

September 12, 2005

Mr. Jeffery Archie
Vice President, Nuclear Operations
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
Post Office Box 88
Jenkinsville, South Carolina 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR PLANT — REQUEST FOR ADDITIONAL
INFORMATION REGARDING INSPECTION REPORT UNRESOLVED ISSUE
(TAC NO. MC6951)

Dear Mr. Archie:

The Nuclear Regulatory Commission (NRC) staff is reviewing an unresolved issue (URI) documented in NRC Inspection Report 05000395/2004009, dated December 22, 2004. The URI, 05000395/2004009-02, "Tornado Missile Vulnerabilities of Outdoor Components," is documented in section 2.1.12 of the report. On the basis of our review of this issue to date, we find that we need additional information as identified in the enclosure.

This RAI was discussed with Mr. Robert Sweet, and others on your staff, on September 7, 2005. Please contact me if you have any questions.

Sincerely,

/RA SMonarque for/

Robert E. Martin, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-395

Enclosure: Request for Additional Information

cc : See next page

REQUEST FOR ADDITIONAL INFORMATION

INSPECTION REPORT UNRESOLVED ISSUE 05000395/2004009-02

RELATED TO TORNADO MISSILES

VIRGIL C. SUMMER NUCLEAR PLANT

1. Section 3.5.1.4 of the Final Safety Analysis Report (FSAR) for the V. C. Summer Nuclear Station (VCSNS) states that the total probability of a missile impacting exposed length of the emergency diesel generator exhaust pipe is less than 10^{-7} per year. Therefore, no missile protection is provided. However, the FSAR does not indicate how that probability was calculated. Available records do not indicate that the Nuclear Regulatory Commission (NRC) staff had evaluated the VCSNS methodology for these calculations. Please provide information describing the methodology for the calculation of this probability that supports the conclusions of the VCSNS FSAR.
2. The equation located in section 3.5.1.4 of the FSAR calculates the total probability per year of a tornado-generated missile reaching and passing through a Seismic Category I (Category I) structure opening, and impacting any critical components located inside. In its application of the total probability equation to components located outdoors (see 1993 Calc. No. DC03380-001, *Adequacy of Control Room Intake Missile Shields to Protect Chilled Water Expansion Tanks*),¹ the VCSNS analysis concluded that the acceptance criteria were met because the missile inlet area of the expansion tank barrier was smaller than the maximum allowable target area (~196 ft²). It is not clear to the NRC staff how the acceptance criterion accounts for the cumulative probability of damage to the critical components that are located outside of Category I structures since the equation calls for a summation of impact probabilities for all openings in Category I structures, and by extension, all externally located critical components.
3. In VCSNS's application of the total probability equation to the chilled water expansion tanks, the probability of an object maintaining an orientation inside the tornado which exposes its maximum cross-sectional area to the full force of the wind (P3) is assumed to be 0.1. However, the probability that a missile impacts a target located outside of a structure is not a function of its orientation. Please, provide an explanation that justifies the assumption for P3.
4. The equation described in Section 3.5.1.4 of the FSAR calculates the total probability for impact to critical components per year per missile. This in itself does not take into account the impact probability based on multiple potential missiles generated by the design basis tornado. Please provide your rationale in assessing the adequacy of the acceptance criteria for providing missile protection to critical safety-related components either inside or outside Category I structures.

¹ A copy of this calculation may be found at ADAMS ML052130469.

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