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Comment On: NRC-2020-0245-0001
Environmental Qualification of Certain Electrical Equipment Important to Safety for Nuclear Power Plants

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Comment (3) of William Horin on FR Doc # 2020-27717

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General Comment

NUGEQ Supplemental Information in support of extension request.

Attachments

NUGEQ Supplement to Request for Extension of Comment Period for Draft RG 1.89 R2 W Attachments

NUCLEAR UTILITY GROUP
ON EQUIPMENT QUALIFICATION

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February 2, 2021

Mr. Meraj Rahimi, Chief
Regulatory Guidance and Generic Issues Branch
Division of Engineering
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subj: Supplemental Information in Support of the ***Nuclear Utility Group on Equipment Qualification*** Request for Extension, dated January 31, 2001, of the Comment Period Regarding Draft Regulatory Guide, DG-1361, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants"

Dear Mr. Rahimi:

Further to our letter dated January 31, 2021, referenced above, we are providing an additional illustration of one of the key points made in that letter. Specifically, the NRC staff's representation, over decades, of its intent to consider issues in the context of the planned revision to Regulatory Guide 1.89. For example, in 2004, the NRC responded to many questions the Group had posed in the spirit of ongoing and developing efforts in arenas related to industry and NRC efforts to focus the application of regulations to reduce licensee regulatory burden, consider risk-informed application of requirements, eliminate inconsistent application of regulations with the ultimate goal of assuring safety while reducing costs.

In this spirit, the Group had suggested many areas of potential consideration related to Equipment Qualification in the initial phases of the reduction of unnecessary regulatory burden initiative.[1] Although the staff was interested in those topics, they took the position that many of the topics could be dealt with in other contexts, citing the future revision of Regulatory Guide 1.89 as one path.[2]

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[1] The NUGEQ had submitted two letters, in 2001 and another in 2003 in this regard. See NUGEQ Letter dated October 22, 2003, to the NRC related to the consideration of maximum post-accident operating times (Attachment 2, hereto), and NUGEQ letter dated July 2, 2001, concerning proposals in the context of the "Reducing Unnecessary Regulatory Burden While Maintaining Safety" initiative (66 Fed. Reg. 22,134) (Attachment 1, hereto).

[2] See NRC letter from Mr. J. Calvo, Branch Chief, to the NUGEQ (W.Horin, Counsel, NUGEQ), dated February 20, 2004 (Attachment 3, hereto).

We note that this is but one example of bringing forward EQ issues that have arisen over the years of implementation, only to have the staff delay their consideration until a future revision of Regulatory Guide 1.89 was developed.

As noted in our January 31, 2021, extension request letter, we believe this information cited in our request for an extension of time to be one of the many important reasons to support such an extension as well as holding a meeting with the NRC prior to the submittal of comments.

Thank you again for your consideration.

Respectfully submitted,

William A. Horin

William A, Horin, Counsel
Nuclear Utility Group on Equipment Qualification

cc: Mr. Michael Eudy, Office of Nuclear Regulatory Research
Mr. Matthew McConnell, Office of Nuclear Reactor Regulation

Attachment 1

NUGEQ Letter, dated July 2, 2001

NUCLEAR UTILITY GROUP
ON EQUIPMENT QUALIFICATION

WINSTON & STRAWN
1400 L STREET, N.W.
WASHINGTON, D.C. 20005-3502

TELEPHONE (202) 371-5737

July 2, 2001

David L. Meyer, Chief
Rules and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop T-06 D59
Washington, DC 20555-0001

Re: Comments Concerning Reducing Unnecessary Regulatory Burden While Maintaining Safety, 66 Fed. Reg. 22, 134 (2001)

Dear Mr. Meyer:

In the referenced *Federal Register* Notice of May 3, 2001, the U.S. Nuclear Regulatory Commission ("NRC") Staff (the "Staff") requested comments concerning the NRC Staff's initiatives for reduction of unnecessary regulatory burden while maintaining safety. 66 Fed. Reg. 22,134 (2001). The comments provided below are submitted on behalf of the Nuclear Utility Group on Equipment Qualification ("NUGEQ").[1] These comments, as specifically set forth in the Enclosure to this letter, reflect a number of potential regulatory improvements related to licensee 10 CFR 50.49 compliance efforts that could reduce significantly many of the unnecessary burdens imposed on licensees by the current equipment qualification regulatory scheme.

Importantly, most of these suggested improvements can be achieved without a significant dedication of NRC or industry resources. Many involve clarification of existing NRC equipment qualification guidance, or interpretations of that guidance. Many of the comments take into account risk-perspectives in the application of that guidance. We suggest that the NRC

[1] The NUGEQ is comprised of over 30 utilities, each owning and operating one or more nuclear power reactors. The NUGEQ was founded in 1981 to address legal and technical issues related to the qualification of equipment (primarily electrical). The Group regularly interacts with the NRC and industry organizations, including NEI, in addressing questions related to equipment qualification. With these comments the NUGEQ also wishes to express its support for the comments being filed by NEI.

could, with minimal effort, address many of these topics through one or more generic communications to licensees that would serve, in effect, as line item improvements related to equipment qualification guidance. It should be unnecessary to review and amend in toto the underlying guidance documents to adopt these specific recommendations.

In addition, some of the suggested improvements contained in the Enclosure reflect methods of incorporating risk-perspectives into equipment qualification requirements reflected in 10 C.F.R. §50.49. These suggestions may ultimately be appropriate for consideration in the context of Option 3, Changes to Technical Requirements, of the NRC's risk-informed regulatory initiative. However, the NUGEQ does not believe it is essential to await the final outcome of that initiative to accommodate the application of all of these specific recommendations. We respectfully suggest that the NRC consider also adopting, through appropriate exemptions by individual licensees, those particular items that ultimately would involve generic regulatory changes. In fact, these actions could serve as pilot-type efforts in this regard.

We note that for the most part, the suggestions set forth in the Enclosure were originally raised in the context of the NRC's 1993 burden reduction initiative, then-labelled the "Program for Elimination of Requirements Marginal to Safety." At a workshop conducted on April 27 and 28, 1993, the NUGEQ sponsored a panel of industry representatives and experts to address equipment qualification. The recommendations in the Enclosure are derived substantially from the recommendations made in 1993. We note that some of the other recommendations have come to pass (e.g., application of a revised source term). Nonetheless, we believe that the recommendations in the Enclosure remain valid and are perhaps even more important today as licensees must be more cost-conscious while continuing to assure plant safety.

Finally, we would welcome an opportunity to meet with interested members of the Staff to address these topics, and to focus the discussions on the best means to address each suggestion. Please feel free to contact the Group, through the undersigned counsel, at 202-371-5737 or whorin@winston.com.

Respectfully submitted,

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

Enclosure

ENCLOSURE

Comments of the Nuclear Utility Group on Equipment Qualification

Reducing Unnecessary Regulatory Burden
Associated with Equipment Qualification
July 2, 2001

1. Focus on Risk-Significant Periods for Long-Term Post Accident Operability

Discussion: The operating time provisions of 10 CFR 50.49 should be limited to the 'mitigation phase' and possibly certain risk-significant equipment operations during the 'recovery phase' of applicable accidents. Based on 10 CFR 50.49 and NRC guidance document statements regarding the need to qualify equipment for the "duration of the accident function," licensees have established operating times for equipment operating in the 'accident recovery' phase that range from 30 days to over 1 year. Numerous risk-based documents, including the NRC-sponsored NUREG/CR-5313, *EQ Risk Scoping Study*, indicate that the risk significant period is limited to the first days of an accident (i.e., accident mitigation phase) and EQ issues associated with long term post-accident equipment operability are not risk significant. Accordingly, the operating time provisions of 10 CFR 50.49 should be interpreted as being limited to the first few days or weeks post-accident. For equipment that could be used as part of long-term accident recover actions, equipment operability should be addressed under accident management or plant recovery actions. If risk based insights identify risk significant equipment operations during the recovery phase then the qualification provisions of 50.49 could be selectively applied to such equipment as appropriate.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: Licensees currently must demonstrate long-term post-accident operability for certain equipment as part of their EQ program. However, the accident simulation portion of most 10 CFR 50.49 qualification tests is typically 30 days or less but yet is more severe than the licensing basis 'required accident profile.' Accordingly, this effort generally involves an analytical evaluation of differences between these profiles as a basis to establish longer operability for the less severe 'required accident profile.' This analysis must be revised for all affected equipment anytime a revised accident analysis results in modifying the qualification profile used for establishing qualification. A new analysis must also be generated whenever a new type of equipment requires the development of an EQ file. A burden reduction would be achieved if licensees could eliminate these analytical exercises.

Currently there is no uniform guidance from either the NRC or the IEEE on the duration of LOCA accident simulation tests. Consequently, for inside containment equipment requiring long-term operability most test durations have ranged from 2 weeks to over 100 days. The U.K., French and Germany requirements specify a LOCA steam simulation duration of approximately 2 weeks. A burden reduction would be achieved if generic guidance based on risk-insights were available specifying the maximum LOCA simulation test duration (e.g., 2 weeks).

Several NUGEQ documents provided to the NRC contain additional information on the low risk significance of equipment qualification for the recovery period. These include a January 11, 1999, NUGEQ paper submitted to the NRC on the use of Arrhenius methods to analyze accident conditions and the NUGEQ comments on the Draft Regulatory Guide on the alternate source term, dated March 31, 2000.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding qualification for the accident recovery phase. The RIS could state that using risk-informed considerations 10 CFR 50.49 compliance regarding qualification for the duration of the required function is generally limited to the accident mitigation phase. For LOCA accidents, qualification tests of a 2 week duration would adequately encompass the risk significant component of the mitigation phase. In addition, were certain equipment whose actions during an extended recovery phase are considered risk significant, 10 CFR 50.49 qualification could apply. For other equipment potentially used during the recovery phase, operability should be addressed under accident management or plant recovery program actions.

2. Permit Graded Qualification Methods Based on Equipment Risk Significance

Discussion: 10 CFR 50.49 and related guidance documents establish uniform qualification methods for demonstrating compliance. They do not currently provide flexibility for the use of methods that would provide a graded level of assurance commensurate with equipment risk significance. Modifications to the regulatory scheme should be made to permit alternative, possibly innovative, methods of assuring equipment performance that would be applied based on the risk significance of the equipment items for those accidents producing harsh conditions.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: By establishing and maintaining qualification based on safety significance, licensees would be able to more effectively utilize their EQ resources. Licensees would continue to implement currently approved methods for the risk

significant equipment but would apply more cost-effective and resource-effective methods for less safety significant equipment.

Recommended Resolution Path: Revise 10 CFR 50.49, as necessary, and NRC EQ guidance documents permitting licensees to establish and maintain qualification using methods, including innovative approaches, that establish adequate assurance based on the risk-significance of the associated equipment functions. In lieu of revising and reissuing the guidance documents the NRC could issue a generic communication (e.g., RIS) that would supplement and clarify the existing guidance in a manner similar to the line item technical specification improvement program.

3. Permit Graded Qualification Methods Based on Severity of Accident Environment

Discussion: 10 CFR 50.49 and related guidance documents establish uniform methods for demonstrating compliance. They do not currently provide flexibility for the use of methods that would provide a graded level of assurance commensurate with the severity of the environmental conditions experienced by particular equipment. Currently, a two tiered approach applies. For safety-related equipment outside the scope of 10 CFR 50.49 (i.e., mild equipment), equipment selection, application, operation and performance reviews are considered acceptable methods of demonstrating operability. For equipment exposed to 'harsh' conditions (i.e., conditions significantly more severe than normal) the 10 CFR 50.49 methods must be used regardless of the degree of environmental severity. Modifications to the regulatory scheme should be made to permit alternative methods for equipment qualification within the scope of 10 CFR 50.49 that would be applied based on the relative severity of the harsh accident conditions experienced by the specific equipment. The most rigorous methods would be applied for LOCA conditions inside primary containment.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: By establishing and maintaining qualification based on the severity of the accident conditions, licensees would be able to more effectively utilize their EQ resources. The most rigorous qualification methods would be applied for those LOCA/HELB conditions inside primary containment which significantly challenge the functionality of electrical equipment. Licensees would apply more cost-effective and resource-effective methods for those accident conditions that do not significantly challenge equipment functionality, such as relatively moderate temperature increases due to loss of ventilation. By lowering the qualification cost barrier, modern, innovative equipment designs could be effectively utilized to increase overall equipment performance and plant safety.

Recommended Resolution Path: Revise 10 CFR 50.49, as necessary, and NRC EQ guidance documents permitting licensees to establish and maintain qualification using methods, including innovative approaches, that establish adequate assurance based on the severity of the accident environmental conditions and their challenge to the functionality of specific equipment. In lieu of revising and reissuing the guidance documents the NRC could issue a generic communication (e.g., RIS) that would supplement and clarify the existing guidance in a manner similar to the line item technical specification improvement program.

4. Alternative Qualification Methods for Equipment Exposed to Radiation-Only Harsh Conditions

Discussion: (This item is a subset of the previous comment.) 10 CFR 50.49 limits the scope of its applicability to certain electrical equipment exposed to 'harsh" accident conditions (i.e., those significantly more severe than conditions occurring during normal operation, including anticipated operational occurrences). For certain equipment, particularly some equipment located outside primary containment, the only "harsh" accident condition that is significantly more severe is radiation. This equipment has been termed "radiation-only harsh" equipment. For newer plant equipment (i.e., equipment that cannot be qualified using the guidance of the DOR Guidelines or NUREG-0588 Cat. II) the NRC and some licensees have interpreted the 10 CFR 50.49 provisions and staff guidance documents as requiring full qualification sequential type testing including aging simulations. However, adequate assurance of operability can be established using less burdensome methods, such as evaluations based on existing radiation tolerance data for the materials of construction, that comply with 10 CFR 50.49(f)(4).

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1

Burden Reduction & Benefits: The type test qualification method, including preaging to an end of life condition, is unnecessarily burdensome for certain components exposed to "radiation-only harsh" accident conditions. For much of this equipment adequate assurance of performance during the accident exposure could be achieved with a thorough evaluation of equipment functions and materials combined with existing data on material radiation tolerance. By lowering the qualification cost barrier, modern, innovative equipment designs could be effectively utilized to increase overall equipment performance and plant safety.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding qualification for radiation-only harsh conditions. For equipment whose only accident harsh condition is radiation, the RIS could state that adequate qualification can be established using analysis combined with partial test data in accordance with 10 CFR 50.49 (f)(4).

5. Permit Use Realistic (Best-Estimate) Methods to Define Accident Environment Steam Conditions

Discussion: LOCA/HELB steam/temperature/pressure conditions are currently based on very conservative, deterministic DBA assumptions including a DEGB of the largest RCS pipe. Some of these events and associated conditions are highly improbable based on fracture mechanic (leak-before-break) considerations. Currently acceptable methods of establishing environmental conditions for qualification are based on these highly improbable events combined with conservative assumptions and codes, such as those used for containment design. The cumulative effect is unrealistic environmental conditions that are not representative of the risk-significant conditions that could challenge equipment safety functions. More realistic environmental conditions should be developed based on consideration of risk significant events, fracture mechanics information, and best estimate environmental analyses.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: Utilizing unrealistic environmental conditions can create unnecessary burdens whenever (1) environmental conditions are modified due to plant design or analysis revisions (e.g., steam generator replacement, adoption of new accident analysis codes), (2) licensees must institute unnecessary measures to maintain conditions within existing qualification limits or requalify equipment to more severe conditions (e.g., efforts in response to IN 89-10), and (3) the unrealistic conditions are barriers to the qualification of modern, innovative equipment designs that could be effectively utilized to increase overall equipment performance and plant safety. The environmental conditions should not be based on the DEGB of the largest system pipes. More realistic criteria should be utilized to establish reasonable break sizes based on fracture mechanics and risk significance considerations. Examples of analytical assumptions that could be modified to provide more realistic modeling of accident conditions include (1) more realistic assumptions regarding steam generator moisture carryover during MSLB conditions, (2) recognition of moisture revaporization on equipment surfaces and its ability to inhibit equipment temperatures that exceed saturation temperature, (3) the use of test results which demonstrate lower heat transfer coefficients than those defined in NUREG-0588 when performing component thermal analysis.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding acceptable methods for establishing environmental conditions for equipment qualification purposes. Solicit technical information from the industry and others regarding available data and recommended methods.

6. Permit Use of Realistic Methods to Define Accident Environment Radiation Conditions

Discussion: Licensees are currently required to LOCA-qualify equipment using either the TID-14844 source term or an Alternate Source Term (AST) under 10 CFR 100.11. Under both methods, the source term assumes a significantly degraded core and release of "appreciable" quantities of fission products and does not represent the source term associated with LOCA mitigation based on DBA criteria and assumptions (e.g, 10 CFR 50 Appendix K and licensee FSAR Chapter 15 LOCA analysis). Consequently, equipment designed to mitigate a LOCA is required to be qualified to radiation levels that would only occur if such equipment failed to properly function (i.e., an unmitigated LOCA or severe accident). More realistic radiation conditions should apply to equipment required for LOCA mitigation. The more severe radiation conditions (e.g., TID-14844) could be applied to that subset of 50.49 equipment deemed important to severe accident mitigation.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: The use of unrealistic DBA LOCA radiation conditions for qualification purposes creates a barrier to the use of modern, innovative equipment designs that could be effectively utilized to increase overall equipment performance and plant safety. These high dose values have inhibited the use of materials that may be operationally superior with respect to other conditions and performance requirements. Further, accuracy data during accident qualification tests has been found to be closely coupled to accumulated dose for electronic instruments. Since this data is integral to uncertainty analysis and setpoint calculations, the resulting technical specification setpoint values can be unnecessarily restrictive and limit a plant's operating envelope. Finally, unnecessary licensee resources are expended establishing and re-evaluating equipment qualification whenever new information or plant analyses bring into question the basis for the equipment's qualification for these integrated radiation conditions.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding the use of source terms that are more representative of the DBA LOCA core damage level predicted using 10 CFR 50 Appendix K assumptions.

7. Permit Flexibility when Establishing EQ-Required Maintenance, Surveillance, & Replacement Intervals

Discussion: Licensees often interpret NRC requirements as precluding flexibility when establishing maintenance actions based on qualified life calculations or vendor EQ

requirements. Given the uncertainty and subjective nature of these bases, licensees should possess the flexibility to identify and adjust maintenance schedules for 50.49 equipment, including the establishment of "grace periods" using other factors, including risk significance and the maintenance rule and associated guidance regarding maintenance planning and managing risk. Similarly, even where such "grace periods" have not been pre-established, licensees should be able to address operability from a Generic Letter 91-18 standpoint, taking into account risk considerations for EQ equipment.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: By providing licensees with operational flexibility when conducting qualification-required maintenance, replacement, and testing actions, plant operation and safety would be improved by minimizing unnecessarily placing safety-related equipment out of service during power operation to complete these activities.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding flexibility when scheduling qualification-driven maintenance and replacement actions.

8. Clarify Guidance-Only Status of Regulatory Guide 1.97

Discussion: Some NRC staff have incorrectly concluded that the footnote reference in 10 CFR 50.49 to Regulatory Guide 1.97 Rev. 2 codifies the qualification provisions of the regulatory guide. This incorrect interpretation has limited licensee flexibility when seeking to take exception to the guidance in Regulatory Guide 1.97 concerning qualification.

Regulatory Basis:
10 CFR 50.49

Burden Reduction & Benefits: Licensees should establish, with NRC concurrence, qualification requirements for accident monitoring instruments based on careful evaluation of operating procedures, accident analyses, risk assessments, and emergency preparedness needs. This has been the intent of Regulatory Guide 1.97 revisions. 10 CFR 50.49 should not be misinterpreted, as codifying the qualification requirements of Regulatory Guide 1.97 Rev. 2.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding the 10 CFR 50.49 footnote reference to Regulatory Guide 1.97 Rev. 2.

9. Reaffirm 10CFR50.49 Regarding Equipment Scope

Discussion: Some NRC staff have incorrectly concluded that equipment exposed to challenging environmental conditions during normal operation, including anticipated operational occurrences, and similar conditions during accidents must be qualified in accordance with 10 CFR 50.49. For example, an item located near BWR main steam lines may be exposed to a high integrated radiation dose during normal operation that may exceed the dose during accident conditions. 10 CFR 50.49 specifically excludes such equipment from its scope if the accident conditions are not significantly more severe from those occurring during normal operation, including anticipated operational occurrences. Assurance of operability for such equipment is provided by appropriate design and procurement requirements coupled with maintenance/surveillance and performance monitoring programs (See SRP 3.11). Incorrectly requiring implementation of the provisions and qualification methods of 50.49 for such equipment unnecessarily burdens licensees by applying these strict controls in unnecessary applications.

Regulatory Basis:
10 CFR 50.49

Burden Reduction & Benefits: Licensees' equipment qualification program resources are diluted whenever equipment is unnecessarily placed within the scope of 10 CFR 50.49. This resource dilution is ongoing since licensees must continue to install, operate, maintain, and replace such equipment in accordance with their EQ program requirements.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding the inclusion of such equipment within the scope of 10 CFR 50.49.

10. Permit the Use of Low Risk Significance as a 'Sound Reason to the Contrary'

Discussion: For equipment determined by risk-based considerations to be of relatively low safety significance, licensees should be permitted to utilize equipment qualified to the provisions of the DOR Guidelines or NUREG 0588 Category II. 10 CFR 50.49(l) requires replacement equipment to be qualified in accordance with the EQ rule's provisions unless there are "sound reasons to the contrary". Regulatory Guide 1.98 Rev. 2 §C.6 provides example sound reasons considered acceptable to the NRC staff. Typically, there has been a reluctant to consider other sound reasons. As determined by the NRC during the EQ Task Action Plan, the qualification provisions of these guidance documents are adequate for both the current and renewal terms. Consequently, adequate assurance of performance and safety during accident conditions will continue to be maintained if these provisions were applied to replacement equipment with relatively low safety significance.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1

Burden Reduction & Benefits: Typically, licensees must institute plant design changes whenever replacement equipment is "upgraded" in accordance with §50.49(l). As part of these significant design change efforts, licensees must evaluate available qualified equipment and design, specify, procure, and installed this new equipment. The design change process entails significant costs and resources involving necessary changes to numerous documents. These include qualification program and design modification documents and a litany of configuration control-related documents including maintenance/operation procedures, procurement/ parts data, and vendor manuals. This potentially extensive effort provides little, if any, safety improvement for equipment with relatively low safety significance. For this equipment safety significance is an adequate basis to continue use of the DOR Guidelines or NUREG-0588 Category II as the qualification bases.

Recommended Resolution Path: Issue an RIS (or similar generic communication) clarifying the NRC position regarding the use of risk significance as a "sound reason to the contrary".

Each of the items 1-9 above have been included in the NEI matrix of burden reduction actions. Item 10 was subsequently added to the NUGEQ comments. It should also be considered part of the overall list of burden reduction actions.

Attachment 2

NUGEQ Letter, dated October 22, 2003

NUCLEAR UTILITY GROUP
ON EQUIPMENT QUALIFICATION

WINSTON & STRAWN
1400 L STREET, N.W.
WASHINGTON, D.C. 20005-3502

TELEPHONE (202) 371-5737

October 22, 2003

Jose Calvo, Chief
Electrical and Instrumentation and Controls Branch
U.S. Nuclear Regulatory Commission
Mail Stop O-9D5
Washington, DC 20555-0001

Re: Estimated Cost Savings – 30-Day Maximum Post-Accident Operating Time

Dear Mr. Calvo,

During recent discussions regarding the burden reduction suggestions previously provided by the Nuclear Utility Group on Equipment Qualification ("NUGEQ" or the "Group") to the NRC, your staff requested information on the potential burden reduction and cost savings associated with establishing a uniform maximum Post-Accident Operating Time ("PAOT") for 10 C.F.R. § 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," compliance purposes.[1] The information is provided herein.

In summary and based on the analysis presented below, the NUGEQ estimates that an average minimum cost savings of approximately $850,000 for each

[1] The NUGEQ initially provided this recommendation in a July 2, 2001, letter to the NRC, which was in response to the NRC Staff's request for comments concerning potential initiatives for reducing unnecessary regulatory burdens. 66 Fed. Reg. 22,134 (May 3, 2001). The topic discussed herein was identified in the letter's enclosure as one of several potential regulatory improvements related to 10 C.F.R. § 50.49. Specifically, see Item 1, "Focus on Risk-Significant Periods for Long-Term Post Accident Operability" (an excerpt is enclosed for your information).

affected plant over the remaining plant life can be achieved by establishing a standard maximum PAOT.[2] This cost savings is associated with eliminating the PAOT thermal calculations licensees typically use to justify longer (*e.g.,* > 30 days) PAOT operating times based on the shorter duration (typically 30 days) equipment qualification tests. Since the cost of performing thermal calculations is related to utility staff man-hours, eliminating the need for these burdensome, risk-insignificant calculations would permit licensees to focus their staff resources on more risk-significant activities, thereby improving overall safety.

I. Background

In the July 2, 2001, submittal, the NUGEQ maintained that risk-based insights should be used to limit the required operating time provisions of 10 C.F.R. § 50.49 to the first few days or weeks of the post-accident period. The letter indicated that the most significant cost benefit from such an operating time interpretation would be the elimination of a majority of the PAOT calculations currently being performed by licensees as part of their environmental qualification ("EQ") programs. The PAOT calculations are currently considered necessary whenever the duration of the accident simulation portion of a 10 C.F.R. § 50.49 qualification test is less than the licensee-specified required operating time. Since the vast majority of such accident simulation tests use a 30-day duration, the PAOT calculations are needed for any equipment with longer assumed post-accident operating times.

Licensees, based on 10 C.F.R. § 50.49 and NRC guidance regarding the need to qualify equipment for the "duration of the accident function," have established maximum PAOTs[3] for their EQ Program equipment. Licensee maximum PAOTs range from 30 days to over 1 year. Typically, the older plants use a 30-day maximum PAOT, while the newer plants generally committed to longer periods.[4] To the best of the Group's knowledge, the NRC has always recognized and accepted all such assumed maximum post-accident operating times if they were at least 30 days.

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[2] The term "affected plant" refers to those plants with maximum PAOT times in excess of 30 days. A significant number of operating plants use maximum PAOT times in excess of 30 days.

[3] Maximum post-accident operating time refers to the maximum operating time assumed by licensees when establishing qualification. Shorter times, when justified, are used for some devices, but the maximum time is often used to simplify the qualification evaluation.

[4] For example, in one pressurized-water reactor ("PWR"), the PAOT for the Containment Fan Cooler Motors is 30 days; yet, in a similar but newer PWR, the PAOT for these motors is 1 year.

Although the NRC has not articulated its basis for accepting this range of maximum PAOTs, numerous risk-based documents, including the NRC-sponsored NUREG/CR-5313, "EQ Risk Scoping Study," indicate that the risk-significant period is limited to the first days of an accident (*i.e.,* accident mitigation phase) and that EQ issues associated with long-term post-accident equipment operability are not risk significant. The Commission recognized this fact in the more recent AST rulemaking.[5] In the accompanying Statement of Considerations, the Commission noted that "should [] long-term equipment fail, there will not be an undue threat to public health and safety as protective actions would have already been implemented by the time the postulated failure [of that equipment] could occur."[6]

It is important to recognize that limiting the qualification demonstration to a maximum 30-day PAOT does not imply that the equipment will fail on day 31. The NUGEQ maintains that establishing qualification for a 30-day duration provides adequate confidence, commensurate with risk-significance, in long-term equipment operation. The NRC Staff reached a similar conclusion during the initial screening of candidate Generic Issue ("GI") 187, "The Potential Impact of Postulated Cesium Concentration on Equipment Qualification in the Containment Sump."[7] In its screening, the Staff noted that equipment qualified for a given period may, in practice, remain available for a much longer period.[8]

The Staff also recognized, in its initial screening of GI-187, that the lower decay heat rates during these later time intervals allow more time for operator actions and more opportunity for alternative strategies.[9] The Staff further observed that (1) the NUREG/CR-5313 conclusions are consistent with the positions taken by the NRC on risk informing the regulations where large early release frequency and containment performance are concerned with the interval roughly 24 hours following the onset of significant fuel damage; (2) a more explicit treatment of long-term accident recovery would not likely reveal any new risk-significant considerations; and (3) long-term

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5 Final Rule, *Uses of Alternative Source Terms at Operating Reactors*, 64 Fed. Reg. 71,990 (Dec. 23, 1999).

6 64 Fed. Reg. 71,995.

7 Memorandum to A. Thadani from J. Rosenthal, "Initial Screening of Candidate Generic Issue 187, 'The Potential Impact of Postulated Cesium Concentration on Equipment Qualification in the Containment Sump,'" April 30, 2001.

8 *Id.,* Att. at 4.

9 *Id.,* Att. at 4.

equipment operability issues associated with severe accidents can be addressed under accident management or plant recovery actions.[10]

II. Summary, Analysis, and Conclusions from PAOT Cost Survey

In support of your staff's request, the NUGEQ surveyed its members regarding potential cost savings associated with establishing a generic 30-day maximum PAOT. The following information reflects the results of the feedback provided by the NUGEQ members.

Cost for Each PAOT Calculation

It takes approximately 40 man-hours to formally revise a PAOT calculation. Since one PAOT calculation is typically used to establish qualification for the EQ file devices with the longest required operating time, the calculation can be applied to all similar devices which reference a particular EQ file (*i.e.,* each EQ file generally has one PAOT calculation). For estimating purposes, the man-hour cost is assumed to be $80/hour.[11] Consequently, the estimated cost associated with each EQ file PAOT calculation revision is approximately $3,200.

PAOT Calculation Cost for Incorporating New Test Reports

PAOT calculations are issued or revised whenever new test reports are used to establish the qualification of existing or new equipment within the EQ program. Licensees are continually making EQ program changes due to new equipment or new testing for existing equipment (*e.g.,* equipment design changes). For estimating purposes, it is reasonable to assume that each year at least one new EQ test report requires a formal PAOT calculation. The assumed yearly estimated cost is $3,200 for each affected plant. The total costs, thus, could range from $64,000 for plants with a 20-year remaining plant life to $128,000 for plants with a 40-year remaining life.

PAOT Calculation Cost for Revisions to Containment Accident Profiles

EQ file PAOT calculations need to be revised whenever new containment accident profiles are issued. Containment accident profile revisions can result from a number of issues, including, but not limited to, the following:

1. Power uprates

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[10] *Id.,* Att. at 3, 4.

[11] Some licensees have estimated up to $100/man-hour when contractor support is needed for a large project such as a steam generator replacement or a power uprate.

2. New steam generators

3. Removal of inside containment structural steel

4. Emergency Diesel Generator load sequence changes

5. Engineered Safeguards Features/Emergency Core Cooling System timing changes (*e.g.,* injection or containment spray pump suction/recirculation transfer to containment sump)

6. Service water temperatures and heat exchanger performance changes

7. Containment liner coating changes (*e.g.,* heat transfer assumptions)

According to the NUGEQ members, approximately 25 - 35 EQ file PAOT calculations need to be revised each time a new containment analysis results in a revision to the accident profiles used in the EQ program. For estimating purposes, it is assumed that 30 EQ file PAOT calculations will be revised for each containment profile change. Further, it is assumed that over the remaining operating life of each affected plant, at least 8 containment profile changes will require such PAOT calculation revisions. This number of profile changes should provide a conservative assumption, given the technological advances that have reduced the cost of performing these containment analyses and the considerations (*see* above examples) that prompt such reanalyses. One NUGEQ member indicated that 6 containment profile revisions were made at one plant over a 5-year period.

The estimated cost for PAOT calculation revisions due to containment profile changes is $768,000 for each affected plant and is based on the following:

- Cost for each EQ file PAOT calculation revision - $80/man-hours x 40 man-hours/file = $3,200/file

- Cost for each containment profile change - $3,200/file x 30 files = $96,000/profile

- Cost per plant assuming 8 profile changes - $96,000/profile x 8 profiles = $768,000

Total Estimated Costs

Based on the above considerations and assumptions, combining the costs for incorporating new test reports and revising containment accident profiles, the total costs over the life of an affected plant to maintain and update the PAOT calculations ranges from approximately $832,000 to $896,000. The total costs are sensitive to the number of containment profile changes that necessitate PAOT calculation revisions and

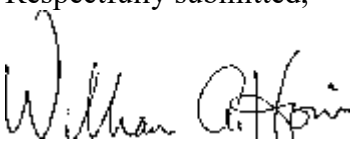
the number of such revisions for each profile change, and whether a plant renews its operating license. However, the Group believes that approximately $850,000 for each affected plant is a reasonably conservative estimate. It is possible that assuming 8 profile changes over a remaining plant life is unrealistically low, particularly for plants with a renewed license. Doubling the number of accident profile changes would increase the cost to approximately $1,700,000 for each affected plant.

III. Conclusion

The NUGEQ concludes that these estimated costs justify further NRC efforts to establish a generic maximum PAOT for the purposes of 10 C.F.R. § 50.49 compliance. Accordingly, NUGEQ is willing to provide the NRC staff with technical information supporting a 30-day maximum PAOT and the issuance of an appropriate generic communication.

We hope this information adequately responds to your staff's request. Please contact us regarding this matter so that we may coordinate further actions to clarify the operating time provision of C.F.R. § 50.49.

Respectfully submitted,



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

Enclosure
cc: T. Koshy (NRC)
P. Shemanski (NRC)
A. Marion (NEI)

Nuclear Utility Group on Equipment Qualification
October 22, 2003

Enclosure

Excerpt from NUGEQ July 2, 2001, Letter

1. Focus on Risk-Significant Periods for Long-Term Post Accident Operability

Discussion: The operating time provisions of 10 CFR 50.49 should be limited to the 'mitigation phase' and possibly certain risk-significant equipment operations during the 'recovery phase' of applicable accidents. Based on 10 CFR 50.49 and NRC guidance document statements regarding the need to qualify equipment for the "duration of the accident function," licensees have established operating times for equipment operating in the 'accident recovery' phase that range from 30 days to over 1 year. Numerous risk-based documents, including the NRC-sponsored NUREG/CR-5313, "EQ Risk Scoping Study," indicate that the risk significant period is limited to the first days of an accident (i.e., accident mitigation phase) and EQ issues associated with long term post-accident equipment operability are not risk significant. Accordingly, the operating time provisions of 10 CFR 50.49 should be interpreted as being limited to the first few days or weeks post-accident. For equipment that could be used as part of long-term accident recover actions, equipment operability should be addressed under accident management or plant recovery actions. If risk based insights identify risk significant equipment operations during the recovery phase then the qualification provisions of 50.49 could be selectively applied to such equipment as appropriate.

Regulatory Basis:
10 CFR 50.49
Regulatory Guide 1.89, Rev. 1
NUREG-0588
DOR Guidelines

Burden Reduction & Benefits: Licensees currently must demonstrate long-term post-accident operability for certain equipment as part of their EQ program. However, the accident simulation portion of most 10 CFR 50.49 qualification tests is typically 30 days or less but yet is more severe than the licensing basis 'required accident profile.' Accordingly, this effort generally involves an analytical evaluation of differences between these profiles as a basis to establish longer operability for the less severe 'required accident profile.' This analysis must be revised for all affected equipment anytime a revised accident analysis results in modifying the qualification profile used for establishing qualification. A new analysis must also be generated whenever a new type of equipment requires the development of an EQ file. A burden reduction would be achieved if licensees could eliminate these analytical exercises.

Currently there is no uniform guidance from either the NRC or the IEEE on the duration of LOCA accident simulation tests. Consequently, for inside containment equipment requiring long-term operability most test durations have ranged from 2 weeks to over 100 days. The U.K., French and Germany requirements specify a LOCA steam simulation duration of approximately 2 weeks. A burden reduction would be achieved if generic

guidance based on risk-insights were available specifying the maximum LOCA simulation test duration (e.g., 2 weeks).

Several NUGEQ documents provided to the NRC contain additional information on the low risk significance of equipment qualification for the recovery period. These include a January 11, 1999, NUGEQ paper submitted to the NRC on the use of Arrhenius methods to analyze accident conditions and the NUGEQ comments on the Draft Regulatory Guide on the alternate source term, dated March 31, 2000.

Recommended Resolution Path: Issue a RIS (or similar generic communication) clarifying the NRC position regarding qualification for the accident recovery phase. The RIS could state that using risk-informed considerations 10 CFR 50.49 compliance regarding qualification for the duration of the required function is generally limited to the accident mitigation phase. For LOCA accidents, qualification tests of a 2 week duration would adequately encompass the risk significant component of the mitigation phase. In addition, where certain equipment whose actions during an extended recovery phase are considered risk significant, 10 CFR 50.49 qualification could apply. For other equipment potentially used during the recovery phase, operability should be addressed under accident management or plant recovery program actions.

Attachment 3

NRC Letter, dated February 20, 2004

February 20, 2004

William A. Horin, Counsel
Nuclear Utility Group on Equipment Qualification
Winston & Strawn
1400 L Street, N.W.
Washington, D.C 20005-3502

Ref: (1) Your Letter dated October 22, 2003 on estimated cost savings- 30 Day Maximum Post Accident Operating Time.

(2) Your Letter dated July 2, 2001 on Comments Concerning Reducing Unnecessary Regulatory Burden While Maintaining Safety, 66 Fed. Reg. 22, 134

Dear Mr. Horin:

I apologize for the delay in addressing the issues that you have brought to our attention. Thank you for your continued efforts in identifying potential items for reducing the regulatory burden on the industry and for bringing to our attention your view regarding the clarity of certain regulatory issues.

After reviewing your letters (References 1 & 2) I have the following suggestions on how to address each of the burden reduction issues:

1. 30-Day Maximum Post-Accident Operating Time (PAOT)

We recognize that the current licensing bases have a wide variety on PAOT depending on when the plant was licensed. While these varying numbers may not have a specific justification for each PAOT, it cannot be resolved by proposing a blanket approval for a period of 30 days without demonstrated technical basis. However, PAOT for certain equipment that are not challenged for continued RCS cooling or Containment integrity could be considered for a lower period; e.g., Containment isolation valves that are no longer required to operate following the isolation, non-safety systems that just have to remain isolated, etc.

An industry initiative to take pilot license amendments (PWR as well as a BWR) would be one approach for the reduction of PAOT from the worst case duration. This approach would focus on the technical bases needed for the staff to support shorter duration. Other licensees may benefit from this effort when a resolution is reached.

2. Graded Qualification Methods Based on Equipment Risk Significance

The current NRC rulemaking efforts with 10 CFR 50.69 for classifying equipment according to specific safety significance are still ongoing and therefore it is premature to address this effort in the equipment qualification area until the final requirements are identified.

3. Graded Qualification Methods Based on Severity of Accident Environment

The existing regulatory documents lead to qualifying all EQ equipment for the worst case environment. Since the accident environment could be different at various areas of the plant and it could further vary by the type of plant, the accident environment profile to which each equipment must be qualified could be different.

We are considering whether to clarify the option to qualify a component specific to the environment through a revision to Regulatory Guide (RG) 1.89.

4. Alternative Qualification Methods for Equipment Exposed to Radiation-Only Harsh Conditions

An alternate method of qualifying equipment for specific harsh environments, such as radiation only, through analysis could be an acceptable approach when there is adequate material data available.

The present requirements in 10 CFR 50.49 (f) (3) & (4) makes a provision to have “experience with similar item”, and “analysis in combination with partial test data that supports the analytical assumptions and conclusions,” as acceptable approaches for qualification.

We are considering whether to clarify the option to address EQ for “radiation only environments” through a revision to RG 1.89.

5. Use Realistic (Best Estimate) Methods to Define Accident Environment Steam Conditions

The existing harsh environment profiles are based on deterministic design bases assumptions (eg.,guillotine breaks) that results in worst case scenarios. The use of fracture mechanics and leak before break considerations could reduce the accident profile to lower limits.

The EQ program is designed to qualify the equipment to worst case scenarios. If the leak before break conditions could grow into large breaks, as in the case of steam line ruptures, the environment progresses to worst case scenarios at a slower pace. This area needs further confirmatory studies prior to any consideration in reducing qualification profile.

6. Use of Realistic Methods to Define Accident Environment Radiation Conditions

The creation of two levels of harsh environment conditions for radiation based upon successful accident mitigation and failure of accident mitigation would be a new design basis

consideration. A set of equipment qualified for successful accident mitigation and a different or complementary set of equipment for unsuccessful accident mitigation do not appear to have noteworthy gains in terms of safety.

Two levels of radiation levels in harsh environment qualification may need to be further explored to identify whether significant benefit will support future staff efforts.

7. Flexibility When Establishing EQ-Required Maintenance, Surveillance, & Replacement Intervals

The performance of an EQ component depends on the performance of critical maintenance, surveillance, and replacement as required. While some of the elements may have negligible influence on the qualified life when considered independently, the cumulative effect of not performing certain elements could be significant. The technical basis for continued compliance to EQ requirements needs to be demonstrated when considering postponement or deletion of insignificant maintenance and surveillance activities.

Re-analysis of qualified life based on actual service conditions, or delay in non-critical maintenance are provisions currently available to licensees in addressing these issues. An arbitrary imposition of a "grace period" for conducting these required actions lacks technical basis.

8. Guidance - Only Status of Regulatory Guide 1.97

The footnote reference to RG 1.97 in 10 CFR 50.49 was not intended to codify the RG but to confirm the EQ requirements for certain post accident monitoring instruments that were classified as Category 1 & 2 variables because of their functional significance.

We are planning to revise RG 1.89 & 1.97 to clarify this guidance

9. Scope of 10 CFR 50.49

The scope of the EQ rule is addressed in 10 CFR 50.49 (c) through the elimination of equipment located in the mild environment and the definition of mild environment as "an environment that would at no time be significantly more severe than the environment that would occur during normal plant operation, including anticipated operational occurrences."

The current regulatory statements provide adequate guidance such that further staff actions are not necessary.

10. Use of Low Risk Significance as "Sound Reasons to the Contrary"

The use of risk-based consideration for establishing the level of qualification or using low risk as a reason to not qualify equipment as a relief under "Sound reasons to the Contrary" for qualifying equipment under 10 CFR 50.49.

The current NRC course of action with respect to 10 CFR 50.69 would have to be completed before considering any other risk-informed regulatory changes. The “Sound Reasons to the Contrary” for not qualifying under the EQ rule were initially introduced into RG 1.89 as an interim measure to avoid significant replacement of installed equipments and to allow the use of previously stocked spare supplies qualified under earlier EQ requirements. After two decades of practice, it is not appropriate to exercise “Sound reasons to the contrary” to avoid decades of equipment replacement under the current requirements in 10 CFR 50.49. This issue will be addressed in the next revision to RG 1.89.

Please let me know your thoughts on the suggested approach.

Sincerely,

/RA

Jose A. Calvo, Branch Chief
Electrical & Instrumentation and Controls Branch
Division of Engineering