UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
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NRC REGULATORY ISSUE SUMMARY 2002-11
REQUALIFICATION PROGRAM TEST RESULTS FOR OKONITE OKOLON SINGLE-CONDUCTOR BONDED-JACKET CABLE (FOLLOWUP TO REGULATORY ISSUE SUMMARY 2000-25)

ADDRESSEES

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) as a followup to RIS 2000-25, "Potential Deficiency in Qualification of Okonite Single-Conductor Electrical Control Cables," to notify addressees of the requalification of Okonite's 1/C #12 AWG EP(Okonite) CSPE HYPALON (Okalon) bonded composite cable used for instrumentation and control (I&C) applications in nuclear power plants. This RIS summarizes the results of Okonite's recent requalification test program. This RIS does not transmit any new requirements or staff positions. No specific action or written response is required.

BACKGROUND

In 1998, to support the resolution of Generic Safety Issue (GSI) 168, "Environmental Qualification of Low-Voltage I&C Cables," the NRC sponsored cable test research at Wyle Laboratories. In late 1999, Okonite Okolon 1/C #12 bonded-jacket cable failed in a loss-of-coolant-accident (LOCA) test (Test #5). The results of this test are discussed in detail in NUREG/CR-6704, "Assessment of Environmental Qualification Practices and Condition Monitoring Techniques for Low-Voltage Electric Cables." After learning of the test results, the NRC held a series of public meetings with the Okonite Company and the nuclear industry. In addition, the Nuclear Energy Institute (NEI) conducted a survey to determine how many plants have this cable installed in a 60°C or hotter service environment. After the survey, the Okonite Company requalified the cable. The Okonite requalification test program was conducted at Wyle Laboratories.

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DISCUSSION

Wyle Laboratories tested Okonite's 1/C #12 AWG EP(Okonite) CSPE Hypalon (Okolon) bonded composite cable in accordance with the standards in IEEE Std 383-1974, "IEEE Standard for Type Test of Class 1E Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations." The test program was also designed to provide data applicable to the 40-year aged condition, based on accelerated aging of the cable.

In the test program, 38 cable specimens were thermally aged and irradiated to represent 19 different aging conditions ranging from *no thermal aging plus 200 Mrad* to *300 hours at 150°C plus 200 Mrad* and *350 hours at 150°C plus 100 Mrad*. The cable specimens were then subjected to a simulated 30-day LOCA high-energy-line break accident profile and to post-simulation dielectric tests. All of the test specimens aged for *225 hours at 150°C plus 200 Mrad* and *300 hours at 150°C plus 100 Mrad* or less performed adequately during the LOCA simulation and passed the IEEE Std 383-1974 post-LOCA mandrel bend dielectric test. These specimens are considered to be fully qualified to IEEE Std 383-1974. Most of the remaining, more severely aged specimens showed evidence of the LOCA-induced longitudinal splitting observed in the NRC-sponsored testing of this cable (See Regulatory Issue Summary 2000-25).

Based on the results for of this testing program, Okonite has established an Arrhenius activation energy of 1.24eV for 1/C #12 Okonite Okolon cable. Calculations using this activation energy and the successful thermal aging conditions in the test program (225 hours and 300 hours at 150°C) extrapolate to a 40-year qualified life at 75°C and 77°C, respectively. Additionally, calculations based on the thermal aging for 225 hours and 300 hours at 150°C extrapolate to a 60-year qualified life at 71°C and 74°C, respectively. The original Okonite qualification report, NQRN-1A, qualified the cable at 90°C for 40 years of operation based on 504 hours of thermal aging at 150°C plus 200 Mrad.

The requalification test results are documented in the Wyle Laboratories test report NEQ 46120-1, "Nuclear Environmental Qualification Test Report of Okonite Okolon Cables" (ADAMS Accession No. ML020320170).

SUMMARY OF ISSUE

The Okonite Company sent the results of the requalification test program at Wyle Laboratories to all of its customers on May 24, 2002. Based on the previously conducted NEI survey and the subsequent actions taken by the Okonite Company to requalify this cable and notify its customers of the test results, the NRC considers these combined actions to be an adequate basis for closing this issue. Furthermore, a new record of qualification has been established for this type of cable, satisfying the requirements of 10 CFR 50.49.

The generic implications for similar Okonite cable of different wire gauges, similar cable from other manufacturers, and similar multiconductor cable of all manufacturers are outside the scope of this RIS and are being addressed in the continuing resolution of GSI-168.

BACKFIT DISCUSSION

This RIS requests no action or written response. Consequently, the staff did not perform a backfit analysis.

***FEDERAL REGISTER* NOTIFICATION**

A notice of opportunity for public comment was not published in the Federal *Register* because this RIS is informational.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not request any information collection.

If you have any questions concerning this RIS, please contact the person listed below.

/RA/
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