6/15/2010
75 FR 33853
(6)

PUBLIC SUBMISSION

As of: August 17, 2010
Received: August 13, 2010
Status: Pending_Post
Tracking No. 80b30652
Comments Due: August 13, 2010
Submission Type: Web

Docket: NRC-2010-0202
Draft Regulatory Guide: Issuance, Availabiity

Comment On: NRC-2010-0202-0001
Draft Regulatory Guide: Issuance, Availability

Document: NRC-2010-0202-DRAFT-0007
Comment on FR Doc # 2010-14339

Submitter Information

Name: William Horin
Address:
Winston & Strawn LLP
1700 K Street NW
Washington, DC, 20006
Submitter's Representative: William A. Horin
Organization: Nuclear Utility Group on Equipment Qualification

General Comment

See attached file(s)

Attachments

NRC-2010-0202-DRAFT-0007.1: Comment on FR Doc # 2010-14339

SUNSI Review Complete
Template = ADM-013

E-RIDS=ADM-03
Add = R.A. Jervey (RJ)
M. Case (MJC)

NUCLEAR UTILITY GROUP
ON EQUIPMENT QUALIFICATION

WINSTON & STRAWN LLP
1700 K STREET, N.W.
WASHINGTON, D.C. 20006-3817

TELEPHONE (202) 282-5737

August 13, 2010

Ms. Cindy Bladey
Chief, Rules, Announcements, and
Directives Branch
Office of Administration
Mail Stop: TWB – 05 – B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Nuclear Utility Group on Equipment Qualification Comments on Draft Regulatory Guide, DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants" (75 Fed. Reg. 33853 (June 10, 2010))
Docket ID NRC–2010–0202

Dear Ms. Bladey:

The Nuclear Utility Group on Equipment Qualification ("NUGEQ")[1] hereby submits comments on Draft Regulatory Guide 1240 (DG-1240), "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants." As described in the attached detailed comments, the NUGEQ urges the NRC to withdraw DG-1240.

The attached comments address a number of issues presented by DG-1240. These matters concern, most fundamentally, inaccuracies in the draft guide with respect to several technical and regulatory topics. In addition, the comments examine the need for such guidance in view of (1) existing regulations and guidance – in particular with respect to the NRC maintenance rule, and

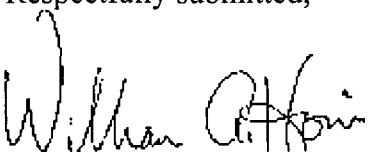
---

[1] The NUGEQ is comprised of member electric utilities in the United States and Canada, including NRC licensees authorized to operate over 95 nuclear power reactors in the United States. The NUGEQ was formed in 1981 to address and monitor regulatory and technical 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.

(2) newly developed industry guidelines concerning cable condition monitoring. Further, there has been no adequate demonstration of actual safety benefits were the draft guide to be issued. In view of the many problems with the draft, and in view of the current availability of adequate regulatory direction and guidelines, we conclude that DG-1240 should not be issued. If the NRC pursues issuance of the draft nonetheless, substantial and fundamental modifications to the draft would be necessary. The NUGEQ's detailed comments are included in Attachment 1, hereto.

In addition, the NUGEQ also supports comments being submitted by the Nuclear Energy Institute with regard to DG-1240.

Respectfully submitted,



William A. Horin
Winston & Strawn, LLP
Counsel to the Nuclear Utility Group on Equipment Qualification

Attachment 1: NUGEQ Comments on DG-1240

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

1. **The Maintenance Rule does not support the scope or means or methodology for cable condition monitoring envisioned by DG-1240.**

The NUGEQ agrees that the maintenance rule (MR) is the appropriate and only regulatory basis for requiring condition monitoring of cables during the current license term. Other regulations relevant to cables are focused on the adequacy of design (e.g., GDC) or the assurance of quality (Appendix B). However, the MR provisions, its bases, related guidance (NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" ("NUMARC 93-01") and Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" (RG 1.160")), and industry implementation do not support the apparent scope of cable condition monitoring envisioned by DG-1240 when it states; "*it is necessary to monitor the condition of electric cables throughout their installed life through the implementation of a cable condition monitoring program.*"

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion" to comport with the MR and approved implementation guidance.

2. **The vast majority of MR scope cables are highly reliable and do not require component level performance or condition monitoring.**

The vast majority of MR scope cables are highly reliable and can appropriately be classified as "inherently reliable" under current MR guidance. The NRC recognized the inherent reliability of cables in the SOC accompanying the original MR.

The SOC state:

> "*The purpose of paragraph (a)(2) of the rule is to provide an alternate approach (a preventive maintenance program) for those SSCs where it is not necessary to establish the monitoring regime required by (a)(1). For example, this provision might also be used where an SSC, without preventive maintenance, has inherently high reliability and availability (e.g., electrical cabling) or where the preventive maintenance necessary to achieve high reliability does not itself contribute significantly to unavailability (e.g. moisture drainage from an air system accumulator).*"

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

For such cables with high reliability and availability it is appropriate that they be monitored under 50.65(a)(2). Further, 50.65(a)(2) is the appropriate classification for SSCs where it is not necessary to establish the monitoring regime required by (a)(1). It is well established that (a)(2) can be used for SSCs, like the vast majority of cables, that have high reliability and availability without preventive maintenance.

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion" to comport with the MR and approved implementation guidance.

3. The NRC's stated basis for extensive condition monitoring of cables under 50.65 is substantially flawed.

In "B. Discussion" the NRC argues that periodic operability testing of cables is inadequate because it does not: (1) specifically focus on cables, (2) detect all aging/degradation mechanisms, (3) demonstrate performance under prolonged normal or accident conditions, or (4) provide "specific information" on degradation processes or physical integrity. Given these operability testing deficiencies the NRC concludes that cables might pass an operability test and subsequently fail when operation is required.

The NRC also argues that CM of cables throughout their installed life is needed because (1) "several" power cable failures have occurred, (2) the failure rate is increasing with plant age, (3) these cable failures have had safety significance, and (4) some failures occurred before they were identified.

The stated NRC concerns with periodic operability tests do not apply to cables that are normally operating (i.e., not in standby mode). Consequently, these concerns are not a basis for condition monitoring of normally operating cables.

The NRC claim that periodic operability tests are inadequate because they do not specifically focus on cables is without merit. This view conflicts with other MR guidance which recommends that most performance monitoring be conducted at the plant, train, and system levels and not at the component level. Further, RG1.160 encourages the use of such periodic operability tests for performance monitoring. RG1.160 states: "*The NRC staff encourages licensees to use, to the maximum extent practicable, activities currently being conducted, such as technical specification surveillance testing, to satisfy monitoring requirements.*"

The other operability test deficiencies cited by the NRC (failure to - detect all aging/degradation mechanisms; demonstrate prolonged performance; or provide

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

"specific information" on degradation or integrity) are stated as concerns because cables might pass an operability test and subsequently fail when operation is required. This view fails to recognize the objectives (e.g., reasonable assurance) associated with such operability tests and that such limitations or "failures" exist to varying degrees with the operability tests of virtually all other types of equipment, including active components. However, such operability tests remain a critically important element of plant safety and the MR performance criteria and monitoring.

The NRC also argues that CM is necessary because there have been "several" cable failures and the failure rate is increasing with plant age. The vast majority of MR scope cables are highly reliable and can appropriately be monitored under (a)(2) or classified as "inherently reliable" under current MR guidance. Any unbiased review of operating experience and failure data would conclude that cables exhibit availability and reliability characteristics substantially exceeding those of their active supported equipment. Simply stated cables are not one of the weak links when evaluating system, train, or supported equipment performance. The NRC does not cite the basis for its conclusion that cable failure rates are increasing. However, EPRI in its analysis of the medium-voltage failures reported in response to Generic Letter 2007-01 (see EPRI handout from May 2009 meeting) concluded that there was no correlation between the number of failures and cable age at the time of failure.

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion" to comport with the MR and approved implementation guidance.

3a. Broad-based cable condition monitoring will not materially affect plant safety

The NRC's apparent goal of eliminating virtually all cable failures while laudable is unrealistic, unobtainable, and even if achievable would have no significant effect on plant risk given the high inherent reliability of cables in most plant applications. Regarding the benefit of such extensive monitoring we cite the NRC's own conclusions as part of the resolution of GSI-168. A GSI-168 evaluation of the core damage frequency (CDF) reduction determined that the monetized benefits from requiring measures (such as condition monitoring) to reduce the contribution to the CDF of cable failures appear to be relatively modest. In that report the NRC concluded that,

> "*The risk assessment suggests that, at our current level of understanding, a cost-beneficial improvement is not supported.*" (emphasis added) The NRC affirmed this view during a June 2002 ACRS meeting on the GSI-168 resolution when the staff stated: "*If you reduce the cable failure probabilities to zero, the benefits are*

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

modest. There are benefits. The benefits are not zero. But they're modest."

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion."

4. **The guidance fails to recognize that the MR is a risk-based regulation and performance criteria for SSCs are related to their safety significance.**

As described in NUMARC 93-01, for SSCs within the scope of the Maintenance Rule it is necessary to establish safety significance. The associated performance criteria for 50.65(a)(2) SSCs or goals for 50.65(a)(1) SSCs should reflect that safety significance. The safety significance of a cable is application dependent and is directly related to the safety significance of the supported equipment (e.g., pump). DG-1240 fails to recognize that the MR is a risk based regulation and performance expectations are related to safety significance.

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion."

5. **The proposed DG-1240 guidance fails to recognize that under the MR the NRC has recommended that most performance criteria and goals for high safety-significant and stand-by applications be established at the system, or train level and not at the component level.**

DG-1240 directly conflicts with other MR guidance when it apparently recommends that all cable need to be condition monitored at the component level using the describe techniques. Specifically, Regulatory Guide 1.160 states:

> "*The extent of monitoring may vary from system to system depending on the system's importance to safety. Some monitoring at the component level may be necessary; however, it is envisioned that most of the monitoring could be done at the plant, system, or train level. SSCs with high safety significance and standby SSCs with low safety significance should be monitored at the system or train level. Except as noted in the Regulatory Position of this guide, normally operating SSCs with low safety significance may be monitored through plant-level performance criteria, including unplanned scrams, safety system actuations, or unplanned capability loss factors. For SSCs monitored in accordance with 10 CFR 50.65(a)(1), additional parameter trending may be necessary to ensure that the problem that caused the SSC to be placed in the Paragraph (a)(1) category is being corrected."*

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion."

6. The NRC conclusion that cable condition monitoring is necessary throughout cable installed life is inconsistent with the MR and related guidance.

The vast majority of plant cables under the MR are highly reliable, are appropriately classified under (a)(2), and their performance is monitored at the train, system, or plant level depending on their safety significance and operational configuration (e.g., standby). According to RG 1.160 additional component level monitoring and trending may be necessary if a performance problem causes a SSC to be placed into (a)(1). Other than cables with performance problems the MR and its guidance neither require or recommend such component level monitoring. Consequently, it is inappropriate based on existing MR guidance and implementation for the NRC to claim that "*it is necessary to monitor the condition of electric cables throughout their installed life through the implementation of a cable condition monitoring program.*"

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion." Specifically, were the NRC to revise the DG, to provide for consistency with the MR, we recommend deleting the following text:

> *"Therefore, it is necessary to monitor the condition of electric cables throughout their installed life through the implementation of a cable condition monitoring program."*

That text would then be replaced with the following text:

> *"Under existing NRC and industry MR guidance the establishment of performance criteria, goals, and monitoring must consider both safety significance and operational configuration (e.g., normally operating or in standby). MR guidance documents recognize that most monitoring will be accomplished at the plant, system, or train levels and not at the component level. It may be appropriate to monitor additional cable parameters for cables that have been placed into (a)(1) because of performance problems. Licensees may also choose to monitor the performance of cables under (a)(2) as part of a preventative maintenance program."*

7. The NRC definitions of "wet" and "submergence" are inconsistent with the codes and standards applicable to cables.

In "B. Discussion" the NRC attempts to establish it's own definitions for wetting and

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

submersion as – **"wetting** (i.e., an operating environment in which a cable is exposed to moisture or high humidity for extended periods of time, with intermittent brief periods of complete submergence in water)" and "**submersion** (i.e., an operating environment in which a cable is completely submerged in water continuously or for extended periods of time)." These definitions serve apparent NRC staff efforts to create distinctions between these and related terms. However, these definitions are wholly inconsistent with the codes and standards applicable to plant cables and licensee specifications and design bases for such cables.

Both the Underwriters Laboratories, Inc. (UL) and the National Electric Code (NEC) define the terms *dry*, *damp*, and *wet locations* but not *submersion.* These definitions indicate that the term *wet location* is meant to include submerged conditions particularly when viewed in the context of the related definitions of *dry location* and *damp location.*

More importantly, the cable standards and cable designs applicable to power plant cables (e.g., ICEA, NEMA, AEIC, and UL), including associated qualification tests, make no distinctions between cable designs for wet and/or submerged applications. For example, the current ICEA standard applicable to shielded medium voltage power plant cables is ICEA S-97-682. This standard and earlier ICEA versions establish moisture-related design criteria and qualification tests that are used to demonstrate cable suitability for all plant applications - both dry and wet. Regarding moisture tolerance the standard requires the following qualification test - *Accelerated Water Treeing Test (AWTT) Procedure.* ICEA issues similar standards that are used for industry/commercial/government, but not power plant, applications. For example, ICEA S-93-639 is the equivalent ICEA standard for shielded medium voltage power cables for "*indoors, outdoors, aerial, underground, or submarine*" applications. Like the power plant standard the moisture-related design criteria and qualification tests are the same for these applications. Interestingly, the *Accelerated Water Absorption Test* (EM-60) specified in this standard for cables, including submarine cables, is generally considered to be less demanding than the AWTT test specified in the power plant standard.

Recommendation: Withdraw DG-1240 or delete in "Section B. Discussion" two parenthetical statements associated with the terms "wetting" and "submersion."

8. The NRC neglects to acknowledge and integrate into the draft guidance the fact that an "ideal" condition monitoring technique does not exist.

In "B. Discussion" the NRC identifies the nine desired attributes of an "ideal" condition monitoring technique. These nine are a subset of the eleven attributes initially identified

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

in NUREG/CR-6704 Vol. 2 and recently restated in NUREG/CR-7000 along with the observation that no single CM technique possesses all these attributes. The two attributes included in the NUREGs but omitted from DG-1240 are "*Inexpensive and simple to perform under field conditions*" and "*Available to the industry immediately.*" Apparently, the NRC does not consider availability, cost, or simplicity to be desirable attributes. More importantly the NRC fails to make clear that, according to these NUREGs, no existing techniques, including those described in the draft guide, possess all these desirable attributes.

Recommendation: Withdraw DG-1240 or revise the text to include the two additional attributes identified in the NUREGs - "*Inexpensive and simple to perform under field conditions*" and "*Available to the industry immediately.*" Furthermore, the NRC should add the clarification (again, assuming that the DG is not withdrawn as recommended) that "*No existing techniques, including those described in the draft guide, possess all these desirable attributes.*"

9. The NRC distorts its own research regarding predicting cable survivability under accident conditions.

In "B. Discussion" the DG states – "*Research and experience have shown that no single, nonintrusive, currently available condition monitoring method can be used alone to predict the survivability of electric cables under accident conditions.*" The clear implication is that the application of more than one technique can and will predict cable survivability under accident conditions. This is not supported by the NRC's own research.

As stated in the NRC's GSI-168 technical assessment – "*No single condition-monitoring technique is non-intrusive and effective to detect degradation in incipient states prior to failures of installed cable systems*," and "*although a single reliable condition-monitoring technique does not exist, walkdowns to look for any visible signs of anomalies attributable to cable aging, coupled with the monitoring of operating environments, have proven to be effective and useful* (emphasis added)." Regarding predicting LOCA survivability that assessment concluded that such predictions were "possible" but data on physical and electrical properties of cable segments along with suitable predictive models would be needed. And further that "*while condition-monitoring methods may be viable at their current level of development, application-specific demonstrations are needed to ensure that the techniques can predict LOCA survivability* (emphasis added)." To our knowledge generally accepted predictive models correlating cable physical or electrical properties from suitable monitoring techniques to LOCA survivability have not been demonstrated.

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion." The NUGEQ submits that the NRC should replace –

> *"Research and experience have shown that no single, nonintrusive, currently available condition monitoring method can be used alone to predict the survivability of electric cables under accident conditions."*

And instead insert –

> *"NRC research has determined that no single condition-monitoring technique is non-intrusive and effective to detect degradation in incipient states prior to failures of installed cable systems. Although a single reliable condition-monitoring technique does not exist, a combination of condition monitoring techniques can be used and walkdowns to look for any visible signs of anomalies attributable to cable aging, coupled with the monitoring of operating environments, have proven to be effective and useful."*

10. The NRC understates the implications for techniques that require cable de-termination.

The NRC should make clear that any techniques requiring cable de-termination also involve re-termination, operability verifications, and potential reliability and availability effects. Significant efforts are involved when cables are de-terminated and subsequently must be re-terminated and operability and performance of the affected equipment verified in accordance with plant requirements. The significance of these efforts will vary based on a number of factors including the type of termination, plant location, accessibility, and cable design/voltage level. However, these efforts and associated post-maintenance operability verifications, including equipment/system alignments and operation, can adversely affect equipment reliability and availability. The NRC's Generic Letter 2007-01 Summary Report when analyzing failure root causes attributed approximately the same number of failures (roughly 25) to "Human Error" as were attributed to "General or Age-Related Degradation." Utilities must balance these considerations when determine the need for and type of condition monitoring. While condition monitoring may be appropriate for cables with problems, the implementation of certain techniques for highly reliable cables is not safety beneficial when considering reliability, availability, and human factors considerations.

Recommendation: Withdraw DG-1240 or add the following text:

Nuclear Utility Group on Equipment Qualification
Comments on Draft Regulatory Guide DG-1240, "Condition Monitoring Program for Electric Cables Used in Nuclear Power Plants"
Docket ID NRC-2010-0202

"Utilities should consider the potential adverse impact of condition monitoring and associated maintenance and post-maintenance testing efforts when determining the need for and type of condition monitoring techniques being used. These activities, particularly when devices must be de-terminated and re-terminated, can adversely affect equipment reliability and availability. The impact of these efforts will vary based on a number of factors including but not limited to the type of termination, plant location, accessibility, and cable design/voltage level. While condition monitoring may be appropriate for cables with problems, the implementation of certain techniques for highly reliable cables may not be safety beneficial when considering reliability, availability, and human factors considerations."

11. Information presented on CM Techniques is confusing, in many places erroneous, and may cause inappropriate conclusions.

"Section B, *Discussion*," because of numerous technical errors and inadequate guidance may cause utility personnel to misapply condition monitoring techniques and come to erroneous conclusions about the condition of their cables. Technical errors include a) recommending the use of DC high-pot and step-voltage tests for plant cables and b) mischaracterizing several techniques that may be useful for troubleshooting and failure evaluations or characterizing the environments as methods that can assess cable functionality or age degradation. Many of these errors similarly appear in the cited NUREG/CR-7000. In addition to these errors the technical guidance fails to distinguish among several factors that limit the use of certain techniques to specific types or classes of cables (e.g., medium voltage, low voltage, shielded) or to the effects of certain service conditions (e.g., wet/submerged, temperature/radiation, mechanical damage). Absent this additional information, and potentially relying on these misleading statements, utility personnel might misapply condition monitoring techniques and come to erroneous conclusions about the condition of their cables.

Recommendation: Withdraw DG-1240 or substantially revise "Section B. Discussion" on the various CM techniques or reference EPRI guidance on medium and low voltage cable aging management programs, applicable IEEE standards, and other guidance on uses and limitations of the various techniques.