NUCLEAR ENERGY INSTITUTE

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Mr. Jack R. Strosnider, Jr.
Division of Engineering
Office of Nuclear Reactor Regulation
Mail Stop O9-E3
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: NEI Survey Results on Okonite Okolon Single Conductor Cables

PROJECT: 689

Dear Mr. Strosnider:

In a February 7, 2001, letter to NEI, you identified two questions resulting from the NRC staff review of the NEI Okonite Cable survey results. The first question dealt with licensees' interpretation of the term "average temperature" and whether hot spots were accounted for in the cable qualification results included in the survey. The second question dealt with the technical basis for the 60 C threshold used in the survey; given NRC research identifying the potential for Okonite bonded jacket cable failure at 50 C. NEI met with NRC staff on May 7 in a public meeting to discuss these questions. This letter summarizes our response.

Regarding the first question and the use of the term "average temperature" in the NEI survey, the NRC concern is that some licensees may have interpreted the term to mean the average temperature along the length of the cable. An interpretation such as the NRC postulates would not consider the degradation occurring at cable locations where the temperature is significantly higher than this "average" (i.e., hot spots). We agree that such an interpretation is inappropriate. However, we disagree that licensees could have made this interpretation since this would be inconsistent with the use of this term in equipment qualification programs.

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Specifically, industry practice for establishing and maintaining qualification of electrical cables includes a determination of the highest temperature known to exist in the locations where the cables are routed and terminated. These temperatures are established by a combination of sources that can include HVAC design calculations, direct temperature measurement of rooms and/or locations within the rooms, and ohmic heating effects. Typically, licensees establish plant-specific qualification for the worst-case location using either the highest temperature or the highest weighted-average-over-time temperature at that location and evaluating that temperature against the cable manufacturer's qualification data. Within the context of equipment qualification programs, average temperature over the length of a cable is a meaningless concept. Consequently, we are confident that licensees appropriately interpreted the NEI survey question.

In addition, during plant operation localized hot spots may be identified that exceed the temperature used in the initial qualification. Such hot spots may be identified during normal maintenance and inspection activities or other plant activities where plant personnel may observe off-normal conditions. Upon discovery, such hot spots would be treated as non-conformances and addressed as part of the licensee's corrective action program. (Simultaneously, licensees will also evaluate reportability and operability questions as they would for any non-conformance.) To correct the condition, such hot spots are evaluated on a case-by-case basis to determine the impact on the cable's qualification, specifically the estimation of qualified life. This may result in revising the qualified life estimate, replacement of a portion of the cable, rerouting to avoid the localized hot spot, or other modification to address this localized effect. Further, as dictated by the licensee's corrective action process, the licensee would take appropriate actions to prevent recurrence.

Accordingly, as indicated during the May 7 meeting, industry practices for establishing and maintaining qualification, including the application of corrective action practices for non-conforming conditions such as localized "hot spots," provide a high level of confidence that licensees correctly interpreted the term "average" and appropriately factored cable service temperature information into the industry survey responses. As such, NEI does not plan to reissue the industry survey.

As for the second question, the survey results contained a discussion of the technical basis for choosing the 60 C threshold. NEI noted at the May 7 meeting that the temperature versus lifetime curves for the 50 C threshold used in the earlier NRC research were derived using a different activation energy, 1.04eV versus 1.15eV. Following the meeting, the NRC research results were recalculated by NRC staff using 1.15eV and found to be reasonably close to the curves used for the 60 C threshold. The NRC also agreed that 1.15eV was a reasonable activation energy value for this Okonite cable. Accordingly, your staff has advised me that this question is resolved.

Please contact me at (202) 739-8080, am@nei.org or John Butler at (202) 739-8108, jcb@nei.org if you have any further questions.

Sincerely,

Alex Marion

AM/maa

C: Mr. Michael. E. Mayfield, U. S. Nuclear Regulatory Commission
Mr. Jose A. Calvo, U. S. Nuclear Regulatory Commission
Mr. Cornelius F. Holden, Jr., U. S. Nuclear Regulatory Commission