconforming, the guidance of GL 91-18 and its revisions apply.

Question #2: The Barrier RIS is unclear regarding the use of GL 91-18 and associated operability guidance. In particular, Footnote 1 indicates that GL 91-18 only applies to discovered conditions, while elsewhere the RIS discusses operability evaluations for planned barrier removal being performed consistent with the guidance in GL 91-18.

Answer: The "consistent with the guidance provided in GL 91-18" RIS language means that the operability guidance provided in NRC Inspection Manual Part 9900 – "Operable/Operability: Ensuring the Functional Capability of a System or Component" (which was originally issued as part of GL 91-18) can be used to determine if the equipment affected by planned barrier removal remains 'operable.' In other words, the same operability guidance can be used for both planned barrier removal and discovered barrier non-conformances or degradation.

RIS 2001-09 - Footnote 1 should be interpreted to mean that while GL 91-18 should not be applied to planned maintenance activities, the same operability evaluation methods (i.e., Part 9900 – Operable/Operability) can be used, in lieu of meeting full design qualification, to evaluate the operability of protected equipment when barrier removal is planned as part of maintenance.

Question #3: Please clarify the meaning of RIS 2001-09 - Footnote 2.

Answer: Footnote 2 was intended to address the two circumstances of compensatory measures discussed in NUMARC 93-01 Section 11.3.8, "Regulatory Treatment of Compensatory Measures." The first circumstance involves compensatory measures implemented in response to a discovered degraded or nonconfirming barrier (i.e., such measures are temporary modifications/procedure changes that are credited with restoring or maintaining operability of the protected equipment). The footnote was intended to reaffirm that 10 CFR 50.59 should be applied to such compensatory measures implemented in response to discovered degraded/nonconforming conditions. Per the guidance of NEI 96-07, Rev.1, such an application of 10CFR50.59 determines whether the compensatory measures themselves – not the discovered condition – affect other aspects of the facility. The second circumstance the footnote was intended to describe involves temporary modifications (e.g., barrier removal and associated compensatory actions, if any) that are performed to support planned maintenance.

These temporary modifications are assessed under 10CFR50.65(a)(4) and not 10CFR50.59. These temporary modifications may include barrier removal and any compensatory actions implemented to maintain operability of protected equipment or to reduce risk for such planned actions. As noted in RIS 2001-09 if the planned barrier removal in support of maintenance is expected to be in effect for more than 90 days during power operations, then this removal must also be evaluated per 10 CFR 50.59.

Question #4: RIS 2001-09 Example 1 discussed an alternative approach (the use of a temporary barrier) to maintain the control room envelope and operability of the control room emergency ventilation system (CREVS) Please clarify the statement that the temporary barrier must provide "equivalent protection", including MLSB accidents, in order for the CREVS to remain operable.

Answer: As a temporary alteration or compensatory measure in support of maintenance, a temporary barrier could be installed that preserves the control room envelope under all postulated conditions, including MSLB effects. Such a temporary barrier need not meet full qualification but must be capable of performing the specified protective function(s) under assumed conditions as described in the current licensing basis.[2] The determination of this capability may be based on analysis, a test or partial test, experience with operating events, engineering judgment, or a combination of these factors taking into consideration the protected equipment functional requirements. Such a temporary barrier would provide equivalent protection since the barrier capability is equivalent to the protection provided by an operable permanent barrier.[3]

Maintaining the control room envelope supports operability of the CREVS and protects control room operators and equipment from postulated external events including steam line breaks. In order to maintain operability of the CREVS, the temporary barrier must allow control room pressurization during normal operation and for those DBAs requiring CREVS operability.

Question #5: Must a temporary barrier such as the one discussed in RIS 2001-09 Example 1 provide "equivalent protection"?

Answer: As a compensatory measure implemented to maintain operability of protected equipment or to reduce risk for such planned actions, a temporary alteration in support of maintenance need not provide equivalent protection. However, providing "equivalent protection" greatly simplifies the operability determination for the protected equipment. If equivalent protection is not provided then the operability determination for the protected equipment must recognize that equivalent protection is not provided for all required events and conditions.

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[2] Here the term "full qualification" refers to the language used in NRC Inspection Manual Part 9900 – Operable/Operability which states: "Full qualification constitutes conforming to all aspects of the current licensing basis, including codes and standards, design criteria, and commitments."

[3] An operable permanent barrier need not be fully qualified (see Part 9900 – Operable/Operability).

For example, in RIS Example 1, a temporary barrier might be installed that preserves the control room envelope under all design conditions except for the MSLB event (i.e., the barrier would fail due to MSLB pressurization effects). Since the MSLB event in a PWR may not result in the uncontrolled release of radioactivity, chemicals, or toxic gas, the CREVS pressurization function may not be required for MSLB events according to the TS bases.[4] In this case the CREVS may be operable (since it is not required for a MSLB) but the MSLB would increase the temperature, pressure, and humidity inside the control room. Consequently, operability of control room equipment relied on to mitigate the MSLB must be evaluated for the MSLB conditions that would exist in the control room. Similarly, the operators must be capable of performing their duties in the control room environment caused by the MSLB event.

Question #6: RIS Example 2 states that "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." What if other TS and non-TS equipment was exposed to the HELB environment due to port removal?

Answer: This example was provided to illustrate that the operability of equipment (i.e., SI pump) is not adversely affected if the equipment is not required by TS to mitigate those events producing the hostile conditions due to barrier removal. In this example the only TS equipment exposed to the auxiliary steam line break environment due to port removed is the Train A SI pump. If other TS and non-TS equipment was exposed due to port removal and was required to mitigate an auxiliary steam line break based on the applicable TS bases, then the operability of this equipment must be evaluated. Operability need only be evaluated for affected equipment relied on to mitigate the event and exposed to certain conditions due to barrier removal.

Question #7: In RIS Example 3, clarify the meaning of – the licensee concluded that the pumps will not be able to function.

Answer: Within this context "not be able to function" means that the licensee concluded that the AFW motor-driven pumps were 'inoperable.' In support of the planned maintenance the licensee may have simply assumed the AFW pumps are inoperable if the door is blocked open. Alternatively, the licensee may have reached this conclusion after a detailed operability assessment of the AFW pumps based on estimated HELB conditions with a blocked open door.

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[4] This assumption is for illustrative purposes and does not necessarily reflect the CREVS bases in licensees' TS. According to standard TS bases, the CREVS provides a protected environment from which operators can control the unit following an uncontrolled release of radioactivity, chemicals, or toxic gas. For PWR MSLBs that do not involve uncontrolled release of radioactivity, chemicals, or toxic gas, the control room envelope, including an operable door or temporary barrier, and not the CREVS, supports operability of the control room equipment and protects the operators.

This example was intended to illustrate the concept that TS operability can be the limiting consideration when evaluating planned barrier removal. If TS operability cannot be established this can prevent the implementation of a proposed maintenance action that might otherwise be considered acceptable by the 50.65(a)(4) risk assessment. In this example there is likely little affect on CDF by blocking open the door for a 60 minute interval based on the probability of a HELB occurring during this interval.[5] However, since TS operability cannot be established, the maintenance should either be postponed or performed within the allowable repair times specified by the TS.

Alternatively, if the licensee, through the completion of an operability assessment, concluded that the AFW motor-driven pumps were operable while exposed to the HELB conditions, then the TS AOT for the AFW system would not be entered.

Question #8: In RIS Example 3, must the door be assumed to be blocked open (i.e., barrier removed) when evaluating equipment operability?

Answer: The operability evaluation should be based on a conservative assessment of the barrier's condition during the maintenance activities. If the door is blocked open or would be forced fully open by HELB pressurization, then this would be the appropriate assumption during the operability evaluation. Alternatively, the temporary air line might only open the door a few inches and the HELB pressurization tries to close the door. In this case the licensee could conservatively establish HELB temperature, pressure and humidity conditions in the motor-driven AFW pump rooms assuming the door remains cracked open by the air line. Since these conditions would be significantly less severe than the conditions with the door blocked fully open, the licensee may be able to conclude that mitigation equipment in the affected rooms would remain operable. The operability assessment need not demonstrate that the motors for the AFW pumps are fully qualified to 10 CFR 50.49. If operability was established, then the TS operability requirements would not be limiting and the licensee would control maintenance risk based on the 50.65(a)(4) risk assessment (i.e., licensee would establish the appropriate conditions, timing, and compensatory measures, if any, for the maintenance activity).

Question #9: Does RIS Example 4 by using the terms "judgment" and "not likely to occur", permit licensees to use probability of occurrence arguments when evaluating TS operability?

Answer: Example 4 should <u>not</u> be interpreted to mean that within the scope of guidance provided by RIS 2001-09 the TS operability requirements can be fulfilled using a risk analysis to demonstrate that the occurrence or consequence probabilities of a <u>valid threat</u> are acceptably low during a short time interval. However, consistent with the Commission's policy statements on technical specifications and the use of PRA, the NRC and the industry continue to develop risk-informed improvements to the current system of technical specifications. These improvements are intended to maintain or

[5] See Q&A #8 for further discussion of risk considerations and TS operability.

improve safety while reducing unnecessary burden and to bring technical specification requirements into congruence with the Commission's other risk-informed regulatory activities. Regarding hazard barriers, the NEI Risk-Informed Technical Specification Task Force (RITSTF) is developing guidance as part of Initiative 7a – "Impact of Non Technical Specification Design Features on Operability Requirements – Barriers."

This example includes a statement that "the design change is being implemented during a time of year when a hurricane is not likely to occur." It also permits the use of judgment that during this interval the hurricane "is not a valid threat" and; therefore, the door need not be considered a support system and the ESW may be assumed operable. This example and RIS 2001-09 Example #3 are consistent because in Example #3 the HELB remains a valid threat during the 60-minute interval, even though the HELB is not likely to occur during such a short interval. Since the HELB is a valid threat, it must be assumed as part of the operability evaluation.

The judgment discussion in this example is consistent with the language in Section 6.12, "Support System Operability," of NRC Inspection Manual Part 9900 – Operable/Operability.[6] That language permits licensee judgment when determining whether a support system (e.g., a hazard barrier) is or is not required based on case-by-case considerations. This example is also consistent with Section 6.9, "Use of Probabilistic Risk Assessment in Operability Decisions," of Part 9900 – Operable/Operability since judgment concludes that the event (e.g., a hurricane) is not a valid threat when the maintenance is being performed.

Both the judgment discussions in Example 4 and in Section 6.12 are related to external events and involve weather conditions (summer vs. winter, and hurricane threat). However, the concepts can be more broadly applied, particularly when plant or equipment operating conditions or configurations during a proposed maintenance interval are less restrictive than those assumed when the TS system or support system design bases were established. For example, actual plant loads and ultimate heat sink temperatures during the planned maintenance interval rather than design basis assumptions may be used when evaluating the operability of a cooling water system.

[6] See Q&A #2 on the use of Part 9900 – Operable/Operability for operability evaluations performed in support of planned barrier removal.