UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

AMPACITY DERATING ISSUES

VIRGIL C. SUMMER NUCLEAR POWER STATION

DOCKET NO. 50-395

1 BACKGROUND

By letters dated March 29, 1996, June 20, 1996, and March 27, 1997, South Carolina Electric and Gas Company submitted its response to the October 6, 1995, NRC Request for Additional Information (RAI) related to cable ampacity due to application of Thermo-Lag fire barrier for Virgil C. Summer Nuclear Power Station (VCSNPS). The licensee concluded that they would eliminate Thermo-Lag 330-1 fire barriers installed at the facility for Appendix R related electrical circuits, replacing them with an alternative means of protection. In a February 2, 1998, letter, the licensee indicated that they completed their Thermo-Lag resolution effort. The staff's evaluation of the ampacity derating methodology for VCSNPS follows.

2 EVALUATION

The licensee indicated that they eliminated the Thermo-Lag 330-1 electrical barriers installed at the facility for Appendix R related circuits through replacement with an alternative means of protection as described below:

Cable Tray 3088 & Conduit XX-7177A

The licensee indicated that they removed the Thermo-Lag 330-1 fire barrier on Cable Tray 3088 and Conduit XX-7177A. The Appendix R required circuits within the protected portions of this raceway were replaced with 1-hour fire-rated cable. On August 23, 1996, the licensee determined that four circuits (EMC83A, ESE31A, ESE32A, and ESE33A) in Cable Tray 3088 were required to support Appendix R requirements. Also, the licensee determined that three other circuits (DGE4A, DGE14A, and DGE32A) in Conduit XX-7177 were required to support Appendix R functions. The licensee eliminated the Thermo-Lag 330-1 fire barrier from the conduit and used fire-rated cables for the three required circuits in Conduit XX-7177A. The licensee indicated that using Rockbestos Firezone R rated cable assures operability of the required "A" train safe shutdown cables located in Cable Tray 3088 and Conduit XX-7177 during and after exposure to the fire.

Enclosure

On the basis of its review, the staff finds that the licensee has adequately resolved the ampacity derating issue due to Thermo-Lag 330-1 barriers by removing the fire barriers completely, and by replacing the existing cables with Rockbestos Firezone R rated cables for the Appendix R required circuits.

Nuclear Instrumentation (NI) Boxed Enclosure

The licensee indicated that they eliminated the Thermo-Lag 330-1 fire barrier on the NI Boxed Enclosure. The licensee indicated that the Appendix R function for the NI circuits can be adequately performed through alternative means. Ampacity related concerns do not apply to this enclosure since it contains only instrumentation circuits.

On the basis of its review, the staff agrees that the licensee has adequately resolved ampacity related concerns for the subject enclosure as identified by GL 92-08, since it contains only instrumentation circuits.

Conduit VUL21A

The licensee removed the Thermo-Lag fire barrier material and constructed a fire rated gypsum board enclosure around conduit VUL21A. The licensee indicated that the new enclosure consists of two existing 3-hour fire rated concrete walls (south and east) and two new 1-hour fire rated gypsum board walls (north and west). The existing concrete floor is 3-hour fire rated. The licensee installed a new 1-hour fire rated, gypsum board ceiling to complete the enclosure. The licensee also sealed all penetrations into the enclosure in a manner to maintain the fire ratings identified above. The construction of the enclosure is similar to accepted UL listed designs. The licensee evaluated minor variations from the UL listed designs (similarity analysis) to ensure the listed fire rating is maintained. A design calculation has been performed which evaluates and concludes that no long term cable degradation has occurred for the cables in conduit VUL21A. In addition, the licensee performed a similarity analysis to ensure adequate ampacity is available in the existing cables in Conduit VUL21A with the new enclosure installed as described above. The licensee contends that the Thermo-Lag fire barrier provided for conduit VUL21A is not within the scope of, or required for, compliance with GL 92-08, Appendix R to 10 CFR Part 50, or Regulatory Guide 1.75.

On the basis of its review, the staff finds that the licensee has adequately resolved the ampacity derating issue due to Thermo-Lag by removing the Thermo-Lag fire barriers and by constructing a fire rated gypsum board enclosure around the Conduit VUL21A.

The staff did note that the previous licensee calculation provided in its March 29, 1996, submittal used a watts/ft method to determine the ampacity derating for the subject Thermo-Lag fire barrier. The staff has determined that there are several fundamental flaws using the watt/ft method. No further action is necessary, given that the licensee has abandoned using the watts/ft method.

3 CONCLUSION

On the basis of its review, NRC staff concludes that there are no ampacity derating concerns as identified by GL-92-08 at VCSNPS.

Principal Contributor: A. Pal