DUKE POWER COMPANY
P.O. BOX 33189
CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PRESIDENT
NUCLEAR PRODUCTION

TELEPHONE
(704) 373-4531

April 18, 1984

Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street NW, Suite 2900
Atlanta, Georgia 30303

Subject: McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
LER/RO-369/83-85 and 370/83-50

Dear Mr. O'Reilly:

My letter of October 14, 1983 (supplemented by my letter of October 27, 1983) submitted Reportable Occurrence Reports RO-369/83-85 and 370/83-50 which dealt with a potential deficiency of seals at conduit connections to safety-related equipment located in harsh environments. Consistent with the corrective actions stated in the submittal, a full environmental qualification test program inclusive of thermal and radiation aging was performed for the chosen moisture intrusion preventative sealant, Dow Corning RTV 3145, to envelope a 40-year qualified life for all Duke Power applications (i.e., Oconee, McGuire, and Catawba Nuclear Stations). This letter discusses the results of analyses concerning environmental qualification of connections and updates the corrective actions stated in the original submittal.

Based on Dow Corning Radiation Testing for Dow Corning RTV 3145, Duke Power is confident that the RTV can provide an environmentally qualified short term seal. Dow Corning data shows that RTV 3145 maintains its strength and elongation properties with substantial margins at radiation exposures of approximately 20 megarads, substantially below the test level of 200 megarads. This correlates to a qualified life of five years' normal operation with approximately four days post LOCA for Duke Power inside containment applications. In that containment spray is terminated at the end of one day post LOCA, and since there is only a short term pressure spike (Note: The spray and concurrent pressure are the primary forcing functions that contribute to moisture intrusion), it is Duke Power's judgment that ample margin exists in the ability of the RTV to maintain an adequate moisture barrier throughout the primary period of concern for the postulated containment profile. By the time (i.e., approximately four days post LOCA) that the cumulative radiation dose approaches the threshold value to cause RTV degradation, the containment environment has returned to conditions that should not subject components to significant moisture intrusion.

With respect to long-term seal qualification of Dow Corning RTV 3145, the Duke Power Company Environmental test profiles were very conservative compared to specific application requirements on a station and device basis. Some moisture intrusion was detected during this testing which resulted in the test being inconclusive in regard to the ability of the RTV to provide an acceptable long-term seal for specific applications. The moisture intrusion is attributed to the effects of high radiation (i.e., normal aging plus one year post LOCA dose).

In review of the Dow Corning temperature qualifications for RTV 3145 (i.e., qualified to 482°F long-term exposure), Duke Power has determined that the RTV is fully qualified for outside containment use. This analysis consisted of reviewing the postulated conditions in relation to the physical characteristics and limitations of the silicon elastomer inclusive of the results from Duke Power preliminary testing.

Per the corrective action plan outlined in the October 14 and 27, 1983 submittals, Duke Power has applied Dow Corning RTV 3145 to the conduit fittings of all equipment of concern in McGuire Units 1 and 2. Based on the analysis provided above and in the previous submittal, Duke Power finds Dow Corning RTV 3145 to be an acceptable short-term method of sealing components located inside containment and fully qualified for long-term use outside containment. Duke Power plans to upgrade the conduit/cable seals of affected devices located inside containment using Scotchcast 9 epoxy resin in a sealing configuration fully qualified for long-term use in harsh environments. This planned sealing method involves placing individual conductors through a stainless steel male hex nipple potted with scotchcast 9 epoxy resin. The nipple is installed into the device, with a condulet installed on the nipple. The cable is terminated and spliced to the conductors (using raychen heat shrink inside the condulet).

The installation schedule for the upgrade modifications discussed above is as follows:

Unit 1 - Prior to start-up following the second refueling outage.

Unit 2 - Prior to start-up following the first refueling outage.

This schedule provides sufficient time to prepare and distribute necessary revisions to installation specifications, assemble materials and equipment, and assemble and train installation personnel.

Very truly yours,

H. B. Tucker

Hal B. Tucker

PBN:glb

cc: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

Mr. W. T. Orders
NRC Resident Inspector
McGuire Nuclear Station